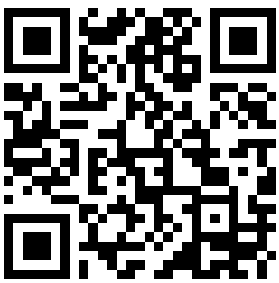

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y. JANUARY 1922

NUMBER 1
VOLUME 21

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AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

VOLUME 21 | JANUARY, 1922 | NUMBER 1

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BUFFALO, N. Y., U. S. A.

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"OUR JOURNAL" AND RISING COSTS

Most of "Our Folks" have shown their sincere appreciation of the matter of which we speak here, but it is such an outstanding fact that we must mention it at this time.

Ever since the establishment of "Our Journal" in 1901 the subscription price has been the same—ONE DOLLAR per year. Through all the years—just twenty of them—we have maintained the same price. During the hard, up-hill climb to secure recognition of a centuries old craft, during the first years of ambitious effort to bring the practical help and information so much needed by the rank and file of the good old craft if it were to succeed as it deserved, "Our Journal" was priced at a minimum figure. And the practical craftsman was indeed short-sighted who could not see the advantages which would be his if he read, studied and followed the teachings of it's wise counsel. And all during the years after its firm establishment in the shops, minds and hearts of those who have since become known as "Our Folks" the paper has continued to be known as "The Biggest Dollar's Worth that Goes into The Shop".

And during recent years—the years during and since the Great War—when prices were inclined to be out of proportion and when wage demands were generally unqualified hold-ups—"Our Journal" has still continued to give increased value for the one little dollar. And this too, in spite of the fact, well known by all of us, that the dollar of today is pretty small change based upon its buying power of a few years back.

As we stated in the opening sentence—most of "Our Folks" have already shown their sincere appreciation of this policy of price maintenance and in a most substantial way—by sending their renewals promptly. And it is for this very reason that we wish to mention the matter of price at this particular time. If you have received notice of your expired subscription, renew promptly. It will aid us very materially in enabling us to give you the service you want and appreciate. We are very glad indeed to be able to continue at the same price and it is really the loyal and prompt support of "Our Folks" that enables us to do so.

We take this opportunity to thank all of you good folks for this loyalty and to remind the few who have overlooked the matter of the sacrifices we have had to make in order to continue at the old price, that the most impressive way they can take to show their appreciation is to send in their renewals the same day they get their notice.

If you have any doubts as to how you stand on our books ask the Subscription Department. They will be glad to hear from you.

Contents January 1922

THE NEW ARTICLES ON TIRE REPAIR WORK

This month starts another new series of articles—Standard Tire Repair Shop Methods. These articles will be found of extreme practical value to all of our readers as they will go into detail on all matters connected with tire repairing. The illustrations will show exactly how the various steps in the work are accomplished so as to make each and every operation clear and easily understood. The illustrations are used by courtesy of the Firestone Tire and Rubber Company.

SUBSCRIPTION AGENTS

DO NOT give money to any agent or representative unless you know who he is. There are many unauthorized agents and unscrupulous collectors representing themselves as agents and collectors for "Our Journal" and we wish to warn every one of "Our Folks" against them. Do not under any circumstance give them any money unless you know them. If there is any doubt send your money and orders direct to Buffalo, N. Y.

Autos, Trucks and Tractors on Farms of United States

This table refers to motor vehicles on Farms only. It does not include the large number of motor vehicles in rural communities which are owned and operated by persons other than farmers.

Section	Tractors	Trucks	Autos
New England	2,397	8,119	44,754
Mid-Atlantic	14,140	22,011	164,939
South-Atlantic	11,254	15,787	200,193
East-North-Central	58,092	26,074	550,858
East-South-Central	5,404	5,153	86,141
West-North-Central	97,890	33,375	693,182
West-South-Central	19,892	9,455	184,275
Mountain	17,513	7,589	98,727
Pacific	19,557	11,606	123,533
	246,139	139,169	2,146,512

Does This Table Mean Anything to You?

With the ever increasing use of motor vehicles in the rural districts an ever broadening field of activity for the general shop is certain. The present year will find more auto, truck and tractor work in the shops of "Our Folks." They will sell more accessories, parts and supplies. And lots of automobile owners are going to have the "old bus" over hauled and repaired rather than buy a new car.

Are you ready for the autos, trucks and tractors that will start toward your shop with the first signs of spring? How is your equipment? Machines and tools in ship-shape ready for immediate use? Look over your stock of supplies, parts and accessories. Order needed items now—Plan to increase your line—The present year will be bigger than any you have had.

The Above Compilation of Motor Vehicle Statistics Means More Business for "Our Folks"

Standard Tire Repair Shop Methods

How to Repair Tubes and Casings, the Shop Equipment Necessary and How to Figure Repair Costs

The repairing of rubber tires has developed during the past few years from makeshift, temporary work to a scientific and dependable operation, requiring not only skill, but familiarity with the handling of rubber, its peculiarities, the relation of fabric to rubber, the means of uniting these materials by liquid rubber or cement and the proper vulcanization of the whole.

In order to determine when and what repairs are practical and to execute them in an efficient and durable manner, a knowledge of the construction of tires is necessary, and numerous conditions that enter into their use must be considered.

There are so many different methods of making repairs and such a difference in the equipment and materials employed in the work, that only recently has any attempt been made toward a standardization of tire repairs and repair shop methods.

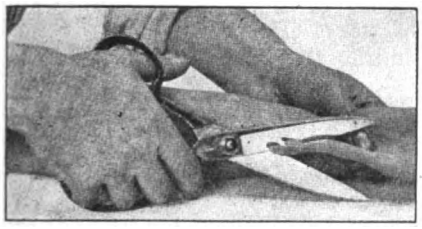


Fig. 1—THE RAGGED EDGES OF THE HOLE ARE NEATLY TRIMMED

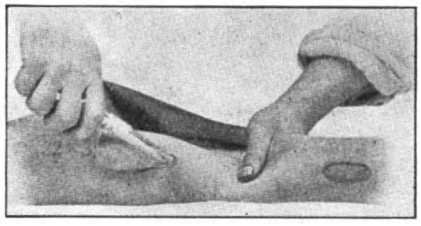


FIG. 2—HOW THE INSIDE PATCH IS INSERTED

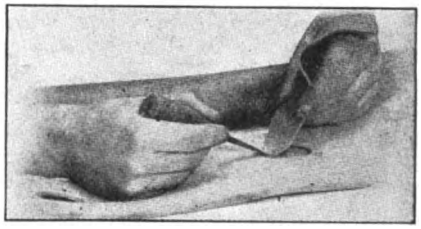


FIG. 3—THE CAVITY OVER INSIDE PATCH IS FILLED WITH GUM

In this series of articles will be shown how to repair both tubes and casings using such equipment as should be found in the average tire repair shop. The repair of tubes will be taken up first and casings will then receive proper attention.

Immediately upon receipt of repair gum and fabric, remove rolls from boxes and suspend on racks, which should be had for this purpose. Do not permit the rolls to remain in the boxes for any length of time, and do not lay a roll of stock on the floor—the weight will cause it to stick to the liner. Do not stand the rolls on end for any length of time, as repair material will wrinkle, stick to liner and be difficult to work up later.

We recommend a system for working off the old material so as to keep the stock fresh. It is a good plan to tag each roll with a number and the date received. Do not keep the repair gum and fabric in a warm place or where it will be exposed to soapstone or dirt.

If a repair gum and fabric received by you during cold months is hard and appears to be lifeless, it is an indication that same is frozen; this will not effect the stock, but before using same, it should be thawed out by leaving in a warm room awhile.

Care of Uncured Repair Gum Trimmings

The value of this material when returned to the factory, and the credit allowable, depends largely upon the condition. The gums should be kept separate and free from all foreign matter, for instance, little pieces of cured rubber, fabric, dirt, etc. We suggest that two or three galvanized iron retaining boxes with lids be secured for this purpose. These boxes should be about 18 in. long, 12 in. wide and 8 in. deep.

When returning any uncured gum trimmings to the factory, see that it is wrapped up in muslin liner or boxes, so that it will be protected during transit, and each bundle or box should be plainly tagged with the number of the gum. If two or three kinds of gum are mixed together, it is extremely difficult to separate them and reclaim to good advantage. If the bundles are not marked with the kind of gum, it sometimes causes considerable trouble to get this information, as a number of the gums are about the same color and appearance.

Repair gums and frictions for fabrics are specially compounded and require different treatment than materials used in the construction of new tires. Repair stocks must be adaptable to quick vulcanization so as not to injure the old tires, they must possess good wearing quality and, in order to keep the cost at a minimum, the specific gravity or weight must be low.

Getting Best Results from Cement

The practice of using tread, cushion and tube repair gum trimmings for making cement is to be discouraged because it is not economical and results are very uncertain. These materials are not compounded for this purpose. The cures are different and a mixture of this sort will not prove satisfactory. Honeycombing of the tread rubber during vulcanization and loosening of repairs after short service are quite often due to lack of adhesiveness or irregular cure as the result of a poor grade of home-made cement.

All uncured repair gum trimmings should be kept free from foreign matter and returned to the factory for credit, as is recommended in the foregoing paragraphs.

Best results will be obtained by using factory made cement or by ordering cement gum. This stock is made for that purpose and is not calendered. Therefore it will cut or dissolve readily in high test gasoline. The addition of a very small quantity of wood alcohol will insure quicker and more thorough dissolving of the gum. Cement should be stirred frequently and always before using.

Tube Cuts, Punctures and Small Injuries

Tubes that have been cut, punctured, pinched or similarly in-

jured, are often repaired by placing a rubber patch over the incision by means of cement, or with cement and acid curing solution; both known as cold process. A repair of this nature is often necessary in emergency, and is quite effective, but when it can be done, we recommend having the repair vulcanized. The following method may generally be applied to filling small cuts and holes.

The first step preparatory to vulcanizing a patch is shown in Fig. 1. Trim the ragged edges of rubber with scissors and make an opening large enough to permit the insertion of an inside patch. Width and length of opening depends, of course, upon extent of the injury.

All sulphur or "bloom" should be removed from inside of tube directly around the hole. This can best be done with a piece of muslin dampened with benzine. Apply one or two coats of vulcanizing cement to the cleaned parts, allowing it to thoroughly dry.

The method of inserting inside patch and showing same in position is shown in Fig. 2. It should be approximately ½" to ¾" larger all around than the hole; the sticky or uncured side placed toward the hole—the other side of patch is semi-cured to prevent adhesion to the opposite side of tube.

The method of filling cavity over inside patch with gum, until even or flush with the rubber around the repair is shown in Fig. 3. To secure a good union, it is advisable to use a very soft gum for filling in the cavity.

After the cavity has been filled and tamped firmly, trim the rough edges of new gum with a thin, sharp knife, then smooth or wash the repair with a piece of muslin saturated with benzine.

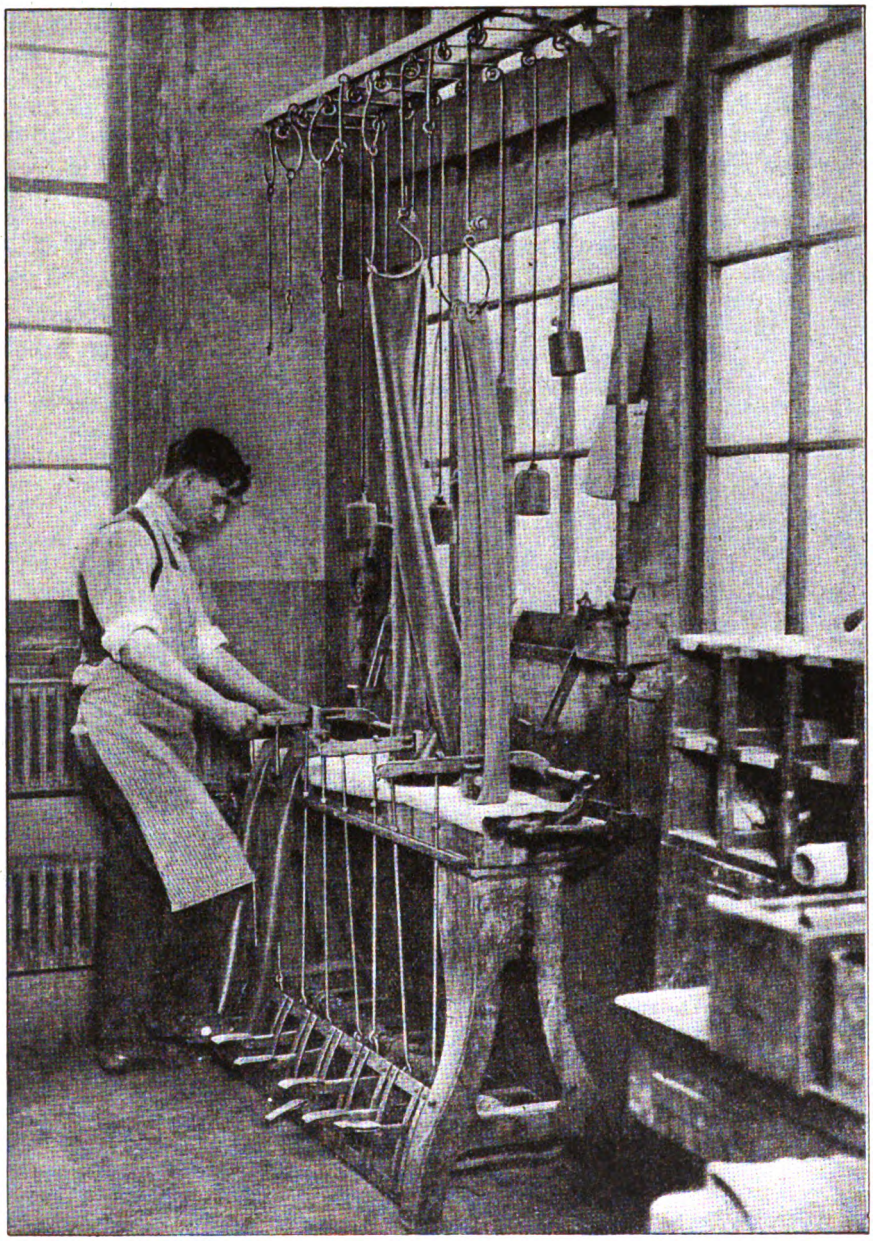


FIG. 4—HERE THE PATCHED PART OF THE TUBE IS SHOWN IN THE VULCANIZER. NOTE HOW THE REMAINING PORTION OF THE TUBE IS SUSPENDED OUT OF THE WAY

Tube Vulcanizing

Soapstone or mica should be dusted on the new gum, also vulcanizer, to prevent adhesion. Soapstone can be handled most effectively in a muslin bag; when shaken, it will be evenly distributed in about the right amount.

The patch or part to be cured should be placed on the vulcanizer and a block of wood or rubber (preferably rubber), about the same size as the patch directly above it, the arm then brought down onto block and the pressure regulated by spring tension.

Suspend the upper portion of the tubes to avoid damage by vulcanizer, and arrange to accommodate a number of tubes on the vulcanizer at one time. A simple and yet very effective means of suspending the tubes is shown in Fig. 4.

The patch should not be cured too much, or the new rubber will be hard and the old rubber affected. The new rubber should be cured just firm enough so that it will not show a slight impression from the point of a lead pencil.

When 60 lbs. steam pressure is carried, from 10 to 12 minutes is about the right time for vulcanization. If high steam pressure is carried, shorten the time; or if not convenient to carry a high steam pressure, lengthen the time.

Large Blow-Outs and Other Injuries Requiring New Sections of Tube

Large blow-outs and other injuries which cannot be patched, are repaired by cutting out the damaged portion of the tube, and inserting a new section. The sections to be inserted can often be secured from old tubes of the same size, but when this cannot be done, or the old tubes are stretched, or not in condition to be used, the new lengths of tubing for any size can be secured from the manufacturer.

The new section should be approximately 6 inches longer than the old section removed from the

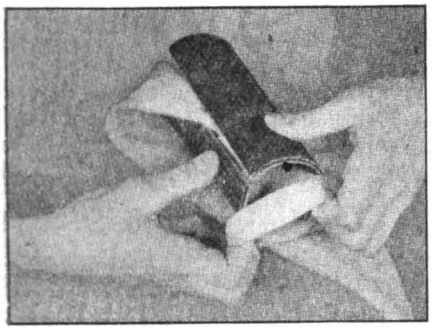


FIG. 6—ONE END OF TIRE IS PLACED OVER LARGE MANDREL

tube. This is necessary to allow 3 inches for splice at first end.

First, prepare tube for splicing by putting the ends in position on mandrels, as shown in Fig. 8, and

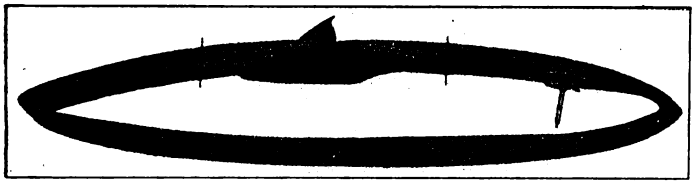


FIG. 5—A BLOW OUT SUCH AS THIS SHOULD BE REPAIRED BY INSERTING A NEW SECTION OF TIRE

use a thin, sharp knife for beveling edges—this will insure a thin, workmanlike splice.

After beveling the edges, the ends of tube on both mandrels should be buffed, 3 inches on each end, with a wire brush, or other means for roughening the surface. If the buffing is done while the ends of tube are on mandrels, care should be exercised not to buff through the rubber—it is better to remove the ends of tube from mandrels when buffing same.

After the ends of tube have been beveled, buffed and placed in position on mandrels, as shown in Fig. 8, then apply one heavy coat or two light coats acid cure splicing cement. Allow the cement to dry thoroughly—this can be determined by its tackiness to the touch.

Before Joining, Be sure That Tube Is Not Twisted

Apply tube splicing acid to cemented ends of tube, with a wide, soft brush, afterwards quickly transferring the end of tube on female (large) mandrel to the end of tube on male (small) mandrel.

Immediately wrap the spliced ends with strips of muslin or strips of inner tubing. From 15 to 20 minutes is sufficient time for the tube splicing acid to form a good union.

After unwrapping, remove tube through slots in mandrels.

Repeat operation for other splice.

Acid cured splices will not loosen, are not affected by heat from the tire, and on this account have a decided advantage over the old method of splicing with cement only—the cold process. If the splice doesn't cure together well, it is an indication that the splicing has not been done quickly enough after applying the tube splicing acid or that certain solvents in the tube splicing acid have evaporated. To avoid this latter trouble, the tube splicing acid should be kept in a glass bottle, jug or earthenware vessel, and tightly corked when not in use.

Things to Observe After Repairing Inner Tubes

The washers on valves should be screwed down tight at the base, so that they do not leak.

Plungers or valve insides should be inspected, and if worn, it is advisable to replace them.

There are generally two lengths of valves used with inner tubes. The short valves are used when the tires are applied to Regular Clincher or Quick Detachable rims, and the long or extension valves when the tires are used on Demountable rims.

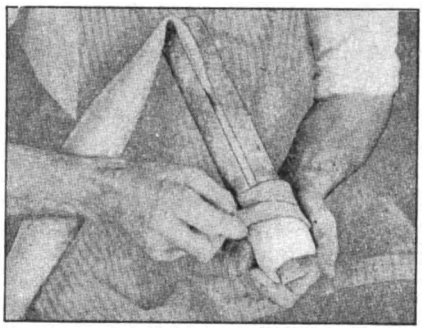


FIG. 7—THE OTHER END OF THE TIRE IS PLACED OVER THE SMALLER MANDREL

Inflate tube, testing it in water, to discover any small leaks that may have been overlooked during the repairs.

Valves should be fitted with dust caps.

Cutting Repair Gums

When unrolling gum for cutting, loosen it from the muslin liner on which it has been rolled. Do not cut or damage muslin liner—keep it clean and in good condition, so that same can be returned to the factory for credit.

In quite a number of shops, the repair gums are worked up by being cut across the table, and not with the length of the roll. This is a matter that does not seem of great importance, but experiments will show that gums cut the long way, or with the length of the roll will wear better than gum cut across the roll. Rubber has a grain that may be compared with the grain in wood. When cut with the grain, it naturally is tougher and can therefore better resist the strain and pull it is subjected to by the traction of the tire.

Cutting Repair Fabrics

All fabrics, for every type of repair, should be cut on a bias in the same manner that fabric is cut for the original construction of tires. Sectional repairs that are hard and bulge, are generally a result of cutting the fabric straight with the roll.

The diagram Fig. 12 explains how to find a 45° angle on a cutting table 3 ft. wide. The same rule will apply to a cutting table of any length or width, for instance: If the table be 3 ft. 6 in. wide or 4 ft. wide, mark off the same distances on the length of the table, and by cutting the fabric from points (x) to (x), it will be on a 45° angle or bias, providing, of course, the stock is laid on the table, so that its edges are parallel with the edges of the table.

Punctures

This is a common injury, and often not serious at the outset. Unless given proper attention, however, moisture and foreign matter

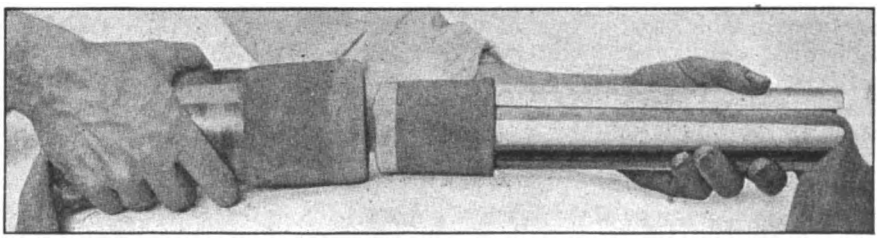


FIG 8.—THE ENDS AFTER BEING BUFFED AND CEMENTED ARE NOW PLACED TOGETHER

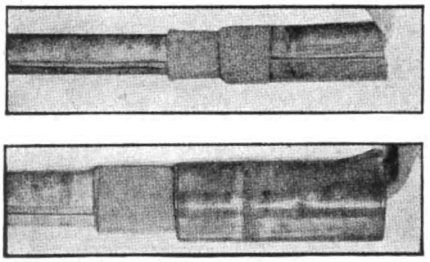


FIG. 9—(Above)—SHOWING ENDS PLACED TOGETHER
FIG. 10—(Below)—ONE END OF TUBE TURNED OVER OTHER END

will work under and loosen the tread. The ruptured fabric may, from the strain and internal pressure, continue to break, and eventually blow out. It is therefore advisable to take care of an injury of this kind promptly, by filling in any cavity or gouge in the rubber tread, also protect the ruptured fabric on the inside by removing one or two thicknesses of fabric, depending upon the size of the break. While not always absolutely necessary, the repairs will be more dependable if vulcanized.

For quick emergency repairs to tires punctured, or developing

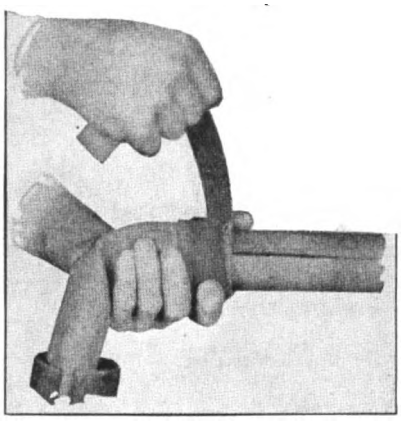


FIG. 11—THE SPLICED ENDS ARE NOW WRAPPED WITH MUSLIN

small blow-outs, durable emergency inside patches and outside sleeves or boots have been designed as shown in illustration Fig. 13 and 14. A well equipped repair station should carry a few of the standard sizes.

Surface or Tread Cuts

Small cuts in the rubber tread are unavoidable, and if neglected, moisture and grit will work through the tread rubber to the fabric breaker strip, and quite often to the fabric body or carcass, destroying the adhesive properties, causing decay to the fabric, and resulting in separation, blow outs and other annoying developments.

For temporary protection, a rubber filler may be used. This can be tamped into small cuts and punctures. After being exposed to the air for a short time, this specially compounded rubber vulcanizes from its chemical constituents—no heat or acid being required.

The most effective way of repairing these injuries is to buff the several cuts, as shown in Fig. 15, with a rasp. Apply a coat of vulcanizing cement, and after it has dried for about an hour, apply a second coat. Fill in with tread gum, and trim edges of new gum so that repair will be smooth and even with the old rubber around it.

Repairing Blow-Outs

There are various methods of repairing blow-outs, but only the two most commonly employed will be explained here.

The Inside Method

Illustration Fig. 16 shows the manner of stepping down the old fabric on the inside around the injury.

The methods on cord and fabric tires vary only in the manner of removing the plies and in the number of plies removed.

Fabric plies are removed in strips while the cord plies are removed by loosening the ends of a few cords at a time and removing them with the pliers. On fabric tires steps ¾ inch to 1 inch should be allowed. On cord tires the steps should be from 1 inch to 1½ inch wide.

The number of plies or thicknesses to be removed depends upon the size of the tire:

Remove 2 plies from 3½ inch and 4 inch fabric tires.

Remove 3 plies from 4½ inch fabric tires.

Remove 4 plies from 5 inch fabric tires.

Remove 3 plies from 3½ inch and 4 inch cord tires.

Remove 4 plies from 4½ inch and 5 inch cord tires.

The fabric directly around the injury should be beveled or skived to a thin edge.

Apply a coat of vulcanizing cement, allowing it to dry for about an hour. Then apply a second coat, and after it has dried until tacky or sticky to the touch, fill in the depression with one or two plies of gum, afterward placing the fabric patch in position.

The patch should consist of the same number of plies as were removed, and its stepped up plies should correspond with the stepped down plies of the old fabric or cord plies. If the tire being repaired is of the cord type, cord rebuilding fabric should be used; if it is of the fabric type, the ordinary rebuilding fabric should be bareback or unfrictioned on one side. Whether on a cord or fabric tire the patch should extend 3 inch or 4 inch beyond both ends of the patch underneath, as shown in Fig. 17. This will give the material a better purchase and insures stronger reinforcement.

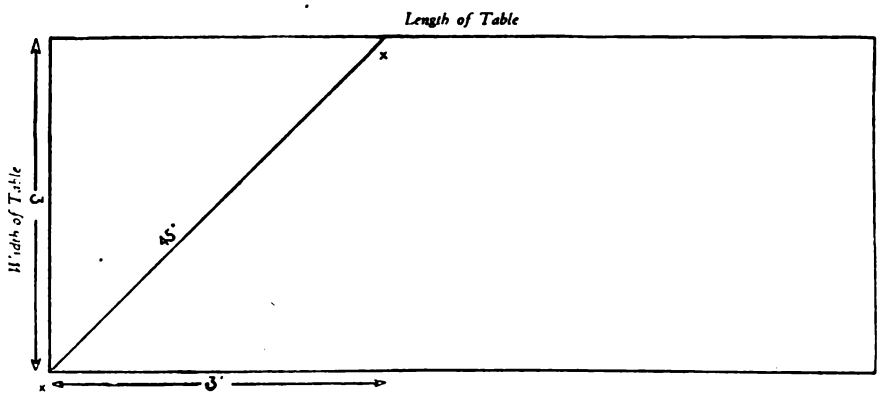


FIG. 12—HOW TO MEASURE FOR A 45° ANGLE ON A THREE-FOOT CUTTING TABLE

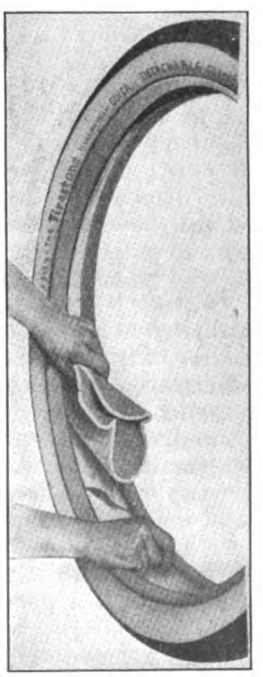


FIG. 13—THE INSIDE BLOWOUT PATCH FOR EMERGENCY USE

It is not necessary to remove any of the old material from the outside of the tire, or apply any new material, except to fill in the punc-

cure or cut with new gum. Less material is required with this process and this is the best feature of the method.

How I Advertise My Automobile Business

H. K. JOHNS

Those of you who have read my story of "How I Got Started in

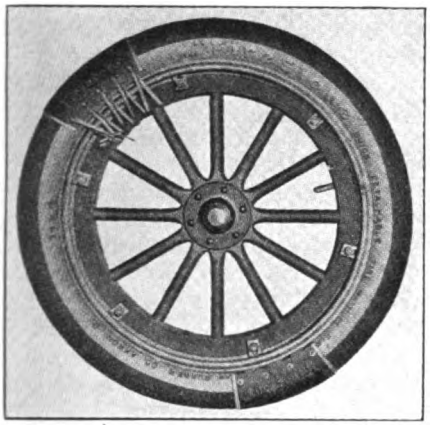


FIG. 14—OUTSIDE BOOTS FOR EMERGENCY USE ARE OF TWO TYPES

Automobile Work" must not get the mistaken idea that it was all easy and plain sailing. In my previous story, I simply told you how I got started. I did not tell you anything about the hard work connected with that start. I told you that I have built up an automobile department of which I am proud, but I said nothing at all about how that automobile department and business was built up. That is the story I intend telling you in this article.

In the first place, any man who thinks it is easy to build up a business or trade that is really worth while, had better go into some line other than that of general smithing and automobile repairing. Every reader of this article who has built up a business of any consequence knows that it is not an easy job. And every man whether in business as a proprietor or as an assistant, who has received any considerable experience in business knows that anything worth having usually costs fully what it is worth; and a trade or business worth having is no exception to this rule.

I have already told how I got started in automobile work, and as I said in my previous story, when I came to the point where I was certain I could do automobile repair work, I did not hesitate to let my customers know this fact. I

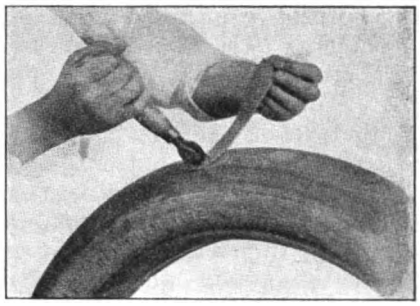


FIG. 15—SHOWING HOW SURFACE CUTS ARE TREATED

quickly realized however, that if I were to depend upon merely word of mouth advertising to build up the automobile end of my business, I would never get very far. Of course, this started things coming my way, but these hints to auto-owning customers and the suggestion that they allow me to take care of their auto repairs and service, did not enable me to build

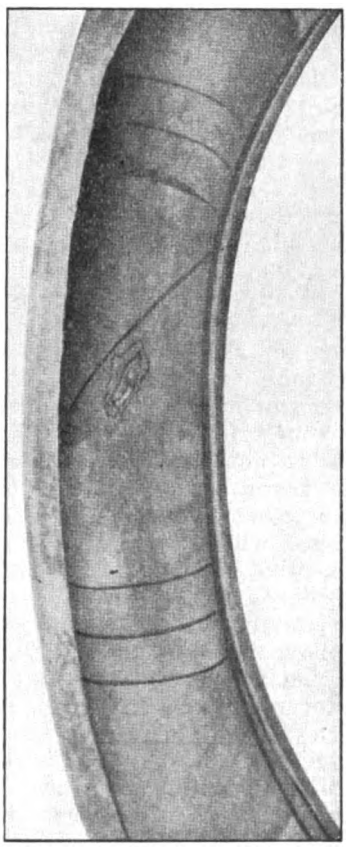


FIG. 16—SHOWING HOW INSIDE FABRIC IS STEPPED DOWN FOR REPAIR

up the trade and business which I have now.

The first step toward a systematic building up of the automobile department started by making a list of the automobile owners among my regular customers. It was later enlarged by additon of auto owners who gradually built up a card index, in which I had the name of the auto owner, the make of car, the year of manufacture, the date upon which the owner acquired the car and then such miscellaneous items of information as may apply in different cases.

To this list, I sent letters and other advertising literature from time to time depending upon the particular device or service which I wanted to announce, but always carrying some definite message, always telling of some feature of the service they may expect in my shop.

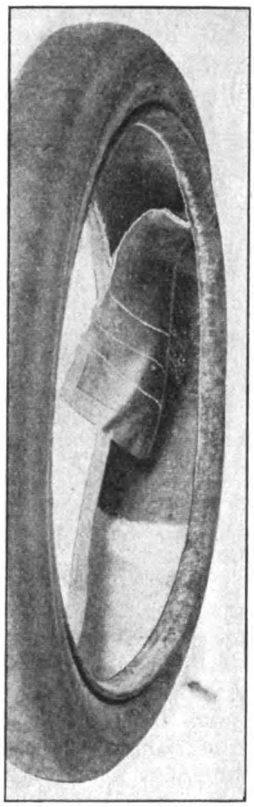


FIG. 17—THE NEW FABRIC IS SO STEPPED TO FIT INTO PLACE ON THE INSIDE

When a new auto owner moves into my district, I send him a letter just as soon as I can get his name and learn something about the car he drives. In this letter, I tell him about the service he may expect at my shop, tell him of the supplies and accessories, offer him the free use of the air and water service and tell him how willing I will be to give his work my personal attention.

As I said before, I always try to have my letters and advertising literature carry a definite message. The letter or advertising circular that talks in generality might better never be sent out at all, as in my estimation it is a waste of postage. "Begging for your Valued Patronage" and telling your prospective customers that "A trial will convince You" are the gray haired children and moss covered phrases of lazy thinkers. The average blacksmith and auto repair man is a good conversationalist. When he meets his customer face to face, he seldom is lacking for something to say in a business way. There is no reason why he

cannot say the same thing in a letter or advertising circular. Picture your customer beside you when you write him a letter. Picture his machine, beside the door of the shop, and then make your offer of repair service and intelligent workmanship in your own plain, easily understood language.

Personal letters of this kind in which you talk naturally to your prospective customer and also to your regular customer will represent your individuality and give your literature and letters a distinctive character. Such letters with an occasional mailing card. circular, or folder, will go a long way towards bringing new customers to your shop and keep them coming.

Another means of advertising the shop are road signs which I have used to excellent advantage. In fact I have posted every road leading to and from town for quite a considerable radius. These signs I do not feel have cost hardly anything as we turn them out during slack periods in the paint shop.

In connection with the use of signs on the road, I want to mention the matter which in my estimation is a most important one, and that is the upkeep of the signs that are out. It is a most common sight, you will all agree, to find advertising signs in all kinds and conditions of repair. The ordinary painted sign is good for about one year of active business producing service. After the twelve months are up however, it begins to show its age very rapidly and should then be rejuvenated or give way to a new sign. This renewal of signs we have endeavored to observe very strictly. All of the shop men are told of this sign advertising and also instructed to report any sign of ours that they may observe as beginning to show the ravages usually produced by the weather. I always make a note of reports of this kind, and when time and slackness of work permit to send one or two of the boys out in the service car to replace the weather-beaten sign. This simple stunt enables me to keep the signs always looking fresh and readable and as we produce them in our own shop, the cost of this advertising is really very little. And that it produces business, is a fact without argument.

I also make occasional use of local newspaper space especially when we have installed some new machine or have added some new part or accessory to our regular line. For example—When we added the visible gasoline measuring pump we used quite a little space in the local newspaper to tell why the visible pump was better than the old style pump. The company from whom this pump was purchased supplied the necessary electrotype picturing the pump and also the literature from which I prepared the advertising. This advertising brought quite a number of people to the shop merely to view the pump and its method of operation.

When we installed a new vulcanizer as we did some time ago, we announced the fact in the newspaper. A little matter in connection with this will interest readers of this story, and that is—Do not fail to let the Editor of your local newspaper know what you are doing from time to time. He will be glad to get the news and will also give you a little notice in reading columns telling about the new machines for the difficult jobs which you have described to him. An occasional cigar or two is also an excellent aid for getting items of this kind into the newspaper.

All of this is advertising of course—advertising as it is known by the average person, but in my estimation, the strongest factor in advertising is the way you handle the customers when they come into your shop. In my estimation, there is nothing that will react more favorable toward the shop than a general atmosphere of snap and go, when your customer or prospective customer calls on you. Let your every action show him that you are full of business—that you have business to attend to—that you are busy — but that you are never too busy to attend to his wants. People generally like to patronize a store or other business establishment that is successful. They like to go where there is an air of business, but—there is just limitation to this—if that air of business interferes with their being waited upon promptly, that very busy-ness will react on the establishment. Therefore, I say let them know that you are busy but not too busy to wait upon them promptly and properly.

And when a customer comes in with his car, make a study of the proper phrasing and wording to use in soliciting business for not only repairs and adjustments but also for the sale of parts, supplies, and accessories. Watch your customer carefully and note just when to tell him of the new spark plug which you are selling, or when he comes in for an adjustment of the bearing in some part of his car, tell him in a diplomatic way that instead of a mere adjustment, that the car or part should have a complete over-hauling. But do not suggest such larger items if they are not really required. Don't attempt to impose upon your customers in any way, for there is nothing that will injure your business or trade quicker than actions of this kind.

There are of course details and points almost without number into which we could go in a discussion of advertising the automobile department, but I have endeavored to give you simply those outstanding features, which I hope will carry other suggestions and enable you to build up a business and a service of which you may also be proud.

Keep Jack Frost Out of the Radiators

With the excellent and very complete article in last month's issue on anti-freeze mixtures for the cooling system it would seem unnecessary to say another word on the subject, but it is impossible to say too much on the matter, therefore this short summary on the subject.

Radiators and cooling systems are not troublesome in the summer time but they do require considerable attention in cold weather. The wise operator will use an anti-freeze mixture as a circulating medium.

The most common is calcium chloride, or common salt. The freezing point of a saline mixture varies from 22 degrees above zero for 10% salt to 18 degrees below zero for a 25% solution.

Some operators use kerosene as a cooling medium and while it does well in gas engines with a complete metal circuit, still in automobiles and tractors which sometimes have rubber connections, it is likely to be injurious. It also has a tendency to seep through joints and gaskets and deposit a film of an inflammable material on the exterior of the engine, which increases the fire danger.

A mixture of alcohol and gly-

cerine is the best anti-freeze mixture. Alcohol does very well when used alone with water, but the glycerine acts as a retardant upon the rapid evaporation of the alcohol. With one part of the alcohol-glycerine mixture to six parts of water, the freezing point is lowered to 22 degrees fahrenheit. A 35% solution of alcohol-glycerine in water has a freezing point of 18 degrees below zero.

Oxy-Acetylene Welding in Belgium

The accompanying illustration shows a Belgian oxy-acetylene welder in the city of Brussels. The picture reveals several interesting facts, to wit: The "shop" is apparently set up in the open, much as street vendors set up stands in cities. Everything in view is portable, even to the small low pressure acetylene generator, a system that is commonly used in this country. The oxygen cylinder resembles oxygen containers in the United States and Canada only in the matter of general form, being much longer than those to which we are accustomed. The welding table, made of iron "horses" and metal sheeting, seems rather low. If there is any provision for preheating, it does not show in the picture, at least in a form recognized in America, though the character of castings in the foreground would indicate the desirability, if not the necessity, of preheat. The blowpipe is of the familiar injector type and the filler rod seems unnecessarily large. The two objects at the lower left corner are extra parts of the water-carbide generator for use in recharging so this may be done without unnecessary loss of time. It seems undebatable that a more sheltered place would conduce to better work, and it is certain that a very few added facilities would greatly improve the welder's job shop. But the picture affords an interesting example of the use of the oxy-acetylene processes, which are now employed in every part of the world. It is not assumed that this is in any sense representative of oxy-acetylene welding in Belgium; but the picture is shown merely as indicating an interesting small shop of a type unknown in our own country.

The oxy-acetylene process has in a short time become known and is used in practically every part of the world.

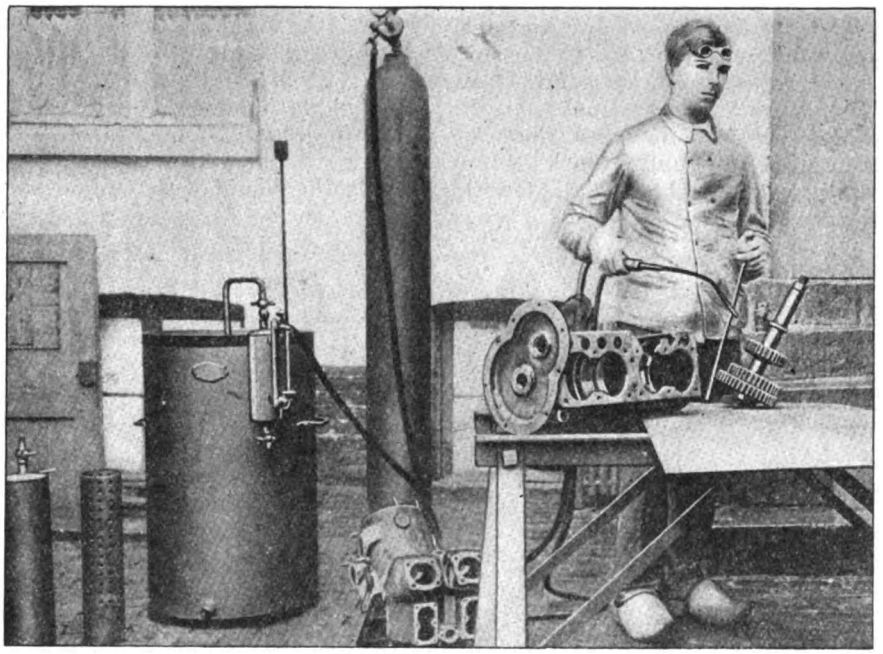
Nebraska Continues Tractor Testing

Nebraska was the first state in the Union to prescribe that tractors sold within the state should be officially tested. The Agricultural Engineering Department of the State University at Lincoln was given the job of conducting the tests. At a cost of some $30,000 the the testing plan was equipped and last year 70 tractors were given complete tests. Probably no single line of work accomplished by any state institution has been of such direct value to the entire power farming field as were the Nebraska tractor tests.

Prof. O. W. Sjogren, head of the department, advises that their tractor testing work is being continued and new equipment has been installed for further refinement of tests. Prof E. E. Bracket has been appointed manager of the tractor tests.

The Nebraska agricultural engineering department is establishing a trade school under combined government and state auspices in which practical instruction will be given in automobile engineering, carpentry and blacksmithing.

The new agricultural engineering building which was built and dedicated a year or two ago affords exceptional opportunities for investigational work, and projects have been laid out to investigate draft requirements of tillage implements, belt losses in various farm machinery and lighting plants and water supply systems.



AN OXY-ACETYLENE WELDING SHOP IN BELGIUM. THE EQUIPMENT IS OUT-OF-DOORS

A Handy Portable Forge

OLD TIMER

Having need for a portable forge at occasional intervals and having a piece of five-sixteenths boiler plate three by four feet in size I proceeded to build it myself. The plate was a piece of scrap so that the forge did not cost very much either for material or for making.

The first operation was to cut a six inch hole in the plate with the cutting torch. This hole was 12 inches from one end of the plate and about half way across the narrow dimention of the plate.

The engraving at A will show the location of the hole. After cutting this hole for the firepot the edges of it were bent down as shown at X in the side view of the forge.

The edges of the sheet were now turned up for three inches all around and a partition put in. This partition divided the sheet into a hearth about three by three feet with a coal box three by one foot.

The legs of the forge are 1½ by 1½ inch angle iron. These legs are two feet eight inches long and welded to the corners of the hearth. The braces placed as shown are ¾ by ¼ inch stock of a length sufficient to reach from the hearth end of the leg to the

floor end of the other leg on the same side. A bracket was now added for attaching the blower to the forge. To complete the forge, we added casters to the two legs at one end only. These are large casters and enable one to move the forge about wherever it is needed, by simply lifting one end of the forge and pushing it. Yet when all four legs are down it will stand rigidly in place.

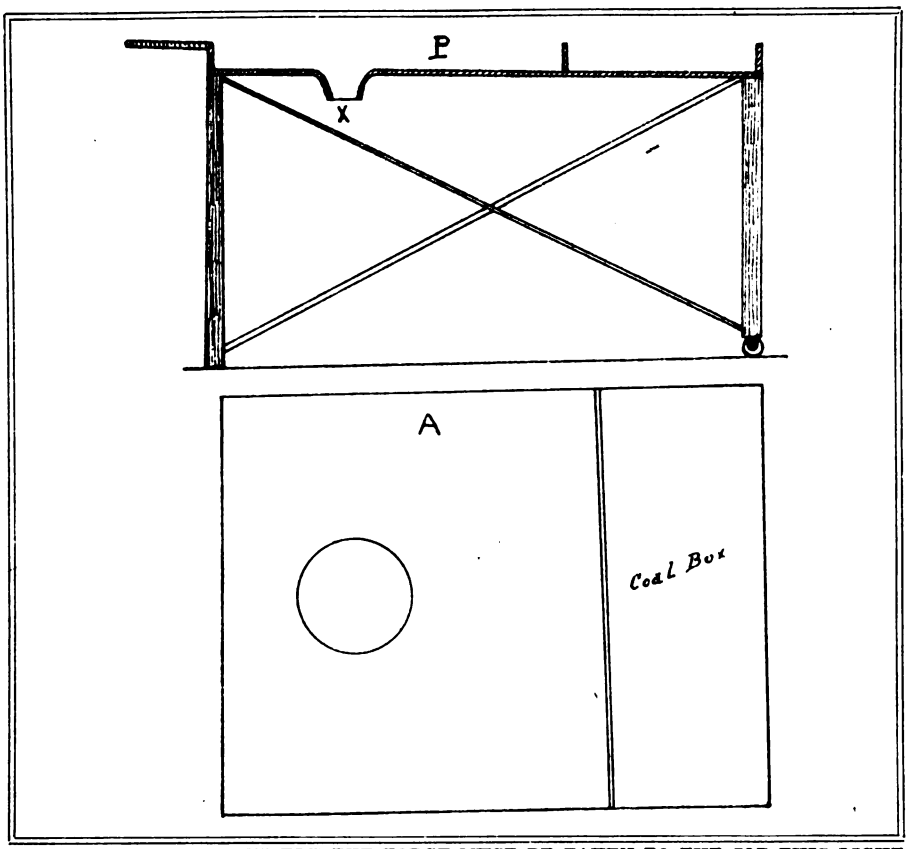
Centering Work in the Lathe

J. BOOTH IN "WORK"

To prepare a piece of material for turning appears, on casual consideration, to be the simplest of all engineering operations; but on analysis it will be seen that for even moderate quality work certain conditions must be complied with. Merely to take the piece to be so turned and to make a centre-punch depression in each end to act as bearings on which it must rotate whilst resisting the whole pressure of the cut, though it may be quick and easy, is a most certain way to ruin a lathe, the work, and ultimately the temper. Nine times out of ten such depressions will be of greater angle than the lathe centres, consequently much too great an effort must be brought to bear on the poppet handle to keep the axis of the piece from floating, and all this pressure has need to be taken on those parts of the centres least calculated to resist pressure or wear, that is, the points.

It is always found to be better to relieve the centre points of all work by drilling suitable-size holes in the ends of the piece, in which they can occupy a negative position, and at the same time take up the bearing pressure and thrust on a much stronger portion of the centre, the bearing pressure being much less per unit of area, thus offering greatest resistance to wear.

Combination double-sized drills and countersinks covering a range of sizes to meet the need of practically the whole of the engineering trade can be easily obtained, the countersinks being 60° included angle, which is the correct and most widely adopted angle for lathe and other machine centres. Sizes E and H of these drills will be found most suitable for model engineers. These sandy tools must be rotated at the correct cutting speed for the drill point, and each end of the drill must be discarded so soon as the drill point becomes so worm down as to reach the apex of the countersink cone. Given one of these tools, certain conditions must still be met if accurate work is expected or required.



FOR OCCASIONAL USE WHERE THE FORGE MUST BE TAKEN TO THE JOB THIS LIGHT PORTABLE FORGE WILL BE FOUND USEFUL

Firstly, the lathe live centre must be run true, and both centres must be exactly the angle of the countersink and accurately in line.

Secondly, the apices of the two cones made by the countersinks in the piece must cut the desired axis of revolution of the piece. This may appear somewhat vague, and will be better understood by referring to Fig. 1, which shows a short piece of relatively large diameter supported between centres. The positions of the centre depressions are, of course, shown much exaggerated on what would ordinarily obtain in practice, but serves to illustrate what will happen when either centre hole wears even the slightest amount. Fig. 1 also illustrates an analogus case to that which obtains when the poppet head is set over for taper turning, and much of the difficulty experienced in keeping a piece running true when turning an abrupt taper is thus explained.

Thirdly, the centre point must clear the bottom of the centre hole for reasons already explained.

Fourth, the ends of the pieces must be faced up, or be reasonably square with axis. Fig. 2 illustrates the reason for this. End A shows a perfectly fitting centre, but has a tendency to wear in one direction, throwing the piece out of truth in the direction of the arrow. End B shows an ill-fitting centre, a very likely condition about which comment is needless.

A well-conditioned and equipped lathe will have the headstock centre-hole running true and straight from end to end, and of the same size and taper as that of the back poppet, and moreover of some standard taper, preferably Morse. Providing the latter condition obtains, a good collection of centres can be carried, made from broken drill or machine reamer shanks.

The writer does not believe in ever hardening the live centre, but the back one must be so treated and carefully tempered.

In addition to ordinary turning centres, a hardened half-centre (Fig. 3), a hardened countersink, or square centre of the same angle as the ordinary centres (Fig. 4), and a running centre (Fig. 5), all

for use in the back poppet, will be found of great value if it is intended to cover a wide range of work. Fig. 3 is for use when end facing work between centres, Fig. 4 to clean up a worn centre-hole, or in countersinking a plain drilled hole, when a combination drill and countersink is not available, and Fig. 5 in supporting work which is bored through and for locating chuck and faceplate work.

Special live centres are not so frequently met with as are those mentioned above. Fig. 6, however, shows one which the writer has used and found invaluable for supporting and driving small pieces, where a carrier would have been very much in the way. The work to be turned, using this centre, is first centred in the usual way, and afterwards one end is saw-cut through to the depth of the countersink. The tongue on the centre engages with the jaws thus made and drives the piece.

Live centres carefully screwed to standard sizes come in very handy for facing up nuts and other tapped pieces, and are much easier to keep true and are quicker to operate than screwed mandrels.

If the mandrel and poppet spindle are bored through, the centres should be provided with a projection on the small end, reduced in diameter to take the blow of the push rod when ejecting, so that the taper proper is not damaged; in the other event of their being solid, two flats should be provided on the centres to fit a standard spanner.

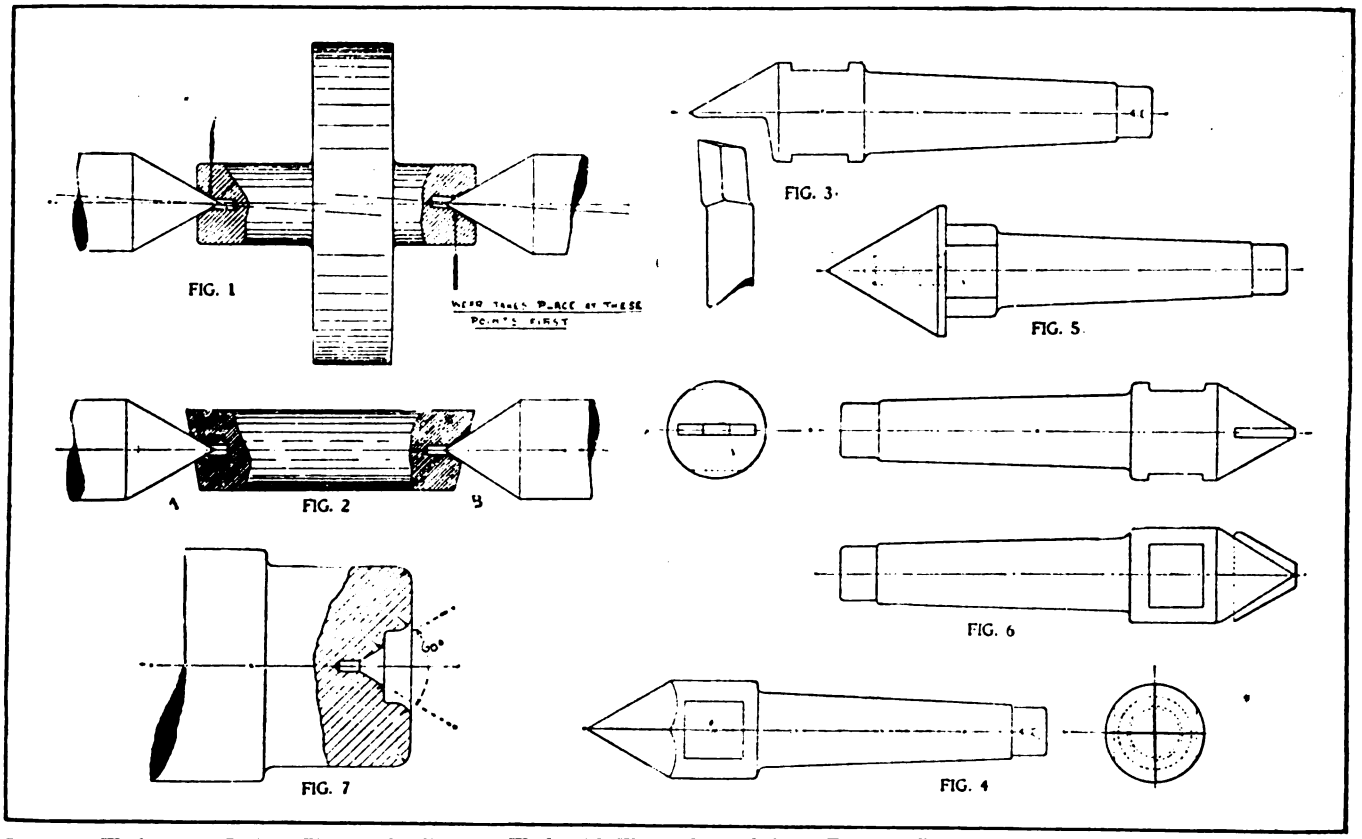
On no account hit the centres on their strides to loosen them in their sockets. This practice will spoil a lathe worse than any ordinary wear.

Fig 7 shows a form of centre depression used by the writer for hardened and ground standard turning mandrels and for screwed and plain plug gauges.

Much care has to be taken in these instances to procure accurate, lineable and hard-wearing centre-holes, especially so in the case of mandrels and where also the centre-holes must be protected against deformation by continually being pressed or driven in and out of holes. The accuracy is obtained by completely removing the centre-holes on which the original turning of the mandrel took place, and after carefully chucking true, new ones are put in. The method is first to turn out the counterbore and radius the edges, then drill the hole of the size required according to the size of the mandrel, afterwards carefully reaming and radiusing the centre proper with special centre reamers, the finishing reamer being honed up so as to leave no appreciable ridges.

The other operations being completed, the mandrel is ready for hardening, and is in essence a cylindrical piece of steel with two centre holes as near perfect as possible and that have never been used.

After hardening, the centre-holes are lapped out in perfect alignment, using copper and cast-iron laps charged with abrasive powder, and are then ground to their nominal size and taper in a rigid grinding machine on dead centres again in perfect alignment and of exactly 60° angle. The result is a mandrel that is true to all intents and purposes and which will remain true.



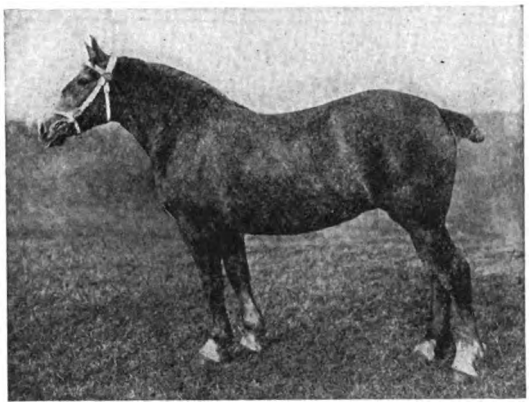
Centering Work in the Lathe. Fig. 1.—Condition of Work with Worn Centre-holes. Fig. 2.—Centre-holes Axially Correct; Ends not Faced True. Fig. 3.—Half Centre. Fig. 4.—Ordinary Centre. Fig. 5.—Running Centre. Fig. 6.—Centre with Driving Dogs. Fig. 7.—Centre Depression for Gauge and Mandels.

Horse and Tractor Sense

W. H. GARDNER

In Orchard and Farm

Editor's Note:—Here is a little verse that it will be well to read to your tractor customers. It emphasises the importance of treating the tractor with horse sense.

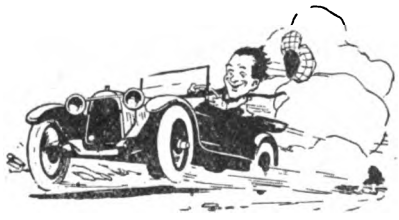


Once you had a pride in knowing
How to judge a head of stock.
You could pick the really good ones—
And you used to love to talk
Of the points that told the story—
Barrel, withers, flank and gait!
You could tell the one worth having
From the poor and lazy skate!
Mighty seldom you were cheated,
For you bought with lots of care—
And you've got to buy a tractor,
As you used to buy a mare.

Oh. you once were mighty careful
On a sultry summer's day,
Not to overwork your horses—
Not to feed 'em too much hay!
And you kept 'em under shelter
If the day was over-warm—
Tied 'em snug in side the stable
If there came a driving storm!
But your pocketbook will suffer,
And your checkbook feel remorse;
If you do not treat your tractor
As you used to treat your horse.

When you hitched up in the morning
And the mule a-limping came,
Why—you left him in the stable—
Never thought to work him lame!
If he had a touch of colic—
If you found him off his feed;
Then you let him rest and nursed him,
Never mind how bad your need!
Now, when cylinders are missin',
Fix 'em first—a worthy rule!
For you've got to treat your tractor
As you used to treat your mule!

High Spots



Business is picking up, so step on the accelerator.

Uncle Jed says: "Wouldn't this be a wonderful world if everybody lived up to their obituaries."

Old machines and discarded tools may their place, but a modern shop should not resemble a museum.

Do you guess or do you know? The first step in making a profit is to know what your costs are. If you don't know what your overhead is, you better sit up nights doing some figuring.

The largest moving van body built on an auto chassis is said to be seven feet wide, six feet nine inches high and almost twenty-three feet long. It contains sleeping accommodatons for three men and is used for long distant hauling.

Don't scoff at the suggestions of your helper. The broad minded man will learn from the most humble person with whom he comes into contact. It is our ability to judge things at their true value that enables us to get full value out of our contact with others.

A good customer is worth hanging on to. Go the limit, to serve him, and don't be afraid to throw in a few little things free for good measure. Keep all your old square-deal customers, and add a new one every now and then—you'll not need to worry about your business growing.

Singeing poultry with acetylene flame is the uncommon use mentioned by an English weekly. While this process is said to quicken the operation very materially, we would not suggest that any of "Our Folks" try it on next Sunday's dinner fowl.

A knock-down blow shows the kind of stuff a man is made out of. It's easy for anyone to smile in prosperity, but when adversity hits below the belt, it takes a real man to set his teeth, and with a smile on his lips to fight back ten times harder than ever. No man is ever licked until he admits it to himself.

"The poor workman quarrels with his tools" so ran the old proverb. A better version of the matter in our estimation is this "Poor tools make the workman quarrel with the job." Tools enable the good workman to do good work. And poor or improper tools never enable the worker to do his best.

"What's become of the chap who shrunk 'em cold?" asks a reader of "Our Journal" in a recent letter. Remember the heated discussions that took place in our columns several years ago on this very important subject of tire work? Wonder where the hot and cold adherents are now?

Old Tom Hardy is first cousin to Peter Tumbledown. And his shop looks it, too. Perhaps Tom thinks he can fool people into believing he's so busy he hasn't time to clear up the rubbish of years. But Tim Tidy's shop up the street has such an air of fresh neatness, that I don't need to be told why all the best custom seems to be attracted up there.

When a man owes you a past due bill, don't wait around hoping for him to come in and pay up. Just get him on the phone. tell him when the sum was due, explain that prompt payments enable you to give good service, and in a pleasant way pin him down to a definite day when he will pay. Then see that he gets a prompt reminder when that day comes. Of course, your bill head states on it just when your bills are payable.

How do you find business today as compared with a year ago or five years ago? Are you going ahead? Perhaps you don't know. Are you keeping a record of your business How can you tell how it is going unless you do not keep a record? And then comparative records are the best. If you do not keep such records better start in today. This is a good time of year to start in on such records. To start properly take an inventory of the shop and all equipment and then do the same each year. You cannot get an idea of your business worth unless you do.

Marshall Foch succeeded they say because he knew what he wanted to do. And there in lies the thought for a whole volume on planning the work and then working the plan. Nothing of permanent worth or desirable consequence, has ever been accomplished by haphazard activity. The motorist who runs up this, that and the other road in an effort to get somewhere MAY eventually hit some town or even the place he wants to find, but, how more efficient is the one who first knows where he wants to go and then plans his trip intelligently. And so with the shop owner—tinkering aimlessly at this, that and the other line of work half-knowing anything about any of it will lead nowhere permanently or successfully. While the the shop man who directs his efforts intelligently—determines first what he wants and then devotes all of his energies to the accomplishment of his purpose will succeed as Foch succeeded in doing what he started out to do. There is really nothing possible of accomplishment that we cannot do if our desire for doing it is strong enough.

Taking Down and Re-assembling the Storage Battery

T. A. BECKLIN

The storage battery upon which the starting and lighting of the automobile depends is one of the most important accessories on the car. While it is a complicated apparatus and depends upon chemical action and reaction for its usefullness, when its so called mysteries are explained, its complications fade into thin air and its action and work become as clear as day.

Most people, and a great many of them are repair men are under the impression that a storage battery receives and stores up the actual electricity used in charging it. This impression is no doubt due to the name given this very important automobile acessory and to, the fact that to all appearances, electrical energy is run into a battery and when required for starting or lighting purposes, it is allowed to run out again. However, the real action of a storage battery is about as follows: The charging of the battery causes certain electro chemical action between the positive and the negative plates in the presence of a medium known as battery solution or electrolyte. This does not actually store up electricity, but produces a chemical change in the plates. When electric energy is taken out of the battery it is brought about in the following manner: — A circuit is established between the elements, the active material of the plates changes back to its original condition and an electric current is generated. Thus it will be noted that a chemical process which takes place in the plates while charging, is reversed in the discharge. The plates reabsorb from the solution, the acid which was excluded during the charging thus forming a lead sulphate which is again changed into its original form in the plate when the battery is recharged, and the entire process is completed.

A starting battery does work which has never been required of a battery before. A little battery of three cells is often called upon to deliver for a few moments an amount of current equal to 2 H. P. or enough to propel a heavy electrical vehicle at normal speed.

So much for the actual action and operation of a storage battery. While this little explanation of the action of a battery is not necessary to the practical man who is undertaking battery repair work, still it is interesting to know just exactly what takes place inside the little black spot.

In order to make the terms, and phrases used in the following article entirely clear to my readers, it will be necessary for me to go over at least briefly a glossary of battery terms and explain their meaning in connection with the work.

Glossary of Battery Terms

Acid: Term frequently used to describe the liquid in cells, in place of the more correct one — **Electrolyte.** Correctly speaking the acid used in batteries is sulphuric acid and is the active element of the Electrolyte.

Active Material: The paste which fills the grid.

Ampere: The nuit of measure of quantity of electric current. (Like "gallon" in measuring water.)

Ampere-Hours: Product of amperes and hours.

Battery: Any number of cells when connected and used together.

Bridge (or rib): Wedge-shaped vertical projection from bottom of rubber jar on which plates rest and by which they are supported.

Burning: A term used to describe the operation of joining two pieces of lead by melting them at practically the same instant so they may run together as on continuous piece. Usually done with mixture of oxygen and hydrogen gases, hydrogen and compressed air, or oxygen and illuminating gas.

Cadmium: A metal used in about the the shape of a pencil for obtaining voltage of positive or negative plates. It is dipped in the electrolyte but not allowed to come in contact with plates.

Capacity: ..The rating of cell or battery

Capacity: The rating of cell or battery or time or discharge.

Case: The box which holds the cells of a battery.

Cell: Unit of storage battery practice; consists of element, electrolyte and jar.

Chareg: Passing direct current through a battery, in order to replace energy used on discharge.

Charging Rate: The proper rate of current, expressed in amperes, to use in charging a battery.

Connector: Solid or flexible part for connecting positive pole of one cell to negative pole of another, etc., or to terminal.

Cover: Cover for cell to retain electrolyte and exclude foreign matrial.

Developing: The first cycle or cycles of a new or rebulit battery to bring about electro-chemical conditions to give rated capacity.

Diffusion: Pertaining to movement of acid within the pores of plates. (See **Equalization.**)

Discharge: The flow of current from a battery through a circuit, opposite of "charge."

Dry: Term frequently applied to cell containing insufficient electrolyte.

Electrolyte: The conducting fluid of electro-chemical devices; for lead-acid storage batteries consists of about two parts of water to one of chemically pure sulphuric acid, by weight.

Element: Positive group, negative group and separators.

Equalization. The result of circulation and diffusion within the cell which accompanies charge and discharge. Difference in capacity at various rates is caused by the time required for this feature.

Equalizing: Term used to describe the making uniform of varying specific gravities in different cells, of the same battery, by adding or removing water or electrolyte.

Evaporation: Loss of water from electrolyte from heat or charging.

Forming: Electro-chemical process of making pasted grid or other plate types into storage battery plates. (Often confused with **Developing.**)

Foreign. material: Objectionable substances.

Freshening Charge: A charge given to a battery which has been standing idle, to keep it fully charged.

Gassing: The giving off of oxygen gas at positive plates and hydrogen at negatives, which begins when charge is something more than half-completed— depending on the rate.

Gravity: Common term for specific gravity.

Grid: Cast or stamped framework in which active material is retained.

Group: Any number of positive or negative plates properly joined together.

Hold-down: Device for keeping separators from floating or working up.

Jar: Container for element and electrolyte. Usually of hard rubber.

Lug: Vertical projection from grid for connecting with and burning to strap.

Mud: (See Sediment.)

Over-Charge: Continuance of charge beyond that apparently or supposedly necessary to imporve conditions of cells.

Over-Discharge: The carrying of discharge beyond proper cell voltage; shortens life if carried far enough and done frequently.

Paste: The mixture of lead oxide or spongy lead and other substances which is put into grids.

Plate: The combination of grid and paste properly "formed." Positives are reddish brown and negatives slate gray.

Polarity: An electrical condition. The positive terminal (or pole) of a cell or battery or electrical circuit is said to have positive polarity; the negative, negative polarity.

Post: The vertical cylindrical part of strap which receives connector.

Potential Difference: Abbreviated P. D. Found on test curves. Synonymous with voltage.

Rate: Number of amperes for charge or discharge. Also used to express time for either.

Rib: (See Bridge.)

Ribbed: (See Separator.)

Reversal: That which occurs to voltage readings when cells are discharged below a certain critical point or charged in the wrong direction.

Sealing: Making tight joints between jar and cover; usually with a black, thick, acid-proof compound.

Sediment: Loosened or worn out particles of active material fallen to the bottom of cells; frequently called "mud."

Sediment Space: That part of jar between bottom and top of bridge.

Separator: An insulator between plates of opposite polarity; usually of wood, rubber or combination of both. Separators are generally corrugated or ribbed to insure proper distance between plates and to avoid too great displacement of electrolyte.

Spray: Fine particles of electrolyte carried up from the surface by gas bubbles. (See Gassing.)

Strap: That part to which all plates of one group are burned.

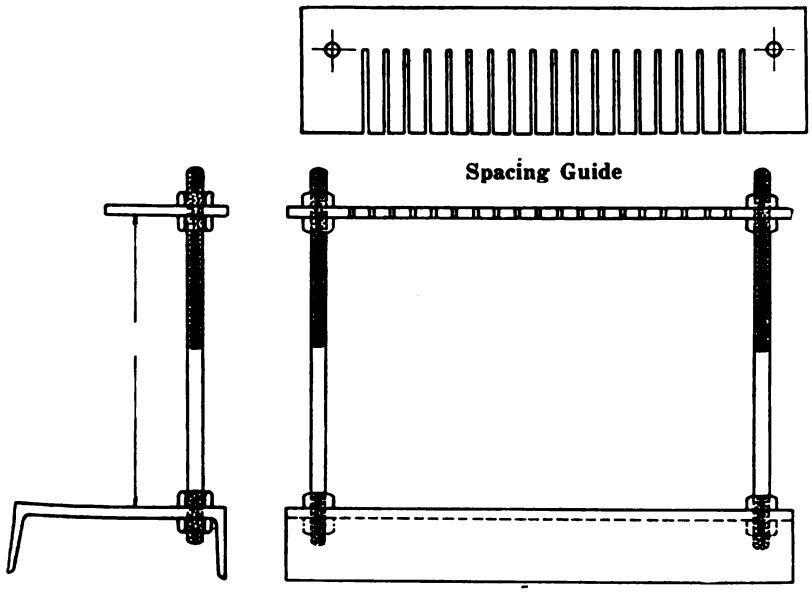
Sulphate: Common term for lead sulphate. (Pb SO4.)

Sulphated: Term used to describe cells in an under-charged condition, from either over-charging without corresponding long charges or from standing idle some time and being self-discharged.

Sulphate Reading: A peculiarity of cell voltage when plates are considerably sulphated, where charging voltage shows abnormally high figures before dropping gradually to normal charging voltage.

Terminal: Part to which outside wires are connected.

Vent or Vent-Cap: Hard or soft rubber part inserted in cover to retain atmospheric pressure within the cell, while preventing loss of electrolyte from spray.



Burning Rack

BATTERY PLATE BURNING RACK

This may easily be constructed in the shop. The base is a piece of six-inch channel iron, fitted with two upright bars which hold the spacing guide. Guides should have slots spaced as follows for the various sizes and styles of batteries: 7/8 inch; 5/8 inch; 3/4 inch inch; 19/32 inch and 5/8 inch. These five guides with slots spaced as indicated will take care of any battery that comes in.

Voltage: Electrical pressure of potential difference, expressed in volts. (Volt is the unit of pressure like "pounds".)

Wall: Jar, sides and ends.

Washing: Removal of sediment from cells after taking out elements; usually accompanied by rinsing of groups, replacement of wood separators and renewal of electrolyte.

Watts: Product of amperes and volts.

Watt-Hours: Product of amperes, volts and time in hours.

Tools and Supplies Needed

There are of course other tools and supplies other than those mentioned here, but it is intended to mention just those items of equipment which should be found on the battery repair bench.

The first item of equipment is perhaps the rack (see Fig. 1.) for holding plates exactly the correct distance apart when burning in meter syringe which is for the purpose of testing and mixing electrolite; a scraping tool, similar to that used by plumbers for scraping lead and which is usually of a triangular shape will be found best for cleaning parts that are to be burned. An acid tank which is of course lead lined for mixing acid and for storing and soaking separators will also be necessary if any considerable amount of battery repair work is done. A ladle for melting sealing compound is also necessary, while a pair of ordinary gase pliers, an old file for cleaning lead before burning, a file card for keeping the file free from lead accumulation and a pair of nippers or lead cutters for cutting lead, should also be part of the battery tool equipment. For filling batteries with electrolyte, a lead funnel will be necessary while a thermometer will also be required at times for determining the temperature of electrolyte in the battery cells. For the protection of the battery workers hands he should have a good pair of rubber gloves.

The supplies necessary for battery work are a compound for sealing jars. This compound can be purchased ready made. However, if the battery repair man prefers to make his own compound it is made up as follows:

One-half part gum asphaltum, one-fourth part parafine wax, and one-fourth part rosin. These ingredients are melted together and used as explained later. A solution for making battery boxes acid proof should also be kept on hand. This may be purchased from battery supply houses, or may be made by the battery worker himself, by taking six parts of wood tar and 12 parts of rosin. Melt these together in an iron kettle after which stir in 8 parts of finely powdered brick dust. In using this solution, the battery box or surface to be covered must be thoroughly cleaned and dried before painting with this preparation which should be warmed before it is applied.

Electrolyte should also be kept on hand in a closed stone, or glass container. Electrolyte is sold by manufacturers and may also be mixed in the battery shop. It is mixture of pure sulphuric acid and distilled water. It should be kept on hand at about a specific gravity of 1.300.

Inasmuch as the mixing of the electrolyte may be accompanied with considerable danger to the mixer, the following precautions are in order:

First, secure a glazed stone vessel or lead lined tank. A large stone crock of the type used for butter by the average farmer, is excellent for the purpose if of suf-

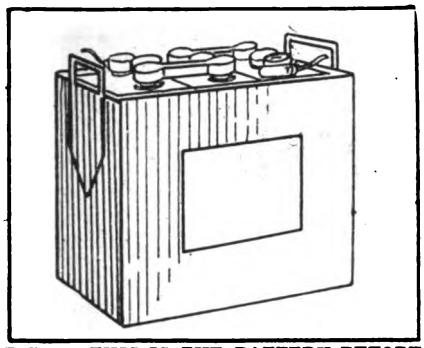


FIG. 2—THIS IS THE BATTERY BEFORE DISMANTLING OPERATIONS ARE BEGUN

ficient size. Put in the crock or container about three parts of water and be sure to put the water in the crock first. Fill the hydrometer syringe with chemically pure sulphuric acid and add it to the water by holding the nozzle of the syringe under the surface of the water. Stir the solution with a glass rod and then carefully rinse the syringe. Now test the strength of the solution with the hydrometer, and if not strong enough, add more acid. If it is too strong, add water. Be careful to allow the pure acid to remain in the syringe not longer than is absolutely necessary. It is of course understood that the water and also the acid used in making the electrolyte should be chemically pure. The water should be distilled water, while the acid should be chemically pure.

Other supplies for battery work are extra battery connections, extra jars, covers, separators, etc. A supply of pure lead should also be kept on hand as well as a bundle of antimony and lead bars for burning connectors.

The Repair of the Storage Battery

The usual battery troubles are

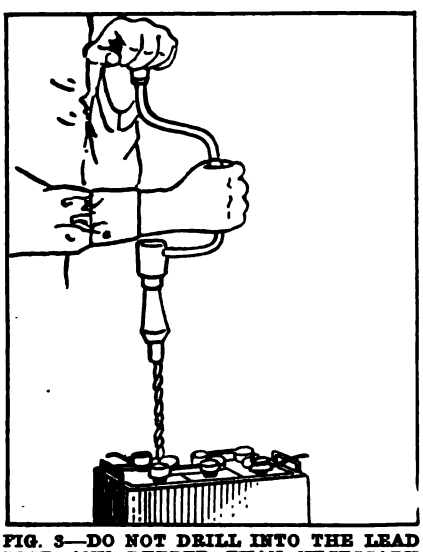


FIG. 3—DO NOT DRILL INTO THE LEAD POST ANY DEEPER THAN NECESSARY

sulphating and the buckling of plates, broken down separators, and sediment accumulation in the bottom of the jar. There of course are other troubles, but these are the most common.

To repair a battery properly, it must first be taken down, but before proceeding with this work, the various cells of the battery should be carefully tested so that the defective cell can be located. Any cells that are found to be on the verge of breakdown should also be taken down for it would, of course, be false economy to take down and repair one cell of a battery in which the two remaining cells were on the point of breaking, although not actually defective.

Taking Down the Battery

In describing the taking down of a battery we will suppose that a

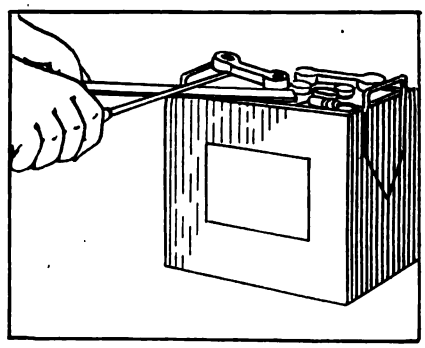


FIG. 4—PROTECT THE EDGE OF THE CASE WITH A FLAT PIECE OF STEEL WHEN PRYING UP THE CONNECTOR

six volt 81 ampere hour storage battery used for starting and lighting has been turned in for repairs. (Fig. 2). Before starting the work of taking down a sketch should be made showing the connections and positions of terminals for guidance in re-assembling. This little stunt will insure your getting all connections back into proper position again when assembling the cells and connecting up the terminal.

The first step in the actual operation of taking down a battery, is to remove the terminal or connecting link. To do this, center punch the top of the terminal and connector terminal post and drill down to a depth of about ¾ of an inch, using a brace fitted with a 5/8 inch bit. In drilling this hole be careful to bore into the lead connector exactly in the center of each post, and do not drill any deeper than is necessary so as to minimize the labor of building up the post again when renewing the connection. The operation of boring the connector post is shown in Fig. 3.

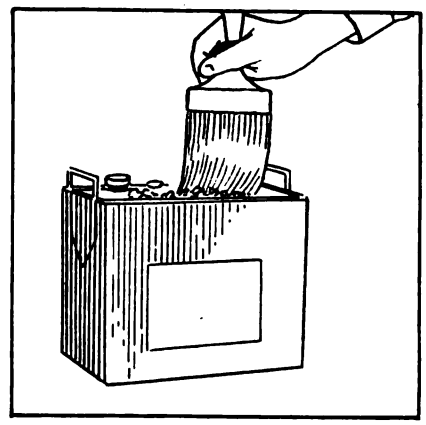


FIG. 5—THE DIRT AND LEAD ACCUMULATIONS ARE BRUSHED FROM TOP OF BATTERY BEFORE REMOVING VENT PLUGS

To remove the connector after drilling down into the post, place a file or flat piece of steel along the edge of the case and then place an ordinary screw driver underneath the connector and ply it off as shown in Fig. 4. Properly done in the manner described and pictured, the case will be uninjured and the connector will come away readily. Remove the other connector in the same way and after this has been accomplished, dust off the accumulation of lead and dirt from the top of the battery. This operation is shown in Fig 5. This should be done very carefully and thoroughly so that there will be no danger of lead and dirt getting into the interior of the battery, for were metal to become lodged between a plate and separator, it would eventually cause a short circuit.

Now unscrew and remove the vent plug as shown in Fig. 6. It is extremely important in this connection to remove the vent plug before using a flame around the battery. Hydrogen gas is generated in a battery and it may result in an explosion. This gas can be quickly expelled by blowing into the cells with a bellows or air hose. Another caution in this connection is

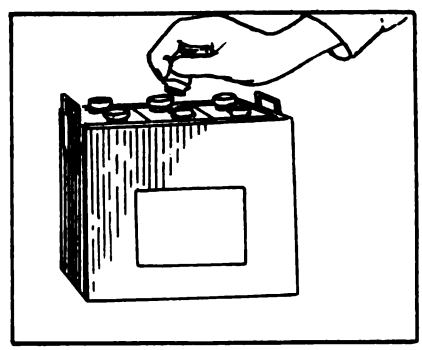


FIG. 6—REMOVE VENT PLUGS BEFORE USING A FLAME NEAR BATTERY

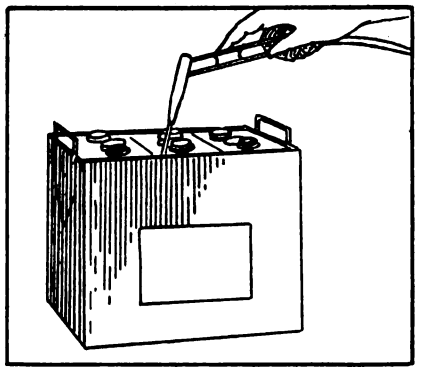


FIG. 7—THE SEALING COMPOUND AROUND THE EDGE OF THE BATTERY IS FIRST SOFTENED

care in the removal of the vent plug. These are made of hard rubber which is very easily broken and a pair of pliers should not be used for their removal.

The sealing compound around the edges of the covers of the cells is now softened by means of the gas torch. Play the flame back and forth, keeping it moving all of the time so as not to burn or scorch the cell covers. This compound will soften very easily, so do not attempt to hurry this procedure, by heating too long in one place.

Take the triangular scraper, warm it with the torch flame and scrape the compound from around the edges of the cover. This may easily be accomplished as shown in Fig. 8. Should the compound not give way to the scraper readily, use the flame until the compound is well softened and entirely removed from around the edges of the box.

With the flame now heat the top of the cover to soften the underlying compound. Do not attempt to force the covers but use the flame, gently softening up the compound until by inserting the screw driver under the covers, they will pry off easily.

After the top covers have been removed heat the under compound as shown in Figure 10. Do not however, allow the flame to play in one place long enough to cause the compound to melt and run. It is simply necessary to soften the compound so that it can be readily removed by using a heated screwdriver.

In softening the sealing compound with the flame, remember that a small flame used for several minutes will bring better results than a large flame which is inclined to melt the compound to a running consistency, and to even burn or char the covers or the battery box.

Now take the putty knife, warm it up in the gas flame, and run the edge of the knife between the jar and the cover. Now take two pairs of pinchers or pliers as shown in Fig. 11, and lift the element, which makes up the battery cell, together with the inside cover, out of the cell. If the elements are difficult to remove do not pull too hard, but fill the cell with boiling water when the plates, will come out very readily.

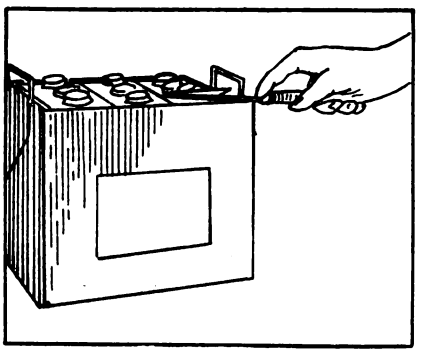


FIG. 9—SCREW DRIVER IS USED TO PRY UNDER THE COVERS AFTER THE COMPOUND HAS BEEN SOFTENED

Proceed in the same manner with the other cells of the battery and let the element rest at an angle on top of the jars to drain as shown in Fig. 12.

While the elements are draining, apply a flame around the terminal post and remove the cover. If the covers have become warped from the heat, place them in boiling water and flatten out on a smooth surface to cool.

The elements of the cells may now be readily examined and the condition of the battery determined exactly. It is generally best when taking the battery down to renew all separators although this is not always necessary. When a new battery is received for the replacement of a leaky jar, the separators will generally be found to be in good condition and not require renewal. Should the separators be in good condition, and a jar replacement is only necessary, put the element with the bottom cover in electrolyte or water until ready to replace in the cell.

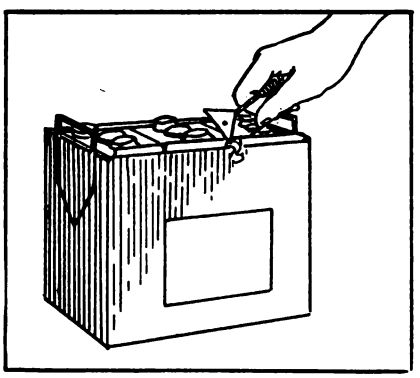


FIG. 8—THE SCRAPER IS USED TO REMOVE THE COMPOUND FROM THE COVER EDGES

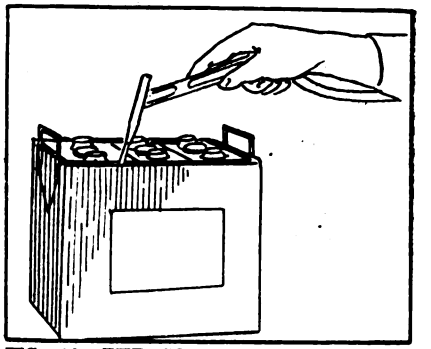


FIG. 10—THE COMPOUND UNDER THE TOP COVERS IS THEN SOFTENED WITH THE GAS FLAME

If the separators of the element are to be renewed, separate the positive and negative group by grasping the element firmly and working the groups back and forth as shown in Fig. 13.

After the two elements are entirely separated, remove the separators themselves. This operation is shown in Fig. 14. Take your putty knife and run it between the plate and the separator. This will cause the separator to come away easily. A separator should never be allowed to dry but should be kept immersed in water. An examination of the plates is now made to determine whether or not they require replacing. If the battery has been over-heated through overcharging or short circuiting this will be indicated by brittle or buckled plates, with the active material granular and falling away from the grid. Plates that are found in this condition will have to be replaced.

If the electrolyte has not been kept well above the plate, the top

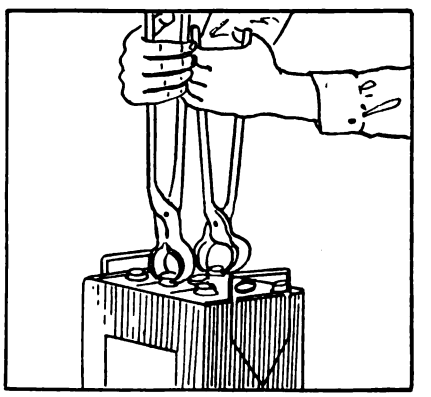


FIG. 11—THE CELL ELEMENTS ARE REMOVED BY GRASPING THE TERMINAL POSTS WITH PLIERS

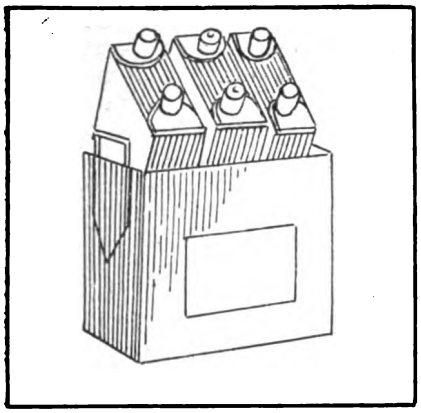


FIG. 12—REST THE ELEMENTS OUTSIDE AT AN ANGLE ON THE TOPS OF THE JARS TO DRAIN

of the plate will show a white substance known as sulphate and if the battery has been allowed to remain in a discharged condition for any length of time, it will be indicated by sulphated plates. The manner of inspecting plates is shown in Fig. 15.

The sulphation may be removed by charging at a low rate for a long period. This rate should be about one-half the normal charging rate, continued until the specfic gravity, and voltage reaches a maximum value.

If the plates upon examination are buckled, but are otherwise serviceable, they can be straightened by inserting boards of suitable thickness between the plates and over each outside plate, and then place them in a vise. Now apply a gradual pressure until they are flattened out perfectly. Care must be exercised however that the plates are not subjected to severe strain. They should also be left in the vise for a time to become set.

The condition of the negative plate is sometimes such that they may be again used with new positive plates. In this case, the negative group should be immersed in water to prevent the plates from drying out through heating or exposure to the air. If the positive plate is fairly hard and has not lost much of its surface, it may be used again. Occasionally it happens that one or two plates in a group require replacement, while the balance of the plates are in good condition. In this case new plates may be used in replacement.

When putting in new plates, be sure that both are fully charged or half charged.

To remove one or several of the positive plates, which are found to be buckled or worn out cut the plates out at the place where it is burned into the strap. Replace with a new one which of course must be burned into place. As a rule you will find that a negative plate will outlast two positive plates.

The positive plates are examined particularly for the washing out of material and for buckling or warping. If the material has washed out on the surface of the plates to a depth below the base of the horizontal ridge, a new group should be substituted.

The negative plates are generally always in good condition mechanically for they are not affected by abuse as easily as the positive plates. If the positive are buckled, the negatives will be also, but if in a charged condition can be readily fixed.

Generally speaking, it is advisable to install new separators whenever a cell is dismanteled for repairs, as it is of vital importance to have the separators in good condition. It is of course understood that in case of doubt regarding the condition of any of the parts of the battery it is always best to supply new parts. It would be poor economy, in other words, to tear down a battery and then to build it up with any old parts which were in anyway of questionable condition.

If perforated rubber sheets are used with wood separators the rubber sheet will nearly always be found in good condition and may be used over again. Of course if they are broken new ones will be used for replacement. It is well to carry a small stock of perforated rubber sheets for just such emergency.

When the positive plates are badly disintegrated, it is usually a sign of foreign manner in the electrolyte. Should this be the case it is best to discard the negative and the separators as well as they may possibly hold some of the impurity and be the means of ruining the new positives in a very short time.

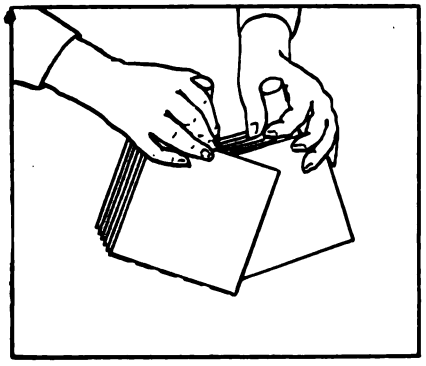


FIG. 13—TO SEPARATE THE ELEMENTS GRASP AS SHOWN ABOVE AND WORK THE GROUPS BACK AND FORTH

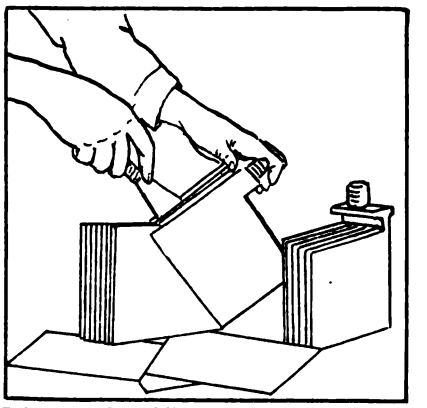


FIG. 14—REMOVE THE SEPARATORS BY RUNNING A PUTTY KNIFE BETWEEN PLATE AND SEPARATOR

For the easy removal of a battery top and cells, a simple steaming device may be made by taking an ordinary teakettle and fitting a rubber hose or other tube to the spout of the kettle. Pour a sufficient quantity of water into the kettle, place over a gas flame, and when the steam issues from the tube, insert the end of the tube into the battery cell. Of course it is understood that acid should be first removed with a syringe. In this way the compound sealing the battery and covers into place may easily be softened and allow for the easy removal of the various cells. After the top of the first cell is softened in this manner, the scraper and putty knife may be brought into use on the softened compound while the end of the tube is inserted in the opening of the second cell, and the compound over the second cell is being softened by the action of the hot steam.

Note:—The second installment of Mr. Becklin's articles on Battery Repair Work will appear in an early issue. In the meantime any questions or problems on this work will be discussed in the "Queries, Answers, Notes, Column."

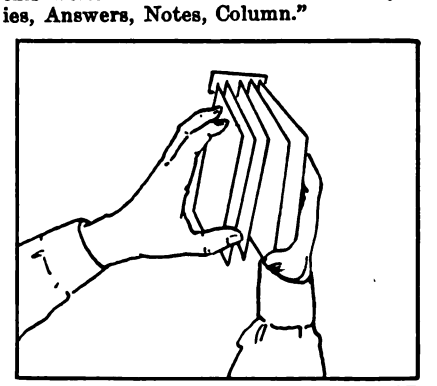


FIG. 15—PLATES SHOULD BE INSPECTED FOR BUCKLING AND OTHER FAILURES

Some Arguments Against Mr. Benham's Natural Shoeing

A. E. HODGETTS

Having read the article in the October number written by H. L. Benham in regard to "Natural Shoeing", I want to say just this:

In his argument Mr. Benham says that a man worthy of the name of horseshoer cannot argue against natural shoeing. He also mentions the story of the optimist, and the doughnut.

Well, in regard to that, I think it is a poor man who cannot pick the good out of any argument. Now in regard to the natural shoeing, I think I have a good argument. In fact, I don't think that natural shoeing is the proper name, as it is very misleading in itself. I think after what I have seen in horseshoeing, it would be better to say, shoe the foot to conform with the limb above it. How many times have you seen a colt come to the shop with a large wing on the inside of its foot, and the outside worn down to the sensitive structures? And even go so far as to cut the other foot with the wing on the inside. Now I don't mean the horse with a crooked pastern or one with faulty conformation, but the natural straight limbed horse worn that way. The fact of a man having to use a rasp, knife, or nipper is going away from natural shoeing. I don't mean to say that a man must cut away the bars or trim out too much of the bottom of the horse's foot. I really can't agree with Mr. Benham, that a colts hoof that has grown natural, that the wear will give the shoer all the information needed. It will in a good many cases, but not in all according to my experience.

Mr. Benham goes on to tell how to get a natural foot on a colt. Now if nature was right, he would have his natural foot already, and when Mr. Benham takes his box of tools to make a natural foot, in my estimation, he doesn't do it at all. I think what he does do, is to prepare the foot artificially to conform with the limb above it.

Now my reason for saying that natural shoeing is misleading is this: — Everytime you run up against a fellow that has read a book on natural shoeing you are sure up against a real proposition. One place to find that out is in the Army. Now I have served five years in the Army. Two years in the World War, and three previously, and I want to tell you that when you come across a young officer who has no practical experience, but who is loaded with book knowledge, such as "Natural Shoeing", such as—"Don't trim out the sole"; "Don't cut the bars"; "Don't rasp off the outside of the foot", in fact "Don't touch it at all", and then another one comes along and asks "What makes the horses feet so long"?;— You get pretty sick of natural shoeing, and especially when you are fined for it as in the army. And these people read all the Don'ts.

My main argument is that a man doesn't make a natural foot with a box of tools. He builds up the foot artificially, where nature has left off. Another reason for my argument against natural shoeing is that it has a tendency to forget what has been accomplished by the hand of man. You can take horses, cattle, hogs, trees, in fact everything you can think of. They have taken flowers that were produced by nature, and made a better and prettier flower. They have taken the common prim rose, and cultivated it till we have the beautiful American Beauty Rose. All accomplished by the hand of man. And last, but not least, if we had always lived according to nature, we would be still back in the dark ages living as savages.

The New Era Blacksmith

F. J. PRICE

Editor's Note:—We are glad to publish this article "The New Era Blacksmith" by Mr. F. J. Price. It is printed just as Mr. Price wrote it, except for a few minor editorial changes. The article is timely and should cause every reader to think seriously regarding the conditions mentioned. It is hoped that the article will cause every reader to think seriously to the point of writing. We will gladly give space to any comments on the situation and suggestions as outlined by Mr. Price.

Naturally, not all of the points as cited by Mr. Price are in strict accord with the Editor's views and opinions. But space at this time does not permit of an expression of Editorial opinions and views on the various matters. We cannot refrain from commenting, however, upon the suggestions for a co-operative bank, insurance company, printing company, supply house, and similar co-operative activities. The paths of co-operative effort along these lines are thickly strewn with the wrecks of countless one time "Co-op." banks, wholesale houses, factories and what not. And we do not want to see any group of "Our Folks" going into anything of that kind until the field of co-operative effort has been carefully surveyed and proper recognition taken of the sound, hard facts of previous example and experience. But more of this next month.

In the mean time—read Mr. Price's article and then let us know what YOU think.

Mr. Price has covered the subject of present conditions in the craft in a very complete manner. He has detailed the conditions which all of us have observed at times, and while these matters are not new subjects of debate they are subjects that warrant thought and attention.

Some of "Our Folks" have no doubt often thought of writing a similar article on craft conditions and now that Mr. Price has "broken the ice", so to speak, these readers will no doubt be glad of the opportunity to express their ideas on the subject.

This matter, in order to get anywhere, must be thoroughly discussed.

The blacksmith is the oldest, or nearly so, of all the known trades. He has witnessed and been a part of the evolution and revolutions of every age of man. Today he is as indespensible as the house top. Yet the blacksmith seems to be the dormant tradesman, or the man that is contented with whatever happens, content to follow well beaten paths. He is a man of contentment, perhaps made so because of his condition and the conditions that are responsible for his conditions—a complex compound situation. To illustrate, the smith who works for the general public is never able to know just what his next job will be. He is never able to tell the exact time he can deliver a job. He can never start or stop work on time as others do. He is required to be on the job every day whether he works or plays. He is a constant target for the criticism of the public. He is the chief consideration for a favor in times of breakdowns, or wrecks. He is compelled to be such a friend to the general public till he can't say, "NO". He is compelled to wear a smile when the most ignorant tries to advise and instruct how to do a job. He is required to have a good shop full of up-to-date tools, equipment, and materials. He is expected to be business man, and honest, and never disappoint any one; yet he must take dishonesty and disappointment from the public. He does not read the newspapers as other men while on the job for fear of public opinion saying—"He got so much money he don't have to

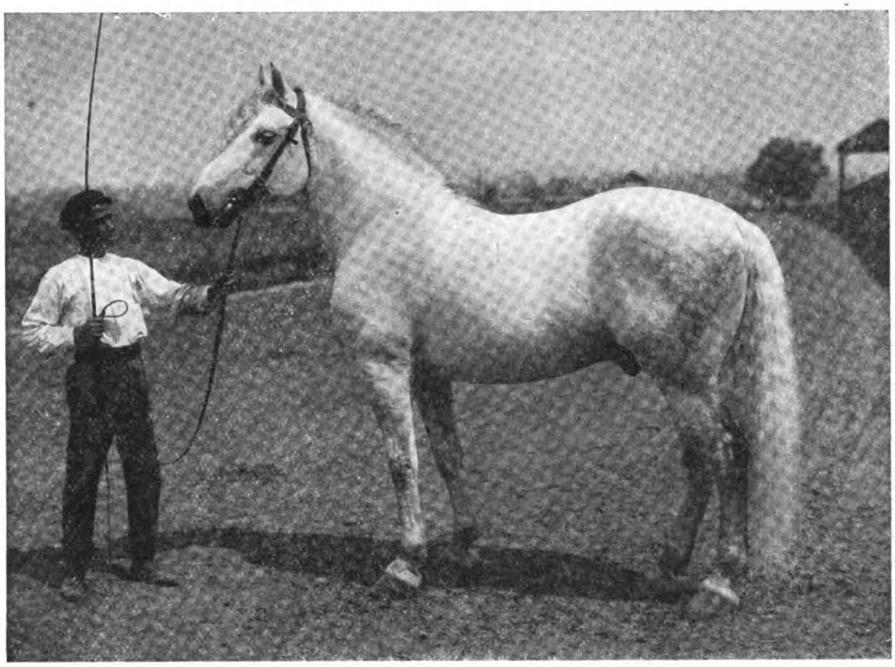
work." Yet the smith is expected to know something about everything and be a source of information to rainy-day crowds. If he sits down, and hears some one coming past the shop, he must jump up before the parties can look in at the door, for if they see the smith sitting down, they will tell everybody, "The blacksmith is lazy—every time I pass his shop he is sitting down." He is required to keep all of his old junk for public scrapping for if he should carefully wreck the old vehicles and implements and assort the valuable parts, then the news would go the rounds that, "The smith uses second-hand material." He is expected to see more service in a piece of material than anyone else, yet if he should see a good piece of iron or wood thrown away along the highway and should take it to his shop, then he is branded as picking up all the old junk along the road. And so on—I could enumerate many other things that tend to hold the smith in prescribed channels, and that go to make up insurmountable barriers in the pathway of his general welfare.

But, you say—"What can be done about it?" Shall the smith continue to see men amass millions, while he continues to drudge in profitless channels? What then is necessary for the smith to do?—to alter conditions and attain a higher standing in business circles in his locality, county, state, nation and the world?

I would suggest that definite and well planned means s o o n be brought about that will effectively bring into existence an organization with purpose, vision, and strength sufficient to raise the standard of BLACKSMITHS the world over. Our dear old trade is lacking in the race with many other trades. Efficiency is a lost note when it comes to opening a new shop in a locality. A man, who has on a few occasions used the sledge hammer to strike a few licks for you in the absence of your helper, may take a notion that he can run a shop, he hangs out his board, 'New Blacksmith Shop'. Yet he cannot weld a piece of iron; but he has our title and when he has butchered a few jobs the expression becomes common; "It's no use to have any thing repaired; buy new implements." If not this there will be similar disrespectful remarks made about the trade more so than about the man who does the shabby work. This and like conditions should be eliminated from our ranks.

A standard should be set and closely guarded as many other professions are protected. Perhaps we cannot demand legislation requiring an examination by the state, for there are many masters of the trade from experience yet who would be unable to master the technical problems and calculations that present day mechanics are required to know. These sons of Vulcan though not having book learning are masters when it comes to doing the actual blacksmithing work. Therefore a state examination in most cases would count this class of true and tried workers out, for the state would have to examine in keeping with present day technics. But it does seem that an organization could be brought about that would work all of this out in a very satisfactory way.

I have it planned this way: Since there is not an organization that is widespread enough to effectively touch all sections of the country, and has a published organ, let those of us who are interested in raising the standard of the trade get the use and cooperation of this splendid publication already devoting great service to the trade, to take up the cause and endeavor to arrange a registration list of the loyal STANDARD RAISERS. When a sufficient number of smiths the country over is registered, then call, a meeting or convention of those registering and at that time effect an organization whose purpose it will be to step out of the whirl of so-called selfmade blacksmiths, and call our selves or those who register NEW ERA BLACKSMITHS and so advertise it, and work to that end to do and have done all work in keeping with the times. Make it possible to adorn the old shops in keeping with other establishments of business, by painting and advertising, arranging the shop surroundings, installing modern business methods and office equipments and sidelines. Modernize by providing, racks and benches, for tools and material; install or make it possible to help in installing machinery and equipment that will enable the New Era Blacksmith to do things in the new era way.



THE SKILL OR LACK OF SKILL IN THE MAN WHO PUTS ON THE SHOES WILL MAKE A GREAT DIFFERENCE IN THE VALUE OF EVEN SUCH A SUPERB ANIMAL AS THIS ONE

Surely the trade has men of talent and ability to handle business and large invested sums as other corporations do. If so then, let them go about to plan the creation of financial backing for the new era men, by way of selling stocks and sharing in a financial institution for our benefit and protection. These shares could be rated low so that the men of small means could buy and pay on easy payments, yet would give them the benefit of the protection afforded.

The lagging condition of the trade and the inability of the

smiths to organize lie in the fact that, there are not very many smiths in any one locality, yet there is not a town or the smallest community that is complete without a blacksmith. These conditions make it impossible to have local organizations in many places, therefore counties should be organized into state associations and states into a national organization. If thus planned and arranged there is no reason why each state should not have and maintain a wholesale house to supply the blacksmiths, and protect him for his money will be invested in it. Our capital should own and operate at convenient points hardwood manufacturing plants to serve the trade on a more economical basis than an independent factory through a jobber, or wholesale house.

The Sons of Vulcan on the New Era Plan could own and maintain: A banking or financial protection department; An insurance department; A credit rating department; A printing and advertising department; An educational department; A local maintenance department; A vigilance department; An employment agency; An advisory and information bureau; An equipment department; A manufacturing and salvage department.

Let this organization establish a new but honest STANDARD and so advertise to the general public. Make it restrictive that a New Era Shop turn out work up to a standard and have the public understand that there is a difference in dealing with a New Era shop, which operates on systematic and methodical principals. By so doing the public will learn to patronize a New Era shop in every town for he will have confide e in them. Let NEW ERA be a sign of good work, good treatment, honest dealings and prices consistent with service rendered. When this standard is once established, and the public learn to appreciate the service, it will be hard for an independent slip shod so-called blacksmith to operate in the vicinity with a New Era Shop.

Further require and assist every New Era shop in being equipped with the necessary tools and material, and managed to a standard. Shops to be rated according to the size of the locality, but even in very small towns and at cross roads let the shops have the equipment to do all classes of work that may come in. So too in larger cities, have the shops equipped for all clases of work. This will put the blacksmith on equal standing with other shops of the city. There is no reason why the blacksmith should not take care of more than half of the automobile work that is to be done in every town and city, for the automobile has supplanted the horse and the buggy, on which the smith formerly worked, when the owners of these horses and buggies put them down for an automobile the smith should still retain that man for his customer, and can and would retain him if the smith was only in position to do his work as before. But the situation is just this our patrons have made a longer step than we can make, so we must lose the good patron, and let an independent fellow feast on him while we perish and wither away. These conditions though true ought not, must not, and will not prevail if the blacksmiths the country over just stop for a minute and catch a vision of the future if only a united effort can be affected. We are too scattered and few in the various location to rise to the situation, it will take an united, well-planned and consolidated movement to enable the smiths to come into their rights.

There are limitless possibilities just before us if we can so unite. Note some of the things that can be done whereas at present there are few young men preparaing themselves for blacksmiths as masters, due to the fact that the trade offers few attractions and inspirations. There are thousands of smiths to day who desire to give up the trade for the same reason, and too because during this depression it seems that the smith is doubly pressed by the surrounding conditions. But we can easily an readily add attractions and rear up standards that will serve to inspire the old smiths to hold onto the grand old trade, and be the means of giving inspiration to thousands of young men to take up the trade and follow it. If we will unite and plan the operation of mills and factories to serve us, wholesale houses and other departments to serve and protect us.

To illustrate, in every shop there is an accumulation of short pieces of select hardwood, ends off wagon and buggy spokes, shafts, hickory axles, and many other pieces of hardwood that could be cut into small blocks and turned into small handles, knobs, and for various other purposes that require small turnings and blocks. Why not then reclaim all of this class of select material and convert it into dollars instead of into ashes. We could maintain a woodworking plant in every state or one to accommodate two or more states, simply by having the smiths crate these small pieces and ship to this plant. This would prove a source of income to the organization with but little outlay for expenses. This same woodworking plant could supply smiths with all of their necessary hardwood for wagon parts, and implement repairs. This would make it unnecessary for many smiths located in small towns to spend hundreds of dollars in installing woodworking machinery. We should maintain an educational department for the training of re serve forces of blacksmiths, I mean master blacksmiths, horseshoers, wheelwrights. We must encourage more inventions among blacksmiths. It's true, that few inventions are ever completed without the aid of a blacksmith. Why not then, the blacksmith as an inventor.

Fellow blacksmiths I think the time is ripe, and that we should rise to our place and rank. The World War was fought and won, and the grand old smith played well his part in factory, mill, shop, and wherever stationed. Yet but little mention is made of him and what he did in helping to win the war. Not a ship was built without the smiths touch. Not a gun large or small was made without his hammer and hand having served in completing. There was not a thing used in the war, before the war, or since the war, nor can any other trade or profession operate without the stroke of the husky blacksmith. Yet fail to realize our place in the rank and file of other trades and professions. We need to advertise more, to put on bargain weeks, and offer special inducements. Let's rejuvenate the grand old trade. Let's JAZZ it, give it an extra punch.

"Our Journal" is the same price today as twenty years ago. Yet the dollar of twenty years ago bought about twice as much paper, ink and labor as that of today. Still, "Our Journal" has steadily improved in appearance, in practical worth and in its importance in the progress of the craft. How has it been possible?—only through the loyal support and encouragement of our good friends in the craft. "Our Folks" are with us.

Queries Answers Notes

Says Our Journal Unequaled:—For any man working around the shop, there is not any paper its equal.

Frank Svoboda, Oklahoma.

The Plumb Spoke Question:—According to my idea of the plum spoke method, both axles should be the same length, in order that the rear wheels will follow in the track of the front wheels. Will H. J. G., New York, who answered J. E. Lyons in November Queries and Answers, tell me why he makes the front axle 3/16 inch longer than the rear.

A. A. Pirie, New Brunswick.

Canadian Appreciation:—I think it is nearly time I was telling you how much help your book is to me. I have been taking it for the last fire years and I find a good many ideas in it that are good for all our trades. I am a general blacksmith, but am now specializing in Welding. However, the ring of the anvil still sounds good to me.

A. Melville, Canada.

Repair Tire Lugs—When the lugs get worn so that the tire begins to slip or work on the wheel, a good plan is to lay the lugs on the welding table and run on about one-eight inch of cast iron. Now grind off so this lug has the same shape as it had before. This is a time and money saver where one is many miles from a supply house and cannot get lugs promptly.

Old Timer, South Dakota.

On Wheels and Axles:—Would appreciate hearing from some of the "Brothers" on the following questions:

(1) To correctly set an axle these days, should they be set straight or with some gather?

(2) The dish in wheels varies greatly, and each dish requires a diffrent set of the axle. What device is used today to ascertain the proper set to give an axle, to suit any given dish of the wheel?

A. A. Pirie, New Brunswick.

Wants New Location:—An all round smith with twenty-eight years of experience at the trade would like to locate in some other part of the United States. The exact location does not matter if there is an assurance of a good trade and business. This man has run a shop for eighteen years and has also acted as foreman. He is 42 years of age, in good health and knows the business from shoeing to repairing autos. Anyone knowing of a good location where a good smith is needed can secure this man's name from the Editor, referring to S. J. Q.—Michigan.

From An Old Friend:—It has been almost four years since I have seen a copy of "Our Journal". It has helped me out on many problems that come up before us "Iron Bruiser's."

I quit the trade in 1918, and went to France with the army. Recently when I went back at the trade I have often thought of what a help the paper had been to me in the past and I want to again be numbered as one of the "folks."

Howard Kelenbenz, New Jersey.

A Welding Kink:—In welding farm machinery castings, I find that 90 per cent are broken at or near a hole and it is quite some job to get said hole in the same place it was before the break.

To overcome this we keep on hand a number of pieces of carbon in different sizes,—from one quarter to one and one quarter inches in diameter, and from one-half to four inches long. Place a piece of this carbon in the hole and you can weld all around the carbon. When the casting is cold punch out the carbon and you will have a good clean hole.

Old Timer, South Dakota.

To Repair Scored Cylinders:—I think it is nearly time I was telling you of how much help your book is to me. I have been taking it for the last five years and I find a good many ideas in it that are good for all our trades. I am a general blacksmith, but am now specializing in Welding. However, the ring of the anvil still sounds good to me.

I would like to know how to repair scored cylinder blocks without welding them. Is there any other methods? If so, I would be glad to know of it, as I don't like the idea of welding them. I weld the cracked water jackets and have good luck, but I don't like putting the torch in the cylinders. I hope you can advise me on what kind of metal would be suitable for the purpose.

A. Melville, Canada.

Battery Charging and Repair:—I am looking for some storage Battery dope. First: A charger. I have 110 V. Direct current, and am using a lamp bank. Do you think a panel or reostat would be more economical or not? What kind is best and cheapest? My electricity cost me fifteen cents per K. W., and I get $1.50 for charging a 6-volt battery, but I don't know just what it costs to charge a battery.

There are four battery-charging stations and 150 batteries in this territory, so you see we don't get a very big run. Where can I get some inside dope on battery work, and how to repair them? I have watched battery men work, and think I can do as good as they can, but don't know just how much acid and water to mix for the electrolite.

T. W. Kitto, Illinois.

Setting Fellow Bands:—In the October number, I noticed an article on setting auto rims. In the last five years we have set a great many rims. Last fall we set some 176.

In setting rims and fellow bands we proceed as follows—remove all rivets or bolts, knock off rim, then tighten hub bolts, as they are most always loose. This makes the hub good and tight. Next—run the wheel and rim to see how much too large the rim is.

Use 18 oz. canvas cut to the width of the wheel rim, and tack this on pulling it tight as it is being tacked. As a rule, one thickness of canvas is enough. Now heat the rim and drop it on. Be sure and cool it off quickly, so as not to burn the canvas. Put in the rivets and the job is completed.

Old Timer, South Dakota.

Knives from Files—In the October number of "Our Journal", I see that Mr. Merriss asks in regard to making knives and the steel with which to make them. I am a reader of the paper and have been for some time and have kept most of my old numbers. I refer to them once in a while yet. In answer to Mr. Merriss question, would say, I have been in the game for nearly 40 years and have made a good many knives in that time. I have had to use all kinds of steel. I sometimes used old files, but when I do, I work them with a moderate heat, putting the saltpeter on the hot steel and working it in. This gives it a fine grain. Try it first on a coarse piece of steel, and then you will see how it works. An old file worked in this way will not need much tempering, as they are usually hard enough. I hope our brother will be able to get something out of this that will help him.

W. O. Brewitt, Nebraska.

Cooling Gas Engines:—A common source of trouble with gas engines on farms or in shops is the use of hard water for cooling, with the result that scale is deposited on the water jacket walls. This limy scale interferes with the passage of heat to the cooling water, and in time, may cause serious over-heating of the engine.

It is always advisable to take precaution against such deposits. The simplest way is to use rain water, which is soft, and free from scaleformng substances. A little trouble and fore-thought will provide a sufficient supply of rain water in most cases.

As a preventative, the use of one teaspoonful of boiler graphite to each gallon of cooling water is recommended. Except in hopper cooled engines, no more than this should be used, as it may clog small openings.

Before using the graphite, the scale should be removed. Graphite will gradually loosen old scale, and permit it to be drained out, or the scale may be dissolved by a dilute solution of muriatic acid and water, placed in the jacket for a few hours. Do not use too strong asolution let it remain over two or three hours, as damage may result. The jacket should then be drained, and thoroughly flushed with fresh clean water.

Where scale gives much trouble, and rain water is not available, frequent changes of cooling water should be made.

A Letter from New Zealand:—I have retired from the trade but as I value "Our Journal" so highly I will continue to subscribe to it.

My abilities do not run toward composition. The pen is not a tool we handle any more than we are obliged to. A piece of chalk or the stub of a pencil or even a chip off a brick enables us to make a rough sketch that we ourselves can work to accurately. But if we are asked to produce something that others could understand we hesitate to put our thoughts on paper. Of course you will understand I am speaking for old timers like myself.smiths who had to depend on their own skill and labor for all their requirements, who made their own tools and tools for other trades who worked long hours for little pay and had little opportunity for recreation or study. Perhaps we are too modest in thinking we could not write anything that would interest the later generations of smiths or me fear to display our ignorance. Personally I don't feel capable of writing, anything that would interest your numerous readers, but if ever I am able to give any information on trade matters inquired for

through the columns of your paper I shall be very pleased to do so.

To every Son of Vulcan on your subscribers' list I wish health and all the success they deserve. To yourselves, continued activity and increased circulation.

Thomas Cuthbertson, New Zealand.

"Don't Knock"—I have been a reader of "Our Journal" for as long as I have been in the blacksmith business. When I first went into the shop, I knew very little about the trade, but being a young man of twenty-six, I soon learned.

When I opened shop my competitor was an old experienced smith, and he was considered a good one, but he left no stone unturned to do all the knocking he could—telling the farmers that I was not an experienced smith, etc. But I kept my mind to myself and on the work, and tried to do the best I could, and be accommodating to my customers, and also done my work well and promptly. I even shod horses and all other general blacksmithing, including plow work, and disc rolling and wood working. We got plenty of work regardless of all the knocking my competitor was doing. The main reason was that we did our work the best we knew how, and promptly, and did not stand around to talk and knock, as was my competitor's habit.

Well, years went by, and I really became a smith, and all the while was enjoying good trade, so that finally my competitor was about forced to sell out his business, and moved to a far away neighboring town.

At this writing, I have branched out, and am doing Auto Repairing, and nearly everything that comes to my place of business. I also have a gasoline station, motor oils, free air service, and handle tires and tubes, and auto repair parts. I have one of the best and up to date shops in Central Kansas, and instead of having my sign reading General Blacksmithing and Horse Shoeing, it now reads, "Blacksmith and Auto Supply", and my Dear Old Competitor, has a little shop in another town. So you see it does not pay to knock. "DON'T KNOCK."

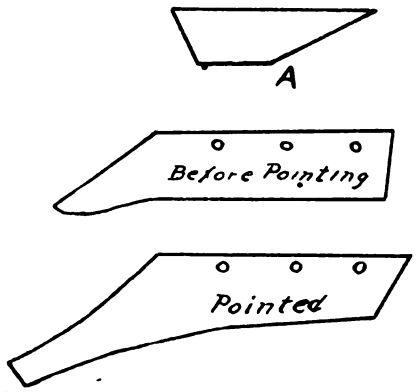
W. C. Z., Kansas.

On Plow Work.—An Invitation to Old Plow Workers:—One of the most important jobs that comes to the smith in the agricultural districts is plow work, and since we have slip shares, almost exclusively we are not having to lay them as we did when the platform shares were in use. But, the job is just as important, and should be thoroughly understood by the man who undertakes the work.

Now, my way of pointing a share is first get ready for the job. I use 2 by 3/8 inch lay steel for ordinary pointing. I cut the point as at A and draw as near as possible to what it will be when finished, as it saves hammering after welding on. Now put plow and point in fire, taking separate heats; handling point with tongs while the share can be handled with the hand for the first heat. Never hurry, as you can't crowd a good heat. I use E. Z. compound or some other anti-borax flux. Get a nice flowing heat, lay point on anvil and place share just as you would in making any weld with a separate heat, and you can securely weld point and with this much done, you can easily finish with as many heats as are necessary. I always point slip shares on top, as they wear out on the shin, and by this method they wear much longer and makes a nicer share to work on, while they last. If share is worn in throat, I use the same method for filling that, but of course put this on bottom. Don't use as heavy stock, and cut longer to fit.

When sharpening and finishing keep cutting edge of share down, so that it will cut level from point to heel. If plow takes too much land, turn cutting edge up gradually. If not enough, turn it down. Don't try to regulate land by the point, as it will do you no good, as the point is manipulated by suction, and it must be level with the wing of the share.

With the hope that some of the younger



AN OHIO SMITHS METHOD OF REPOINTING PLOWS

smiths might be benefited, I have written this article, knowing that the old timer have just as good and some of them perhaps better methods,(I would like to know if they have). I know that in my earlier experience, I would have been glad to get an article like this.

Chas. Barnett, Ohio.

The Lack of Smiths—Protecting the Craft—Pennsylvania Prices.—As the years go by and our trade is getting broader there are fewer and fewer men learning it. I have often wondered what people would do without a blacksmith, but after going fro mtown to town and from one state to another, I find that Sears-Roebuck Book Dept., is kept busy selling "Hint's on Blacksmith." And while it may be a very good way, I do not think that anyone who does not serve his time should be permitted to apply our trade. If I had my way about the matter, it would be hard for these "mail order" graduates to even get a hammer for the purpose of running a shop.

I myself read all sorts of books on the subject of smith work, so I do not say that we should not keep posted, but only an apprenticeship of not less than three years will show us how little we know. I believe in up-to-date tools and equipment and I am not going to stop just because there are no driving horses. We still have a lot of things to work on that are much more profitable than carrying big horses on your back all day. Nevertheless I like to shoe horses, am taking pride to do the very best job that I can no matter if the owner sees it or not.

When it comes to the owner to pay the bill, I just simply don't take any back talk as to the price. There should be NO CUT IN PRICES FOR THIS WORK, and I do not think we are getting what we should.

What is considered a fair hourly rate for blacksmithing in general? With helper? and at what rate is horseshoeing? I get 65, 75 and $1.00 for new horseshoes, and 40-50 and 60 cents for resetting common shoes. I get $5.00, $6.00, and $7.00 per set for drive and screw-calks and get 60, 70, and 80c for resetting same. For blacksmithing I charge $1.50 per hour with helper, and if one man can do the job it is $.75 per hour, plus stock and materials used.

I have an oxy-acetylene outfit, and think it a fine thing. I do not think any sop should be without one. "Our Journal" gave a good account on the subject in the September issue, regarding the change in metal, etc.

Now men, keep on and let no hard luck chance to start one. If the dead-beat gets you, don't say much. Just wait, and he will be back, but be sure not to let him get you again.

G. A., Pennsylvania.

Reclaiming a Burned Tractor:—I have a Fordson Tractor which wen through a fire in a barn. It did not warp the castings in any way that I can tell but I want an opinion as to whether it is worth fixing. The radiator is good. I run a garage and blacksmith shop and would be able to fix any part of it myself except the tempering of the parts that need it. What processes are necessary for tempering the different parts? If there is a craft book that will cover all of these in a way that would be easily understood. Can anyone explain this in a simple way?

An Oklahoma Reader.

In Reply:—It is practically impossible for anyone to advise you definitely and fully regarding this machine. It would be necessary to examine and test the various parts and bearings in order to tell you exactly what will be necessary for a complete rebuilding or renewing of the machine.

As a general thing when a machine of this kind goes through a fire of any intensity the tempered parts will be considerably damaged, and if this is the case with your tractor it will be easier to secure new parts than to attempt a re-tempering or re-hardening of the old parts which have been exposed to the fire.

You will readily realize that with parts of different types of steel, different methods of tempering and hardening are necessary.

There is no book which will give you the information you are seeking. Even though you were able to employ an expert on steel tempering and hardening, he would find it impossible to do this work satisfactorily.

Possibly if you can determine the extent of the damage done to this machine or if you know whether or not the fire was very severe or if the various parts of the machine were heated to redness, then you could proceed with the renewal of certain parts which would make it profitable to rebuild in this way.

Frankly however, it would be best to put the machine into use, carefully watching its performance every day and examining it at frequent intervals for breakdowns and the failure of parts most likely to give way, and then replace such parts from time to time as may afterwards prove profitable.

S. S. D., New York.

Success in Burning Out Carbon—I saw an item in the November issue of "Our Journal",—"Burning Out Carbon"; a

warning. I am not starting an argument, but I am just going to give facts as I find them in my 16 years of repairing and blacksmithing. I have burned out carbon ever since the process came into use, and have failed to find anything wrong with the process and the work done, if it is done right. W. Q. B. of New Jersey, claims it warps and injures the valves. I have an Overland Model 83, that has been driven 65,000 miles, and the carbon has been burned out of the engine every 3,000 miles, and I cannot see that the valves are warped in the least. I burned the carbon out of the motor the 15th of last September, and took the valves out and put them in the lathe and found them to be true as a die.

I suppose our New Jersey brother would prefer disassembling the motor in such as the Buick, 1917 Cadillac, Nash, Chandler, and a few more such motors as the above. How many jobs will you get if a customer drives up to the shop and asks how much for the work of removing the carbon from his motor and you say from 2 to 4 days and from $25.00, to $45.00, for the job? I do not believe in the burning process for the removable-head type motor, but I do believe in it for the non-removable-head type of motor, and I have used it with the greatest of success. I charge $.50 per cylinder, for that kind of work, and get lots of it to do.

I go through the following operation: I shut off the gasoline in the tank and let the motor run until the gasoline is all used out of the carburetor, and then I remove all spark plugs and turn number one cylinder on center with both valves closed. To be sure, they are both closed, I have a piece of handle 10 inches long that I stand on the head of each valve, and strike the top end of the stick with a 16 ounce hammer. If there is any carbon under the valve, the blow from the hammer forces it out and lets the valve seat. I never let the torch stay in the cylinder only enough to complete the burning. I always burn a small amount and then remove the torch for a short time, and then insert the torch and burn some more. Last, but not least, I see to it that the jackets are completely filled with water.

I thought that perhaps some one who was new in the auto repairing business, would read the New Jersey brother's letter, get discouraged, and drop the carbon burning idea. If he does he is losing some easy money that he might just as well have.

I knew there would be no harm in letting him know that there is one who has had good results, and highly recommends the process, and will willingly help anyone who asks for help.

Ira W. Surrite, Kansas.

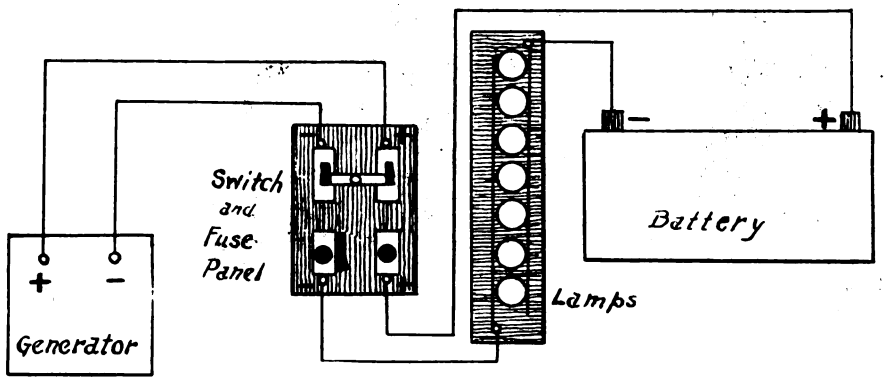
Carging Battery From Generator—Will some one please explain how I can use a 110 volt D. C. dynamo for charging storage batteries. I have been experimenting with the lamp bank regulation. When I try reducing my voltage in this way I fail to get any amperage. I also tried regulating my voltage by the use of a rheostat consisting of a group of high resistance coils. The results were the same as with the lamp bank—no amperage.

E. A. D.—Ohio.

In Reply:—The accompanying diagram shows how to connect for charging storage batteries on a 110 volt direct current line. The lamp bank should consist of 32 candle power 110 volt lamps or 110 volt 100 watt lamps. These must of course be connected in parallel as shown in the diagram. E. A. D. does not say anything regarding the battery capacity or rate, nor, how he connected up his lamps. No doubt the diagram will enable him to find his difficulty, however.

S. S. D., New York.

"Keep 'Em Going—Burning Out Carbon—Cash or Credit—North Carolina Prices:—It has been some time since I have written to "Our Journal" but that slogan stories stop you. Shoot them one back or better still, don't let anyone get a in the November issue compels me to write now. I have been in the craft for ten years and a constant reader of "Our Journal" for the same period of time, and I have not seen nor heard of a better slogan than "Keep 'Em Going"— and I want to heartily endorse it, for it is surely the right one.



HOW TO CONNECT A BATTERY, A LAMP BANK AND SWITCH FOR BATTERY CHARGING

I am thoroughly experienced in all kinds of automobile work, oxy-acetylene welding, also general blacksmithing and still have a liking for the good old anvil and forge. I would feel lost without them just as I would without "Our Journal" for I sure do appreciate ,'The Paper."

There are two items in the November issue that I want to express my opinions on. The first one is the article by Bro. W. Q. B. of New Jersey on "Burning out Carbon" I appreciate the fact that I am not able to put into writing all of the things that I know about burning out carbon, but I can say that I think Bro. W. Q. B. is wrong when he says that "copper has a low melting temperature". for in my experience I have found that copper was harder to melt than steel. I have never before heard of a cylinder head gasket being melted by burning out the carbon.

I am a strong believer in the process, and I think it is the only real way to get all of the carbon out of a motor that has not a removable cylinder head. I have been using the oxygen process for four years, and I have always had satisfied customers. I am sorry that this Bro. and his shop do not believe in it, but if it is done by a mechanic who knows his business, there is no danger of warped valves or a damaged cylinder head gasket. I don't think it's so cheap for we get 50c and 75c per cylinder for burning carbon. I will try to tell how I burn carbon out of a motor of any make.

The first thing I do is to shut the gas off from the vacuum tank or supply. Then I start the motor and run it until it has sucked all of the gas out of carburator and feed line. Now I see that the radiator is filled with water, and then I remove the spark plugs. Then turn the motor to the position with both valves closed and the piston at the top. I am now ready to start burning. I now take a piece of paper and roll it up for a taper, light one end of it and put it in the spark plug hole. At the same time I stick the end of the decarbonizing torch in the hole and off she goes. I never use kerosene to make it burn, for if there is any carbon in it it will burn without oil. After burning the first cylinder, I turn to the second being certain that the piston is at the top with both valves closed. After the carbon has been burned out—the motor may be a little hard to start, but it is worth lots in the saving of fuel and power.

The second item I want to write about is "Cash or Credit," on Page 370 of the November issue. I will say in reply to this query that although I started in business for myself the old credit system had me working for wages in a comparatively short time. I didn't go broke, but I had to go to work for wages so I could pay my debts. I had the same trouble collecting that this brother had, and I had to start all over again. But believe me and take my advice, don't do any credit business whatever. I had rather have had $5.00 cash business a day, than $10.00 on time.

I will give you some of our prices on work in our section of the "Old North State."

Time work, per hour $1.00. Cutting with Acetylene Torch, per hour $5.00; Welding by the Job; Wagon Tongues $3.50 each; Wagon Spokes 45c each; Buggy Spokes 25c; Setting Buggy Tires $1.00; Setting Wagon Tires $1.00 per inch.

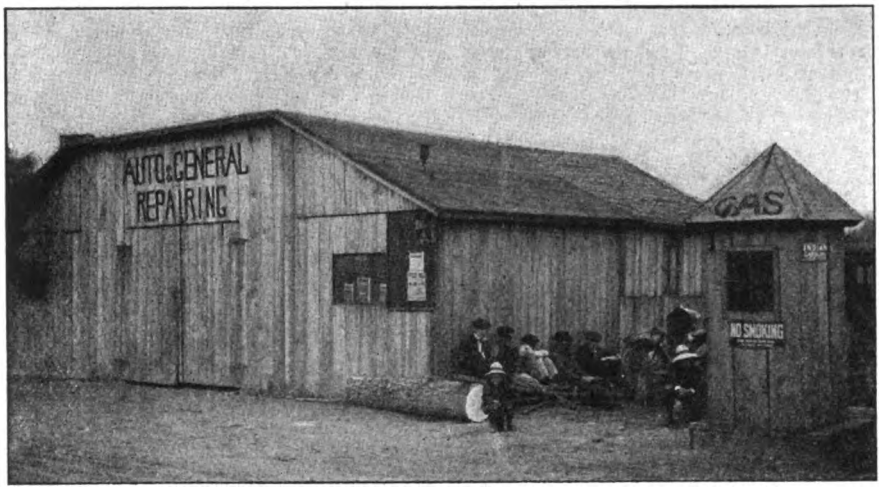
George W. Braxton, North Carolina.

Wants Information on Plows:—I would like to get some information on plows, their setting and drawing, and all about them. This is a sugar-cane district, and we are experimenting with tractors and plows. T. Griffiths, Fiji Islands.

In Reply:—In response to Mr. T. Griffiths for information on Plow Work, I am glad to give him the following advice:

The landside of the plow is the foundation upon which it is built, and if the landside is of the proper shape and size, it will be comparatively easy to make the plow operate correctly. When making the

landside point make it ½ inch wider, then it should be when finished. That much material is needed to weld down, and if the landside is not high enough the share will be lower than the mold board and it should be the other way. The landside point should also be fully as thick as the offset against the plate, for if it is thinner there will be a shoulder against the end of the landside plate, and this will interfere with the clean plowing and run of the plow. The landside point should also have the right concavity or



AN INDIANA AUTOMOBILE AND GENERAL SHOP. THE PHOTO WAS EVIDENTLY SNAPPED ON SUNDAY

circle, for if it is straight like a wedge the share will not fit down on the plow, and if it is too much of a cavity or circle shape, the share will rest too much or too soon on the end of the frog but not fit up against it the entire way. The landside point should also have the right angle in the back end to fit against the shoulder of the plow and stand in line with the whole length of the landside. When the landside point is finished, place it in position and hold it their with a pair of tongs. Now the landside point should stand in line with the entire landside both in regard to the bottom as well as the side.

A most important point to remember in connection with the making or the repairing of plows, is to have all joints tight for if they are not so, dirt will accumulate in the pockets and thus interfere with the clean working of the plow.

An important point to remember in connection with the shaping and sharpening of shares is to see that when the share is shaped and sharpened it should be at right angles with the landside and edge of lay and if it is not at right angles it should be made so. That this is the right shape for a plow. For the breaker plow, the share should be turned up somewhat more, so as to leave a gap between the share and the square at least an eighth of an inch.

It is understood of course that the ground has a good deal to do with the setting of plows. A plow share that to be used on soft ground for instance, should have the edge along the heel turned up more than a share which is to be used on hard ground.

When the share has been fitted to the landside and the square—not the brace as many smiths do, for the brace of the heel might have been bent out of shape, it is not safe to go by that—then clamp the share on the landside. Now weld the point first. You will notice that the share is longer than the landside point. Therefore, bend the share over and under the point and weld. You now have the share stuck and in a good condition to prepare for the most important weld—the weld of the joint. Many smiths weld at the joint first. This, in my estimation is not correct, and while some smiths maintain that it is an easier method, still I find that after one has become used to the point first, every smith will find this method very much easier and more practical.

In the first place, when the point is welded, you can place the share on the plow, and see if it is a good firm fit before you weld. Also you can heat the share at the joint, and fit the landside and the share tight and closely together while it is hot, for if this is not done, the blast in the fire will blow cinders in the joint, and you will never get a good weld.

In welding, have a good large clean fire. Use borax and sand or whatever welding compound you use and proceed slowly with the work. If you put on too much blast, the steel in the share will burn before the landside is hot enough. When the weld has been taken place the share on the plow, and hammer out while hot; Then finish up the point.

In connection with plow work, there are several points which Mr. Griffith will no doubt find of considerable help to him. In the first place, all plow shares should have a dip—that is they should be set down on the point from one-eight to one-quarter of an inch. If this dip is too much or the plow runs heavy, it is best to have the dip a little less than too much. If you find the plow is inclined to tip or lean over to the right, roll the share up along the edge, especially on the heel. If it tips to the left, turn the edge down.

If a plow is inclined to run unsteadily, going up one minuite and cutting too deep the next, the fault might be that the share is too dull or it may not be bolted to the plow. It is also possible that it might have two little dip or the upright or beam may be loose. If you examine a plow that is operating in this way, with apparently nothing wrong with it, sharpen the share and give it a little more dip on the point. This will no doubt correct the difficulty.

No doubt, other readers of "Our Journal" can also give Mr. Griffith more practical information on plow work if he will tell just exactly what difficulties he is having. If he will tell something of the kind of ground in which his plows work—whether the ground is heavy and of a clayey texture, or if it is of a light loomy consistency, no doubt, considerable information that will be of practical value to him will be forth coming. Let us hear from you again Bro. Griffin.

J. A. Edwards, New York.

An Indiana Shop:—I read your invitation in the December number about writing so I take the liberty and fall in line. It is a great pleasure and help to me to read "Our Journal." At night, as soon as I get it, I study and judge the reading matter and especially the "Shop Kinks". I always try to have "my seat in the front row" amongst the others by keeping alert about what is going on and that is what "Our Journal" enables me to do.

Three years ago I was compelled by circumstances to give up the position I held as general repair man in a mine. So I concluded to start an auto and general repair shop.

In every direction within four miles there are blacksmith and auto repair shops, but as the public always seem to like me, I have a fair trade and custom.

I handle all iron and steel work and also woodwork. There are very few jobs I refuse to do. I am continually getting better tools so as to do the work better and faster. There is only one job I draw the line on; that is shoeing horses and mules. Those four legs of theirs and my two don't correspond in size, and strength. I'd rather pound the hot metal on the anvil or work in the pit below a dirty greasy car all day with my 47 years.

I handle oil, have a gasoline station, and have quite a stock of Ford repair parts; also wagon and buggy repair material, and I am located on a country road that ends about two miles east of me.

General business conditions have been very good through this section of the country.

Joseph Mueller, Indiana.

Plow and Share Questions:—I have two John Deere Plows on hand, which are twelve and fourteen-inch. They do not run right, and I think the trouble is in the beam, and knowing you could give me the needed advice, will take the liberty of asking you for some information on setting beams, as I am young in the art.

In right handed plows, how should the beam be set? How far to the right, and what distance should the front of beam be from the poor.

In sharpening shares, what side is the proper side to hammer on, (the bottom or top)? Some smiths hammer the top and some the bottom side? Is upsetting the point always necessary

Albert C. Gran, Missouri.

TO PREVENT CHAPPED HANDS

The winter season is with us in full blast and a smith's hands—particularly the shoer—are apt to get stiff and sore from exposure. Take a 4 oz. bottle and put in 3 ozs. of glycerine, 1 oz. alcohol, and from 20 to 30 drops of carbolic acid. After washing the hands, apply a few drops and thoroughly rub it in. A good time to use it is at night.

VOLUME 21 NUMBER 2

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

FEBRUARY 1922

BUFFALO, N. Y., U. S. A.

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G. A. Castle, Vice-President

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AMERICAN BLACKSMITH COMPANY
BUFFALO, N. Y.

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Do Not Give Money To Agents Whom You Do Not Know

There are many unauthorized agents and unscrupulous collectors representing themselves as agents, and collectors for American Blacksmith, Auto & Tractor Shop, and we warn every one of our readers against them. Under no circumstances give money to any agent who is unknown to you. It is a very simple matter to send money order, check or stamps direct to Buffalo, and it is always best to send your order and remittance direct.

PROFIT FROM ADS WITHOUT ADVERTISING

Advertising has today reached a point, where there is no longer any argument as to whether it pays or not. The profitableness of advertising is agreed by every intelligent business man. But did you ever think that it is possible to make money from advertisements without advertising?

In our estimation, the most important feature of advertising is not what it does for the man who sells, but what it does for the man who buys. Service to the buyer is the real mission of advertising. And that has been our motto and slogan since the beginning. It is not so much what the advertiser wants but what the reader wants that has guided our steps.

You, Mr. Reader, in your business, must keep up with the progress of the trade. That is why you read this publication. You must know about the newer machines, tools, and modern devices. You must know where to get them when you want them. That is the real reason for the advertising section of "Our Journal", because here you find new ways of doing work, easier methods new tools, new machines, and so on almost without limit.

And many of these things you can find out in no other way except through the advertising section and by reading the advertising; you read about things that save time and money—you learn about side lines—how to increase your earnings and decrease your expenditure—And you learn of these things by reading the advertisements.

You do not spend a penny for this advertising and yet receive full reward from the advertisements.

Are you grasping this opportunity in full?—this opportunity for making money through the advertisements without advertising?

Every month progressive makers of modern machines, tools and devices announce their wares in our business columns. These announcements contain information that is vital to the conduct of your business.

Contents February 1922

OUR HONOR ROLL

With this issue we are again publishing the Honor Roll of paid in advance subscribers. As announced on page 37, we will not be able to have the Honor Roll appear regularly every month but it will appear at frequent intervals.

It will be noted that Mr. S. G. Siler of Alabama who is the leader of the Honor Roll is paid to June 1950. The second man on the list is Mr. H. Pass of Minnesota with December 1941, while Mr. E. Krehbiel, of Colorado has his account paid to May 1937.

Of course there are thousands of "Our Folks" whose names do not appear on the Honor Roll but whose accounts are paid up well in advance. Space does not permit of publishing all the names and so we are able to take only those names that appear as paid up farthest in advance.

It is easy to get your name on the Honor Roll. The long-time rates save you time, money and trouble and at the same time enable you to get on the Honor Roll easily. For example: Suppose your subscription expires this month of February 1922. A ten year subscription costing you but $5.00 ($7.00 in Canada and $9.00 in other countries) will place your name in the 1932 class which hasn't a single name in it at this writing. Look at your wrapper. If it reads "Feb. "22" Send in a five dollar William and put your name in that "exclusive" 1932 class.

Let us see who will be the first Feb. '22 reader to get his name into the 1932 class.

HAVE YOU NOTICED IT?

Have you noticed the changes that have been made during recent issues of "Our Journal" We are endeavoring to improve, enlarge and greatly increase the importance, value and interest of "Our Journal" every month. These improvements and changes are being brought about gradually and we wonder how they are meeting the ideas of "Our Folks". Let us know what you think of these changes. Let us know if these changes are helping you in your business. We want "Our Journal" to be of sound practical help.

Too Busy to Improve

When opportunity knocks at your door do you answer, "I haven't time"?

THIS is the age-old excuse that has kept many a man from making his mark. In its capacity for covering a multitude of short-comings, it has no equal.

It's the world's great alibi.

Whoever admits that he is too busy to improve his methods, has acknowledged himself to be at the end of his rope. And that is always the saddest predicament which any one can get into.

For there is a vast difference between *being busy* and *making progress.* When we see that clearly, we have gained an important bit of wisdom.

The easiest thing some people do, is to keep busy.

You have seen the person who is always busy—doing trivial things.

Opportunity comes to him as to all others! but he is so occupied with sharpening his lead pencils, reading the mail or attending to other ordinary duties, that he has no time to listen. The routine of his work swallows him up, and he forgets what he is busy *for.* His favorite idea, and his response to all requests is, "I haven't time."

The man who makes progress is of a different stripe. He doesn't steal the office boy's work in order to keep engaged. He does not think of his job as something to fill up his time; but as something to accomplish. He has a goal; and he is always thinking, planning and seeking the quickest and best way to attain it.

Many must often choose between the trivial and the worth while.

When a proposal is put to him by his co-workers, who wish to guide and help him, how easy it is to reply, "I haven't time." But that is not the pathway to progress.

He should rather say to himself, "Let's assume that here is opportunity. I must consider carefully what it has to offer. Maybe I'll have to re-adjust my time; perhaps I'll have to change my methods. But I am ready for anything that will help the business." Whoever reasons and acts thus, cannot go far astray in the business world.

The man who is eager to improve, does not ignore requests. When he is asked to do something that he believes to be less important than the things that already occupy his time, he will think the subject through and then prove his point.

And "I haven't time" does not prove it!

All of us *have time* to improve—not only at the suggestions of others, but of our own initiative.

All of us *wish* to improve—for therein lies the greatest pleasure of honest work.

All of us *can* improve—for around all about us are many things on which we may start right now.

Here is the most inspiring thought I can bring you at the beginning of a New Year. And, if we are all agreed on this, we can round out 1922 with results which will make us all rejoice.

J. Ogden Armour.

Editor's Note:—The above editorial was addressed by J. Ogden Armour of the great firm of Armour and Company to his employers as a New Year's message. It is reproduced here through the courtesy of Mr. Armour. It contains a timely message for every business man and worker.

How to Cut Threads for Machine Repair*

GUSTAVE H. RADEBAUGH

With the several standards of screw threads used in the assembly of machinery, it is necessary when doing repairs to understand each standard, so that proper selection of thread cutting tools and new screws and nuts can be made without loss of time.

A Word of Explanation

A tap is a hardened and tempered steel tool for cutting internal threads. It has a thread cutter on it and flutes to give cutting edges. The blacksmith tap is tapered three-quarters of an inch to the

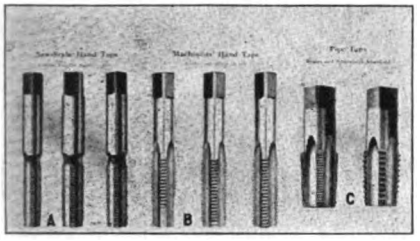


FIG. 1—SHOWING THE DIFFERENT TYPES OF THREADING TAPS

foot. It is used on tapping jobs where a standard is not necessary to maintain. The set of machinist's hand taps, Fig. 1, is not tapered, and maintains one size. In these two styles of taps many different sizes are used. Taps run in sizes by sixteenths. Taps one sixty-fourth or one thirty-second over size can also be bought. When drilling a hole for a tap, the hole should be the diameter of the bottom size of the thread. Some taps have marked on the shank the size drill that should be used in drilling the hole for tapping.

The pipe tap Fig. 1, is used for cutting pipe threads. The pipe thread is a different standard from machine bolts and machine screws. There are two standards of pipe threads the Briggs and the Whitworth Standards; the Briggs standard being the more commonly used. A tap wrench is used for turning the tap in the hole. When tapping cast iron, it is not necessary to use oil, but in tapping steel a good fatty oil should be used. The die and die stock Fig. 2, is used for cutting threads on bolts and screws. A die block is furnished for each size of thread. Die blocks run in the same standards as the taps. Thread standards cause more or less difficulty in using screws of all sizes and designs. The machine bolt standard differs from the standard of threads used in automobile construction. A common standard for quarter inch is twenty threads to the inch; three-eights, sixteen threads to the inch; one-half, twelve or thirteen threads to the inch.

Cutting Threads With Die and Tap

When fitting bolts, nuts, and screws on repair jobs, difficulties are sometimes encountered for the reason that the operator does not fully appreciate the importance of thread standards.

The pitch of a screw is the number of threads to an inch and it is very important when fitting a screw in a job that we know that the number of threads on the screw and in the job are the same.

The use extensively in this country the U. S. Standard thread, which can be identified by a flat top on the thread points. The V thread, which is the shape of a V at a 60° angle can be identified by the thread coming to a sharp point.

There are one or two other styles of threads, but these two are the more common. The shape of the V Standard, Whitworth Standard, United States Standard, Acme Standard, British Associa-

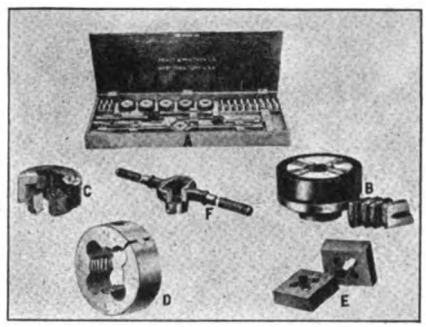


FIG. 2—DIES, AND DIE STOCKS FOR THREADING

tion Standard, and Square Thread are shown in Fig. 3.

As to standards of threads, that is,—the number of threads per inch for bolts and nuts such as used on farm machines, the U. S. Standard is most commonly used. A chart for this standard is shown at A, Fig. 4 which is shown on page 28.

For bolts and screws used on automobile construction the Society of Automobile Engineers adopted a standard (B, Fig. 4.) some years ago. A finer pitch identifies this standard. For example, the U. S. S. thread for a ½ inch bolt is 13 threads per inch while the S. A. E. Standard for the ½ inch bolt has 20 threads.

For the convenience of the trade, all tap and die manufacturers mark on the tool the standard number of threads per inch, the

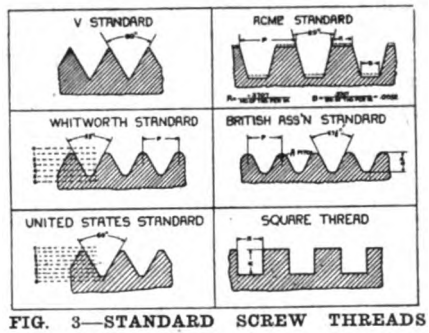


FIG. 3—STANDARD SCREW THREADS

size of the thread, and sometimes on the tap the size of the drill to be used to drill the hole for tapping.

Taps and dies when being used on steel must be lubricated. A good grade of animal lard oil, sperm oil, and graphite and tallow mixtures (10 per cent graphite and 90% tallow) are the best lubricants to use when tapping or threading steel or iron. Remember that a good soap compound is better than "mineral lard oil. Machine oil is a poor thread cutting lubricant.

When tapping cast iron, use very little oil, as it has the disadvantage of causing the chips to stick to the tap flutes.

If a hole is to be drilled for tapping, it is important that the proper sized drill be used. This can be determined by finding the diameter of the tap or bolt at the bottom of the threads or by referring to the chart of tap drill sizes in Fig. 4.

Cutting Treads With a Die

In threading soft steel by hand with the hand stock and die, the end of the material to receive the thread should be rounded, that is, the sharp corners should be removed at an angle of about 45 degrees.

*Editor's Note:—This is the fourth article of Mr. Radebaugh's series on Standard Mechanical Practices in the Auto and Tractor Shop. The fifth article will appear in an early number.

(See Fig. 5.) This can be done by using the coarse or bastard file, as shown in this view.

This operation is an important one, at it permits the easy starting of the die and also insures its careful usage. It will also be found that the die can be started straighter after this operation has been performed.

Another method that is used to round the end of stock before cutting the thread, is that of using the hammer, as shown in Fig 6. The uneven end is rounded by striking medium blows with the hammer on the end of the stock and holding it in about the same position as if you intended to draw it to a point. It is not necessary to heat the stock to perform this operation.

Dies are divided into two classes, —the die required to pass over the thread several times in the cutting of the finished thread and the die that produces a finished thread in one cut. In the latter class there are adjustable, spring, and solid dies. They are made from tool steel, are tempered and are very hard. A die can be sharpened by grinding back the front face of the cutting teeth or chasers.

The adjustable and spring dies are the best style suited for general repair work. The die block is held in a die stock when cutting a thread. One die stock is sufficient for several sizes of dies. It is not good practice to use a standard size die to cut threads on stock that is rolled 1/32 of an inch over size.

To cut the thread the stock is placed in the vise with the rounded end up. The die is placed on the bar and with a downward twisting or turning motion it is forced on the stock, cutting the thread. (See Fig. 7.) After two or three turns forward the die should be given a slight turn backward. This permits the removal of the cutting teeth of the die.

If a full thread up close to a shoulder is desired, the die is turned over and the cutting operation is continued up to the shoulder. Dies are made for right or left hand threads. When using a left hand die it should be turned opposite to the direction of the hands of a clock.

When cutting a thread with an adjustable or spring die, the size of thread should always be tested with a standard tapped nut. The die can be adjusted, as shown in Fig. 8 by using a screw driver.

The designs of adjustable dies are such that this adjusting is simple and can be made very quickly. The adjustable dies can be altered as much as 1/32 of an inch or under the size marked on the die. The spring die will adjust about 1/16 of an inch over or under. It is not good practice to extend this adjustment more on this latter type of die.

TABLE SHOWING PITCH OF THREAD and Sizes of Tap Drills for U S. Standard Thread

Diam. Tap in ins.	Thds per inch	Size of Drill ins.	Diam. Tap in ins.	Thds. per inch	Size of Drill ins.	Diam. Tap in ins.	Thds. per inch	Size of Drill ins.
¼	20	3/16 in.	½	11	37/64	1¼	7	1- 5/64
5/16	18	1/4 in.	⅝	10	5/8	1⅜	6	1-11/64
⅜	16	5/16 in.	¾	10	11/16	1½	6	1-19/64
7/16	14	3/8 in.	⅞	9	47/64			
½	13	11/32 in.	15/16	9	51/64			
⅝	12	13/32 in.	1	8	27/32			
9/16	12	29/74in.	1⅛	7	61/64			
⅝	11	33/64 in.						

S. A. E. Standard Threads and Drill Sizes for Taps

Diam. in.	Pitch	Tap Drill
¼	28	No. 4
5/16	24	17/64 in.
⅜	24	21/64
7/16	20	8/8
½	20	7/16 in.
9/16	18	1/2
⅝	14, 18	9/16
¾	18	39/64
¾	16	43/64
⅞	16	51/64, 13/16
1	14	59/64

FIG. 4 TABLES SHOWING TAP SIZES, THREADS PER INCH AND SIZES OF DRILLS FOR U. S. STANDARD AND S. A. E. STANDARD

Tapping a Hole

The tap is a tool used to produce internal threads. Hand taps are listed in sets, three taps comprising a set, the taper tap, the plug tap and the bottom tap. The taper tap is best suited for starting tapped holes. It can not be used, however, for completing a job unless it can pass clear through the work. The plug tap makes a full thread nearly to the bottom of a hole. It has the first three teeth tapered off. The bottom tap is used to tap a full thread to the bottom of a hole. It should be used after the plug tap.

The plug tap is the best style for all around work. It must be understood that to get a hole tapped proper size it is not necessary to use all three of the taps in a set. In the operation shown in Fig. 9 the tapping position is pictured. The secret of proper tapping is to equalize the pull on the handles of the tap wrench.

When a Tap is Broken

The breaking of taps can be reduced greatly by using proper lubricant. When a tap is broken near the surface it can easily be removed by driving on both sides at the same time as shown in Fig. 10. By doing this, the tap is not wedged against the one side of the hole as when driving on one side only, but it is forced to rotate.

Injecting into the hole a solution of nitric acid (one part acid to five of water) has also proved very effective. The action of the acid on the steel loosens the tap and it can then be backed out by using a drift punch or a pair of pliers. The remaining acid should be washed from the hole.

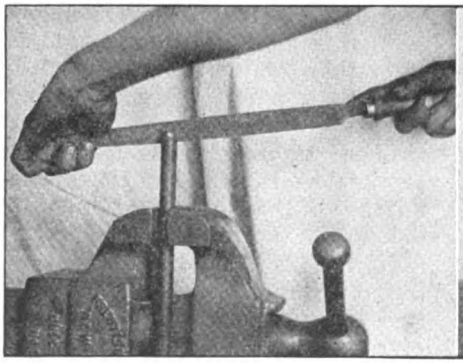


FIG. 5—THE END OF THE STOCK MAY BE ROUNDED WITH A FILE

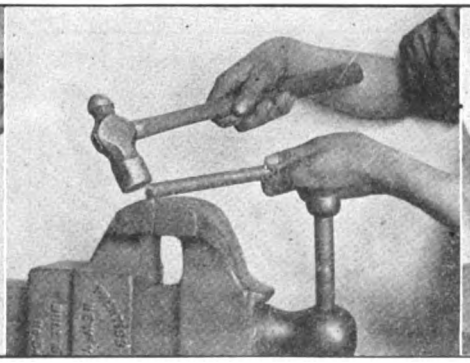


FIG. 6—ANOTHER METHOD IS TO ROUND THE STOCK WITH THE HAMMER

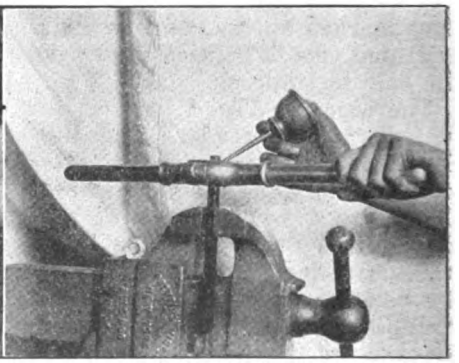


FIG. 7—THE DIE SHOULD BE LUBRICATED WHEN CUTTING THE THREAD

Using The Screw Gage

To find the number of threads per inch on a bolt or in a nut the screw pitch gage is used. This gage has a number of thin blades on which are cut two or more teeth which correspond to the number of threads per inch, which is stamped on the blade. By comparison of the threads on the bolt with a selected blade from the screw pitch gage, the exact pitch of the bolt can be determined. See Fig. 11.

On some of the coarser threads the rule is used to find the number of threads per inch as shown in Fig. 12. This is not an accurate method, but it proves very helpful in finding thread pitches.

Many times in fitting up the ½-inch bolt with nuts it is found that the nut will not screw on the thread, yet the diameter indicates correct size. By measuring the threads per inch on the bolt and in the nut you may find a 13 thread nut and 12 threads per inch on the bolt. By referring to the tables in Fig. 4 you will note that there are two standard threads for ½ inch, —the 12 and 13 threads per inch. Bearing this in mind will save trouble and time when working with a ½-inch bolt.

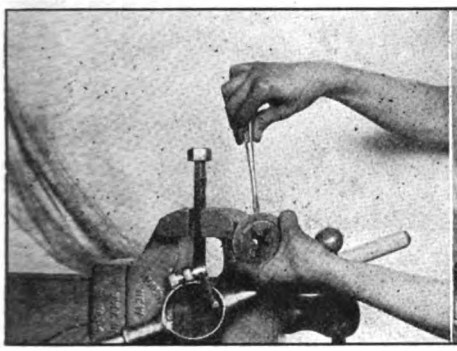


FIG. 8—THE DIE MAY BE ADJUSTED WITH A SCREW DRIVER

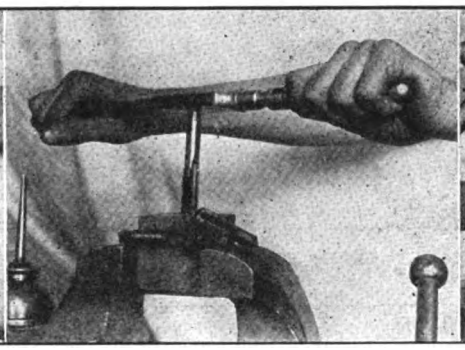


FIG. 9—THE PULL ON THE HANDLES SHOULD BE EQUALIZED

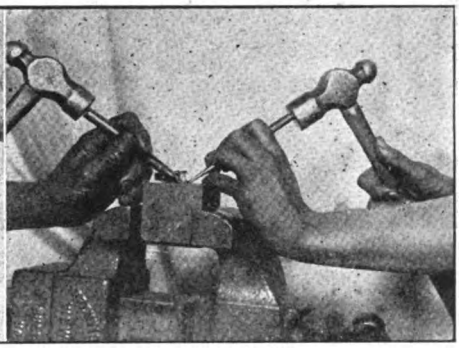


FIG. 10—A BROKEN TAP MAY BE REMOVED BY DRIVING ON BOTH SIDES

Housing the Tractor

The tractor represents an investment which should be carefully conserved. Protection from the elements is absolutely necessary if the efficiency of the tractor is to be maintained. Too many farmers leave their tractor exposed during the winter months when the weather is especially bad. Proper protection will aid materially in prolonging the life and usefulness of the machine.

Naturally the tractor will be used primarily for belt work during the winter time and if possible provision should be made for housing it in a dry and well lighted building adjoining the work shop or conveniently near it so that it may be readily accessible and in good condition whenever it is desired to use it.

Some farmers have little work for the tractor during the winter and make a practice of laying it up until field work is ready to be done. In such a case the following precautions brought to the attention of your tractor owning customers will insure the machine being kept in good condition:

1—After running it into a well protected storage room and before stopping the motor, slowly pour about a pint of good clean oil into the bowl of the carburetor and continue running until the oil has all been sucked into the motor. Then shut down the motor. The object of this is to coat the friction surfaces with a film of oil to prevent rust.

2—Open all drain cocks on the the cooling system. Do not forget to drain the water tank and water line in a kerosene-burning machine. Also drain the air washer.

3—Clean off all dirt and grease from the outside of the machine. Wipe first with kerosene and then with gasoline.

4—At your first opportunity go over the tractor carefully and put it in good shape for the spring work.

Excessive Repair Charges Hurt Future Business

As a rule the rural shop owner is never accused of excessive charging for the work he does. Usually he errs on the other side and to an extent that has caused some of the old school general smiths and repair men to become the easy mark of grasping auto, tractor and implement owners.

A case recently observed however brings up the question of excessive charges and charges for unnecessary repairs and unnecessary replacements. In other words parts being unnecessarily replaced in customers' cars, trucks and tractors as well as implements during the course of repair operations. In Many instances these parts were found to be in perfect condition and were evidently discarded at the whim of the repair man, or for the purpose of realizing a profit on the new parts.

For instance, some shops follow the practice of discarding cylinder head gaskets whenever the head is removed for any purpose. In other places pistons are thrown out when new rings properly fitted would have answered the purpose. Crank shafts are replaced when out of true instead of being straightened.

Repair work handled economically for the customer is equally as important as turning out a job in proper mechanical order. There is nothing more vital to the success of your business than retaining the good will of your customer, through the medium of efficient service at reasonable cost. Shop owners who increase customers' repair bills unnecessarily are working against their own best interests. That this is true, is proven by the results achieved by repair and shop men who have maintained service that was always efficient and yet economical.

Keeping the Men and Keeping Them Busy

How often you hear some shop owners say that the repair business is pretty much "up and down," that is, they will be rushed "to death" one day and then have a day when there is almost "nothing doing." And naturally a shop

operated on that basis cannot be operated economically. If any considerable working force is employed the problem is just that much more complex.

Conditions of this kind are most apt to prevail where the service rendered is generally unsatisfactory, or where no effort is made to follow up customers. Every shop owner should have a list of auto, truck and tractor owners in his locality and should keep in frequent touch with them. When there is a lull in repair work the shop owner should write or 'phone the owners whose cars or implements he has reason to believe are in need of overhauling.

Inviting the owner to bring his car, truck, tractor or farm machines in for inspection or adjustment will frequently lead to further repair work.

Circularizing the other shops and the garages for repair work which they are not equipped to do, is another means adopted by progressive shop owners to increase their repair business.

Shop owners who have heretofore made no real effort to build up their repair work should look into its possibilities at once. The business is there; all that is required to secure your full share of it is conscientious and well directed effort.

Fitting Pistons and Rings on the Fordson Tractor

Tractor pistons are fitted in the cylinder bore tight on .006" and loose on .004". To determine the proper clearance in fitting these parts, it is necessary to use .001" feelers. Because of the possibility of pistons being out of round the feelers should be tried at several points around the bore of the cylinder.

As the top piston ring does not travel the full length of the cylinder bore, it is necessary when overhauling a motor and fitting new pistons, to file off the small flange or ridge which will be found at the tops of the cylinder walls.

Tractor piston rings are tapered and marked so that there need be no mistake in fitting them properly. The latest rings are marked with a groove near the upper edge and fitted with edge having groove toward top of piston. Earlier style rings were punch marked and installed with side having marking toward top of piston.

When fitting a new ring, first try it around the piston by placing its outside edge in the groove to which it is to be fitted, thus making certain that it is a good fit but not tight in any position. Rings are fitted with a clearance of .0005" to .0025" between ring and ring groove.

The top piston ring should have .005" gap between the ends. The second ring is fitted with a gap of from .005" to .008", while the lower ring may have an even larger gap.

In order to maintain the balance of the motor, it is necessary when replacing pistons to make sure that the new pistons are of equal weight; this can be determined by checking the punch marks found on the tops of the pistons. Or it may be determined by actually weighing the pistons and balancing them before replacing in cylinders.

Make a Feed Grinder Turn Money Into Your Pocket

With market conditions as they are this year in both grains and cattle, a great many farmers will find it necessary to feed their grain if they are to make any profit at all out of it.

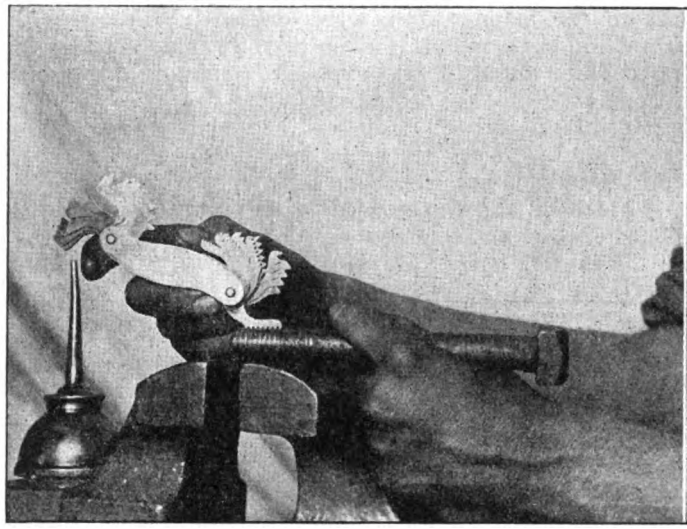


FIG. 11—THE SCREW PITCH GAGE QUICKLY TELLS THE PITCH OF THE BOLT THREAD

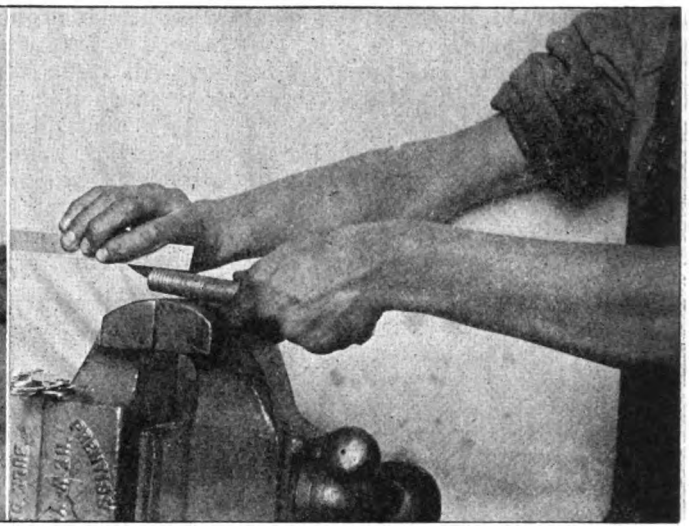


FIG. 12—A RULE MAY ALSO BE USED TO DETERMINE THE THREADS PER INCH

Cattle feeding authorities are practically unanimous in saying that greater value can be gotten out of ground feed than unground when used for feeding purposes. Experiment station figures tend to prove that both cattle and hogs gain in weight much faster when fed the ground food and that the increased gain in weight accomplished through this practice will pay a high rate of interest on an investment in a grinder.

The power for operating the grinder is, of course, an important thing and the shop owner who has a gas engine can easily turn some extra dollars into his pocket. Ordinarily, about four bushels of corn or 2½ bushels of oats will be handled by the ordinary mill for each horse power operating it.

A distinct advantage of feed grinding is that it may be done at a time when work is slack and when there is little else for the shop owner and help to do.

Purdue University Has Tractor Testing Plant

The agricultural engineering interests of the state of Indiana are well served by Prof. Wm. Aitkenhead and his corps of assistants

who hold forth at Lafayette. The agricultural engineering department is in the agricultural division but it works in close co-operation with the engineering division, which has in its equipment a highly developed tractor testing plant where any kind of test can be satisfactorily conducted. Prof. Aitkenhead will continue the direction of various tests of tractors which have given valuable results in the past year or two, and in addition will conduct the regular power farming course in the department, as well as several tractor short courses.

A Spring Furnace and a Practical Spring Jig

W. A. REAGAN

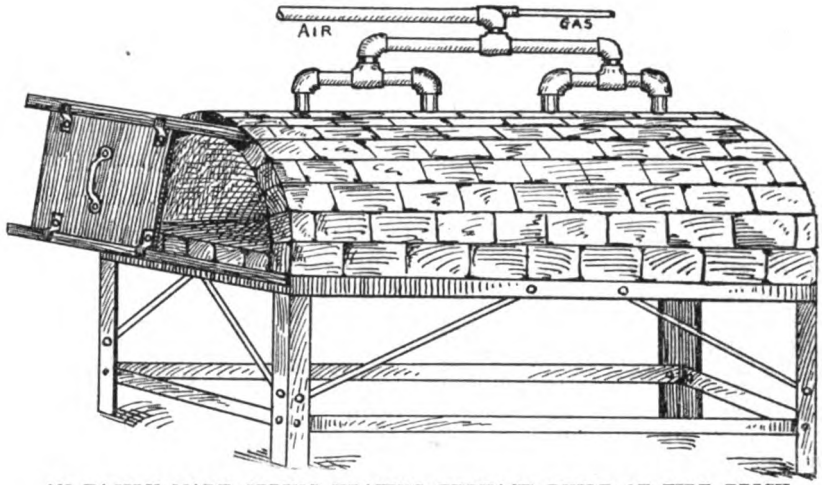
The accompanying engraving shows a practical spring heating furnace that may be built by any practical shop man. If Mr. D. J. Bray, of New Hampshire will try out this type of furnace, I am very sure that he will find it entirely satisfactory for his work. This furnace is what might be called the bee-hive type. The flat bottom measures about 2 feet wide by about 6 feet long, and rests on an iron frame work about 3 feet high from the floor.

The highest point in the arch of the furnace dome is about 2 feet above the floor of the furnace. To preserve the arch of the furnace, an iron frame work of used wagon tires is made previous to the building of the brick structure. These iron arches are rivited at proper intervals to the base or floor frame, and the fire bricks are then built on this frame structure.

It seems hardly necessary to give any instructions regarding the laying of the bricks, as the practical man needs little suggestions along this line. A furnace of this kind can be built up or framed from the material that happens to be on hand, and the material at hand may make necessary some changes in the actual brick structure. In fact about all the average practical man will need in order to build a furnace of this kind, is to look at the pictures and then at the dimensions.

The heat is distributed through the furnace by means of four gas jets or burners, located in the top of the furnace. These jets or burners are placed 18 inches apart and are connected up as shown in the engraving. The shop in which this furnace is used has access to a gas service main while air pressure is taken from a regulation electric blower such as used in the ordinary blacksmith forge.

The inside of the furnace will of course need some fire proof protection and asbestos plaster is recommended for this purpose. The interior of the entire furnace is plastered with this material, so as to carefully close any cracks and cervices and to protect the structure from the intense heat which is generated.

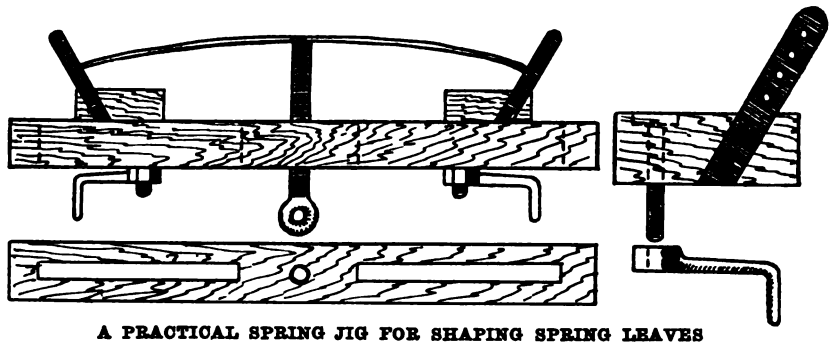


AN EASILY MADE SPRING HEATING FURNACE BUILT OF FIRE BRICK

The doors of the furnace, one of which is located at each end, are of sheet iron and constructed in such a way as to slide on small tracks. No doubt, they could also be arranged to operate on hinges and the reader can use his own discreation using such an arrangement as best suits his convenience, or the material which he has on hand.

The spring jig shown in the illustration will also be found of a very practical use and considerable convenience in the shaping of springs. The base of the jig is made of three by four-inch hickory wagon axle, 6 feet long. The end blocks which slide upon this frame or base are 3 by 4 inches, by 6 inches of the same stock. The irons attached to these blocks are 1½ by 3/8 inch and measure 6 inches above the block. The holes in the top ends of these irons are four in number and one inch apart. When making these iron, of which there are four, two attached to each block, the four irons should be made at one time so as to be exactly uniform in spacing and size. The screws for holding the blocks to the frame or base were taken from an old binder while the nuts for these bolts or screws were fitted with handles as shown in the engraving.

It is hardly necessary to tell the practical smith or shop man how to use this spring jig, as its use and application in the building of springs will be self-evident to the practical man.



A PRACTICAL SPRING JIG FOR SHAPING SPRING LEAVES

These two items of shop-made equipment will no doubt be found of practical profit increasing help to many readers.

An Aid To Proper Gun Cleaning

OTTO A. WAGNER

In a recent issue of "Our Journal" appeared an article on gun cleaning which was very good so

far as it went but it did not cover the subject completely. The object of this article is to attempt to cover the ground not covered by that article.

To begin with I will say that the vast majority of guns are ruined by cleaning and not cleaning, mostly not cleaning. Very few however are worn out by proper use. Just why a man will invest his hard earned money in a good gun; and he is generally particular to try to get what he thinks is best; and then deliberately let it go to ruin by rust, is hard for me to understand. And to this class of gun owners there is little use to give advise. They either don't care or figure on shooting the gun till it becomes inaccurate and then soak someone on it. This class does not appreciate any light on the subject. But the man who unknowingly ruins his barrel while trying to keep it in good shape will no doubt appreciate some advice. For his benefit this article is written.

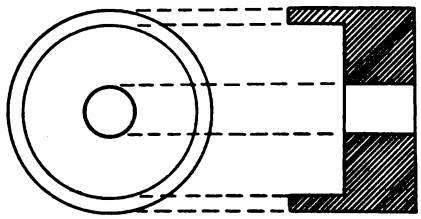
When one who has kept his barrel bright and clean and has never permitted it to rust, finds it has become inaccurate and is told that he has ruined it by cleaning he is at loss as to what is meant, so an explanation is in order.

In their printed instructions some gun manufacturers caution against letting the cleaning rod strike against the muzzle. Others do not mention it, and that is just what most shooters do in cleaning. They will allow the cleaning rod to strike first one side of the barrel then the other. But one asks what harm does that do? It does harm enough, it wears the barrel at the muzzle and flares it out so that the bore is larger right at the muzzle than farther in. When the bullet which fits the bore arrives at the end of the bore it does not fit gas-tight as it should, and the powder gas under high pressure squirts out around the bullet, generally all on one side, and throws the bullet off it's course. Sometimes it escapes evenly and the rifle shoots pretty well maybe a couple of shots in succession. You will then think the gun is alright until it goes to shooting wild again. A barrel in such shape does not shoot accurate though it may be as bright as a dollar inside, and that is the reason the muzzle should receive special care in cleaning.

Any rod steel, brass, copper or wood will wear the barrel. So watch the muzzle. A barrel worn at the muzzle is ruined as it can't be fixed.

To guide a cleaning rod in and out of a barrel without it touching at all is a tedious operation, and it is almost impossible if one hurries. Guiding it with the finger and thumb of the left hand will help, but it is not very satisfactory. I have overcome this trouble by the use of a special muzzle protecting cap turned out of steel, brass or bronze, the latter is best. This is made like a wooden pill-box or hair-pin box lid. It is bored out so it just caps the muzzle snugly. Through the exact center a hole is drilled to fit a small metal cleaning rod.

This cap must be turned in a lathe and it must be made accurately to be of value. Just chuck a round bar of the desired material in the lathe and turn it off the end.



AN AID TO GUN CLEANING THAT WILL PREVENT MANY GUN TROUBLES

See the accompanying engraving for the idea.

I keep this cap on my cleaning rod, and as I insert the rod with patch into the barrel I slip this cap over the end of the barrel and hold it firmly with the thumb and first finger of the left hand while I operate the rod with the right. The rod cannot touch the inside of the barrel, and I keep the bore as straight and true at the muzzle as elsewhere.

I do not claim to have originated all the information here given, but I did have the experience of having helped ruin several barrels by the ignorant use of the cleaning-rod and so learned by experience. However so far as I can learn I am the only one to have used this muzzle-cap. It is original with me, though others might have used something similar, unknown to shooters in general.

Sixty-one Horseshoe Nails Help Pay Rent

The story of an odd custom followed in England since the twelfth century is sent in by our friend and frequent contributor Mr. J. Baldwin of Indiana. The story follows:

One of the odd customs for which England is famous was followed the other day when two bundles, six faggots, a hatchet, a billhook, six horseshoes and "sixty and one" horseshoe nails were given to an agent of King George V. as "rent in kind" for a small plot of land in the Strand where a forge originally stood and for another piece of land in Shropshire. The Kings representatives received the rent on behalf of the crown.

In the year 1235, a tournament was being held in a field where the law courts now stand and during the tournament a knights armor gave way. A smith repaired it so well that the king gave him the right to erect a forge on the field, stipulating that the annual rent should be six horseshoes and sixty and one nails.

The rent has been so paid every year down to the present one.

How To Build a Bus Body

W. A. REAGAN

The bus described here and pictured in the accompanying engravings is a type used in this part of the country for light trips. It is built on a one-ton Ford Chassis, fitted with over-size pneumatic tires.

The side elevation of the truck body as shown in Fig. 1 gives an excellent idea of its general outline. The body is 12 feet long, 6 ft. wide, and 5 feet, 6 inches high at the corners. The panels may be made any size according to the dimensions of the lumber or metal which you may choose to use. Some body builders may wish to use the regulation or ordinary wall board for paneling, similar to the material used and now found very popular for partitions in homes and stores. The widths of the battens on the paneling may also be of practically any width, depending upon the stock you have on hand.

In the engraving at Fig. 2 is shown the seat arrangement. Here it will be noted that the seat runs around the outside of the body. They are covered with imitation leather. Good seat springs should be used in the cushion in order to give ease in riding and also for the sake of economy. Cheap springs do not pay. As a rule they will not stand up under the hard service which a vehicle of this kind usually receives. A detail of the seat

construction is shown at A in Fig. 2. The driver's seat is located at), and is made with another seat backed up to it, to allow for the seating of another passenger. A

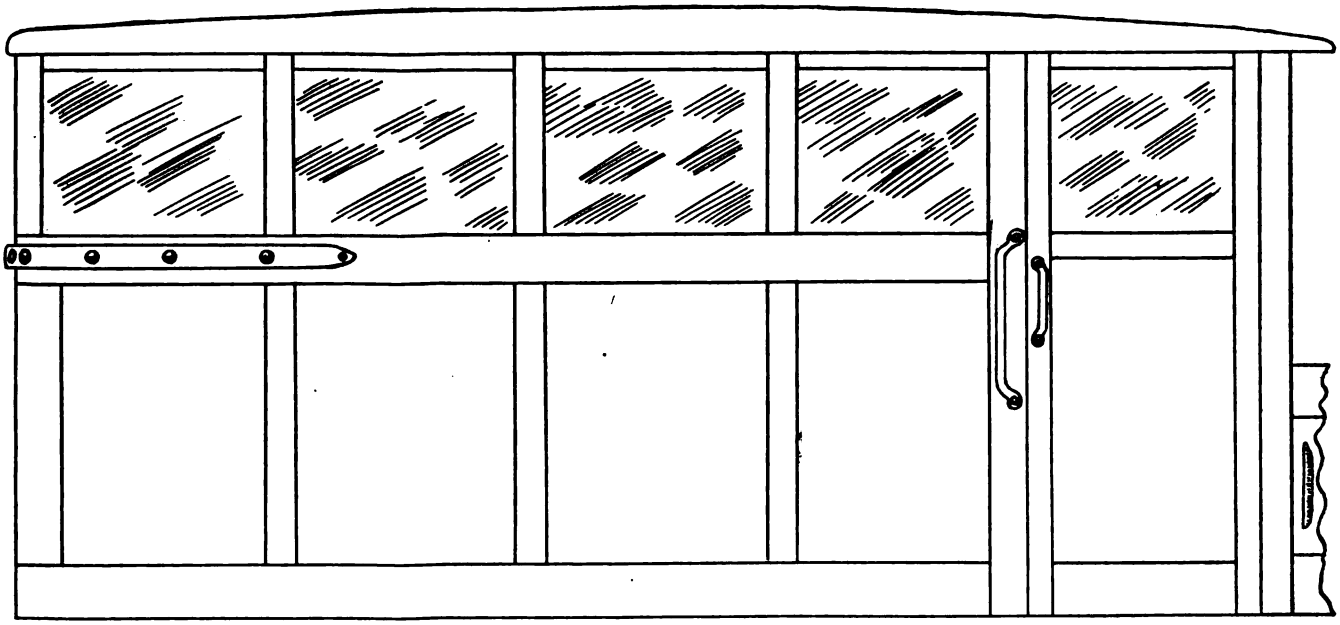


FIG. 1—SHOWING A SIDE ELEVATION OF THE BUS BODY. THE UPPER PANELS ARE OF GLASS WHILE THE LOWER PANELS MAY BE OF ANY SUITABLE STOCK

detail of the driver's seat and its passenger seat combination is shown at C Fig. 2. This construction permits of a very convenient tool box under the seat closed with a small door as shown in the engraving. Immediately in front of the driver's seat and at the foot of the windshield is a shelf about 10 inches wide and the length of the windshield. Under the shelf is located the gas tank. A hole in the shelf allows for the removal of the filler cap for the filling of the tank. A side elevation of this construction is shown at D, Fig. 2. In this side elevation X represents the switch or instrument board. This shelf makes an excellent holder for small parcels, which are often carried for "Through Off" along the line. The space at the left of the emergency brake lever may also be used for this purpose.

The front elevation of the body is shown in Fig. 3. The center panel below the windshield is most easily cut from sheet metal in order that this panel may fit the hood just as closely as possible. The cross bar and sill arrangement is shown in Fig. 4. An idea for the roof cross pieces is to cut hand holds in these cross pieces large enough to admit the hand easily. These are found very convenient for passengers when entering or leaving the bus, and also when the bus is in motion. Fig. 5 is shown the construction of the luggage carrier. An arrangement of this kind is very necessary on a vehicle of this character in order that the space inside the bus will not be taken up with large packages, trunks and baggage. This carrier should be made of quite substantial stock depending upon the material at hand.

This body can also be adopted to larger truck frames and be built in proportion. The door to the right of the drivers seat is hinged to open toward the front of the body, though it could also be arranged to slide along the side of the body, though it could also be outside. A convenient hand hold attached to the door frame at the left of the door will be found convenient for the use of the passengers upon entering and leaving the vehicle.

Wisconsin Farmers Believe in Tractors

The real test of power farming comes in a period of depression, enforced farm economy and the absence of super-heated sales campaigns. This is a period when the lasting qualities of existing tractor models show up to best advantage. With this thought in mind, the Wisconsin Farmer made a survey of power farming conditions in that state, with some interesting results.

Seventy-five per cent of the farmers used their tractors as much as ever, while an additional 16 per cent said they used it much more frequently and for jobs on which the saving of time and labor made motor power imperative. Ninety-five per cent of the owners expressed no aversion or disappointment in the machines they own now.

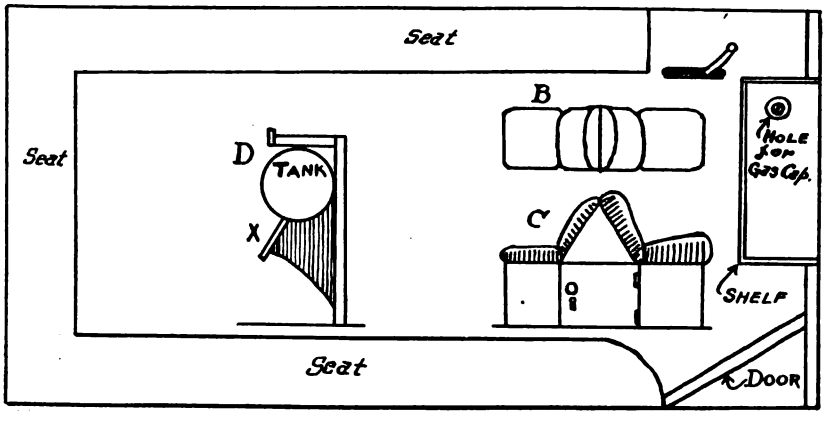


FIG. 2—SHOWING A PLAN VIEW OF THE BODY WITH DETAILS OF DRIVER'S SEAT AND TANK AND SHELF

Among the advantages enumerated were the possibility of increased acreages, more elastic production ability, and greater economy. Practically all the farmers used their machine for winter belt work.

Without exception, the men who were most enthusiastic were those who kept operating costs low by using their tractors throughout the year on a varied assortment of hard and time-consuming tasks, which means that the fellow who stored away his tractor for the winter simply added to the overhead and let it rust out perhaps when it should wear out by honest service.

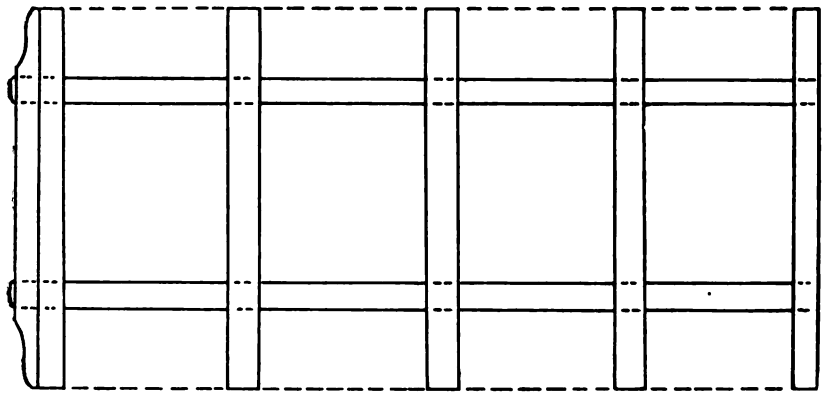


FIG. 4—SHOWING THE CROSS BAR AND SILL ARRANGEMENT OF THE BUS BODY

Help Keep the Tractors Busy

Tractor owners are continually having drummed into their ears the advice that they must keep their tractor busy if they are to make it pay. When winter comes, some tractor owners wonder what work there is to do to keep their tractors busy. Here are some suggestions:

For regular work throughout most of the winter the tractor can be used to grind feed and shell or shred corn. Sawing wood for his neighbors keeps many a tractor owner busy. In regions where limestone is available, crushing limestone for fertilizer is good business. Where roads are being built, crushed stone is always needed for construction work.

There are also times when there is very little snow; then it is possible to use the tractor for hauling loads to and from town, for hauling logs and firewood, or for clearing stumps and stones from fields.

A Handy Anvil Shear

N. A. GRANT

The accompanying illustration shows a handy shear to be used on the anvil. It is a very practical help, and I find it second to none for clipping cultivator shovels and kind of hot stock and also heavy sheet iron.

In order to make this device just as handy and practical as possible make a place for it on your anvil block. It will then be ready and right at hand to shove in your anvil when you need it without taking any extra steps.

In the engraving A the top blade of the shear is 11 inches long. The lower blade shown at B is 8 inches long and part C is a piece of square stock to fit the hardy hole of the anvil. This piece is bent at right angles as shown with the horizontal section measuring 3 inches.

I made my blades out of some broken leaves taken from a front Ford spring. These have given excellent service. I heated them to a bright cherry red, and then shaped them to size, then I put them under ashes until cool. I then drilled a hole as shown, ground the cutting edges to the proper level, and assembled the pieces as shown at D. Do not try to temper them.

In assembling the parts, the piece B should be rivited to the right side of the base section C. While A is hinged to the right piece C for a right-handed man. In case of a left-handed man, this part should be to the left. When drilling holes in the lower blade of part B countersink the first two holes and rivit to the square stock solidly. In the completed shear, this blade B should rest solidly on the base of the anvil and set squarely across it.

In operation, open the shear by striking the long shank of the top blade with your hammer. This will open the jaws. Now place the stock to be cut on the lower blade, and strike the upper blade at a point just over the stock. I am very sure that if any of my brother readers of "Our Journal" will make this shear, they will be as enthusiastic as I am on account of its practical use and extreme handiness in anvil work.

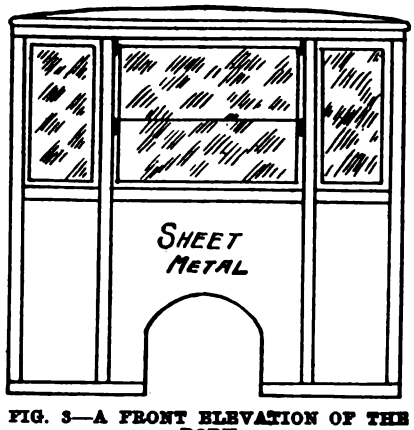


FIG. 3—A FRONT ELEVATION OF THE BODY

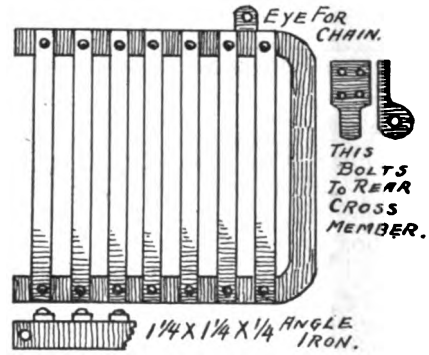


FIG. 5—THE LUGGAGE CARRIAGE IS FASTENED TO THE REAR CROSS MEMBER

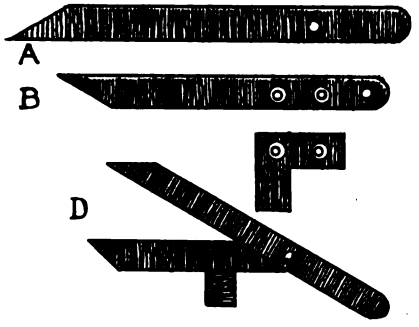
Welding Angle Iron and a Light One Piece Forging

F. E. PARSONS
"WORK"

The worker in light metals will usually find himself up against trouble when he attempts his first weld in angle-iron. Assuming that he contemplates welding up a square or an angle piece, he will first think it necessary to cut out a vee-shaped piece as in Fig. 1, concluding that this should be a true mitre, having an included angle of 90°. This would be so far correct if the joint was to be just butted and subsequently brazed; but if the joint is to be welded it would be found that were a 90°

angle piece to be removed, the joint scarfed and then welded, the finished result would be an angle piece considerably out of square.

The secret of such a process is to cut out a piece of metal at an angle of less than 90°, say from 60° to 70°, then to prepare the joint for welding and to bend it round



WONDER WHY NO ONE THOUGHT OF THIS HANDY ANVIL SHEAR BEFORE

farther than the proposed angle, as in Fig. 2. Thus in welding and flattening the joint the metal will spread, and so bring the work back to the required angle.

In welding angle-iron a square or rectangular cast-iron block, having the upper corners suitably rounded to agree with the radius at the root of the angle-iron, will be found of far more advantage than the anvil, as the block may be utilised for squaring-up and levelling purposes (see Fig. 3).

It may often be required to produce a light metal tee-shaped forging of a substance perhaps so slight that it is difficult to weld it, as would be done were the metal thicker. A suggested method of producing such work is along lines represented in the example given herewith.

Assuming that it is desired to make a tee-shaped forging, as in Fig. 6, the primary idea being to save material, first take a piece of steel or iron plate of the required thickness, width and length, then, as in Fig. 4, either punch or drill the two small holes shown near its centre, and proceed to cut the plate down to the holes, as indicated, well rounding the corners A and B, which will facilitate subsequent operations. Now get the plate hot and open out the two ends as in Fig. 5, using a round fuller in the corners and a flatter to level and make it plain. At each successive heat widen out the ends until they are at right angles with the centre piece, as in the finished example (Fig. 6). The bottom edge may require a little chipping, filing or grinding in order to give the job a presentable appearance.

Flushing the Engine With Kerosene

The practice of flushing the working parts of an internal combustion engine with kerosene after draining it of old crank case oil has become so common as to be almost universal, but recently several authorities have come forward expressing their doubt as to the value of the practice.

Like every other operation to which the motor and working parts are subjected, the work of flushing the engine must be properly done. The dilution of lubricating oil by kerosene will affect the efficiency of any lubricant and may affect it to such a degree as to cause injury to bearings and working parts. Other objections to the use of kerosene as a cleaning and flushing medium are detailed.

The objections which have been brought forward to it are as follows:

First; a certain amount of kerosene is likely to become entrapped in natural pockets and troughs which are formed through details of the engine design, and when new oil is put in it will be diluted by the kerosene caught in these pockets.

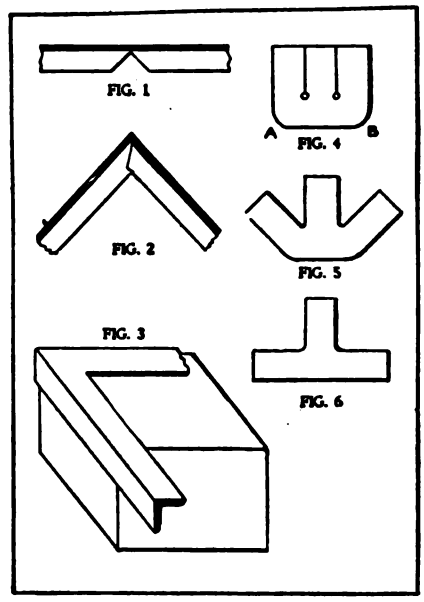
Second, many engines which have circulating pumps above the crank case for the lubricating

A SERVICE THAT CUSTOMERS WILL APPRECIATE

system require that the pumps be primed with lubricating oil to insure immediate circulation of the oil on starting. When kerosene is employed, it is not effective as a priming and it is difficult to start circulation.

Third; many operators will turn the engine for a few minutes with a starter in order to make the flushing thorough. The effect of this on the engine is very bad indeed.

Fourth; it is claimed by some that the gritty abrasive particles which collect in the crank case are more readily disturbed and circulated when kerosene is used for flushing than otherwise. Naturally, the results of this cannot be good.



ANGLE-IRON WELDING AND LIGHT METAL FORGING

A Service Idea that Customers Will Appreciate

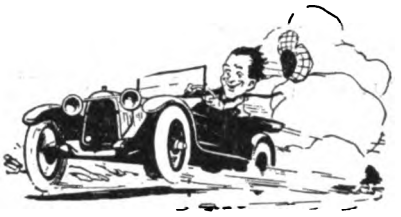
An excellent idea suggested by the Ford Service Bulletin and illustrated herewith will be thoroughly appreciated by your customers.

How often we find the fine upholstery of a car soiled by grease and dirt stains from the clothing of mechanics who have worked on the car. And how often we find the fenders marred and scratched because they present such exeellent resting places for wrenches, hammers and tools in general when working on the car.

To guard against marring and scratching of fenders in their own shops many repair shop owners have made canvas cover or protectors for fenders and upholstery which they place on the car as shown in the engraving.

This sort of service is appreciated by customers and makes the shop using it to stand out from the crowd.

High Spots



Naming The Tractor

W. H. Gardner

(Mother tells what she thinks of the gasoline contraption.)
When Old Sol crowed in the barnyard, mother was quick to rise.
Her steps were sort o' shuffin' and puffy red her eyes—
But—she wasn't one to carry on—just built a rousin' blaze.
(Folks got up mighty earily in them old horse-farmin' days!)
She boiled the coffee, fried the eggs, and crisped the bacon thin—
And the table it was ready when the hired men stomped in!
Now, we kept 40 horses—that meant eleven men,
All scattered 'round the section; and 'long about nine or ten
I had to pack out lunches, a job I didn't mind—
But in the swelterin' kitchen, mother was left behind.
And every blessed afternoon, no matter how hot 'twould feel—
She stood over th' cook-stove, gettin' th' evening meal!
But dad has sold the horses—and fired the hired men;
(And I wake up a-stretchin', then snuggle to sleep again!)
For since we got the tractor, there ain't much to do;
The horses made th' trouble—them and the hired crew!
There's more creakin' down the stairs by light of the mornin' star—
Says mother, "Call it a 'tractor,' boys—for me it is a PLEASURE CAR!"

Loose business methods usually lead to tight money affairs.

What's become of the old-fashioned man who paid his blacksmith bill in carrots?

How about paving the road to success with a concrete reputation instead of with good intentions?

And now that she's within sight again we find that Miss Prosperity is the same good looking gal she always was. We sure did miss her these past many moons.

What have you bought from advertisers lately? We want to know. For the best story of actual purchases we will give a five year's subscription. Tell us your story.

When you're stuck on some job—look it up in "Our Journal" Index. Most likely you'll find it solved in some back number. If you're still stuck, ask the Editor—there's no charge.

Every job done at a loss consumes the profit on at least two profitable jobs. And jobs done at cost reduce the gain on profitable work just fifty per cent. The work done at cost "simply to keep the men busy" simply keeps the men busy at a loss.

Men are pretty much like engines. You can pull a toy engine along by a string, but the mile-a-minute train carries its own fire. The inefficient man is being pulled along by the string of necessity and need. But when a man generates his own fire and steam, look out for him,—he's like an express train; using every bit of energy to reach his goal.

Some craftsmen seem to be worrying about the lack of boys coming up in the trade. Which leads to some very leading questions:—Is it the fault of the boys? or the fault of the men in the craft? or the fault of the craft? Some members of the good old trade could debate on those questions at considerable length to the good of the boys, the men and the trade. How about it you veterans? Not necessary to name names.

Do you agree with everything said in these pages? Of course not. You're not expected to. But you are expected to tell us your side of the question. If you want to know something ask us about it. If you have a good recipe or formula let us have it so we can tell others about it. This paper is truly "Our Journal"—yours Mr. Reader and Craftsman—it's a 50-50 proposition between all members of the trade. Don't be backward in holding up your end of the deal.

Take a lesson from the barber—you know the slick, smooth talker who suggests everything from a neck shave to a massage, shampoo and a bath when all you desire is a quick shave. Well, take a suggestion from him.—But just a suggestion mind. There are ways and ways to suggest other needs to your customers. Make them in the spirit of helpfulness and co-operation not rank salesmanship. Study the right way—it pays—it is well worth it.

Our Friend Tom Tardy is quite a humorist. When we asked him why he continues to keep an old battered clock on the shelf under a sign reading: "If you want Credit, listen to the clock?" He explained with great pleasure that there was no tick to the clock and there was "no tick" in the shop. But then there isn't much cash either and if the truth were known poor Tom has more on his books (or slips of paper rather) than he cares to admit. Some day he will attempt to collect, no doubt.

Of course it is possible for a man to continue in business without reading a paper on his trade. But it's just as our friend the Dominie says: "It is possible for one to live a christian life outside the church, but it is so much easier with the help of the church." And so it is easier for a craftsman to carry on his craft with the help of a good craft paper. The man who burdens himself with self imposed burdens is foolish and he who rejects acknowledged helps and assistance in his daily business problems is blind.

Reputation—how hard to achieve and yet how simple the formula. If a man "made good" on every promise made, no matter what happened, wouldn't he build a sterling reputation? If a man insisted upon the right, the true, the good no matter what the odds, wouldn't he build a golden reputation? If a man pleaded the cause of the unfortunate, took the part of the oppressed and sided with the lowly, wouldn't he build for eternity? All of these things are simple, yet how few of us follow this easy formula!

When you get to looking on the dark side of things.—When your pessimistic tendencies get to over balancing your optimistic inclinations, just sit back and think. Think hard and long. Think of the progress you have made, the craft has made, the world has made. Think back five, ten, twenty years—think of what has happened. And then with the schedule of past performance to guide you, chart your course for the future. Get busy, stay busy and work for what you will then know is coming. Determination, ability and honest striving will bring you out right—you cannot fail.

How long must we wait before we receive that letter from you for publication? You've been reading and enjoying the letters of other readers and practical smiths, now, why not give them something practical and interesting from your experience? If we all depended upon ourselves alone the craft would not advance very fast. Suppose others had withheld the information you have gotten out of this issue! Suppose you had to depend entirely upon yourself for new ideas, new methods and new stunts! And where would the craft be today if everyone did the same! This matter of craft advancement means big, broad-minded consideration of the give and take attitude. Again we ask how long before you send in something to help the craft?

"Been too busy" replied a prospective subscriber the other day in response to our second call. "You see I've so much work on hand now I can hardly turn 'round, and everybody yelling for their work. Why there's a job Mr. Milburn brought in two weeks ago and I ain't even had time yet to figure out how to do it" and the shop owner pointed to a broken motor casting. In asking more about the job we found that the same thing had been described in a recent issue of "Our Journal." And we weren't long in pointing out how the investment of one little lone dollar and about twenty minutes time in reading the article would repay our friend twenty fold. "Gosh! I never thought of that" said he as he handed us two dollars for a three year subscription.

AMERICAN BLACKSMITH, AUTO AND TRACTOR SHOP
A SERVICE
Not Merely a Trade Journal

The American Blacksmith, Auto, & Tractor Shop is a Service for the individual reader. It's mission is to help at forge, bench, desk and home. We believe that the correctly balanced shop owner is first a man, second a mechanic and third a business executive. We want to help in each capacity, and individually. Therefore, let us help YOU, Mr. Reader. Ask for help on your individual problems. This service is for

YOU.

OUR HONOR ROLL

RETURN OF AN OLD FRIEND

Several of "Our Folks" have asked about Our Honor Roll and if we would again print this list, and so here it is. We are compelled to leave out some of the regular matter this month in order to find room for this list but are glad to meet the wishes of our readers. It will be impossible to publish this list every month but we will have it appear at frequent intervals.

A DEMONSTRATION OF VALUE

This list of readers who have paid their subscriptions far in advance is a most convincing demonstration of the practical value of "Our Journal." Readers will not pay in advance for a paper that is not useful and profitable to them. Space does not, of course, allow for publishing the name of every reader who is paid up to or beyond the present date.

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These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents. (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

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H. Schreiber, Pa. .....July, 1925
H. Fast, Manitoba .....June, 1925
G. Broughan, N. Y. .....June, 1925
D. Conillard, Vt. .....June, 1925
Rasmussen & Baasch, Nebr. ..May, 1925
J. O'Rourke, N. Y. .....May, 1925
A. Spangberg, Oregon .....May, 1925
C. DeVore, Pa. .....May, 1925
Halvorson, Bros. .....May, 1925
A. Lemmon, Utah .....May, 1925
H. Leadbitter, N. S. W., Aust. Apr. 1925
J. Matthews, England .....Apr., 1925
M. Duvoisin, Ill. .....Apr., 1925
E. Ellsworth, Iowa .....Apr., 1925
G. Gullgren, Iowa.....Apr., 1925
H. Wiese, Iowa .....Apr., 1925
Heart's Delight Farm, N. Y. Apr., 1925
S. Wilkin & Sons, N. Y. ....Apr., 1925
P. Wand, N. Y. .....Apr., 1925
M. Settle, Ohio .....Apr., 1925
D. Kile, Okla .....Apr., 1925
J. Helms, Calif .....Mar., 1925
E. Moon, Ind. .....Mar., 1925
A. Holmquist, Iowa .....Mar., 1925
G. Frericks, Minn. .....Mar., 1925
O. Martinson, Minn. .....Mar., 1925
C. Lindquist, Minn. .....Mar., 1925
F. Locke, N. Y. .....Mar., 1925
G. Follmar, Nebr. .....Mar., 1925
C. Alexander, N. Y. .....Mar., 1925
P. Chemin, Ohio .....Mar., 1925
F. Faixtinger, Pa. .....Mar., 1925
E. Roseth, S. D. .....Mar., 1925
V. Priessnitz, Wisc. .....Mar., 1925
A. Hersog, Misc. .....Mar., 1925
J. Taugher, Ont. .....Feb., 1925
G. Lawton, South Aust. .....Feb., 1925
E. Dillabough, Ont., ...Feb., 1925
J. Ford, Wash. .....Feb., 1925
J. Kers, Ill. .....Feb., 1925
E. Price, Ill. .....Feb., 1926
B. Nystrom, Mich. .....Feb., 1925
E. Hiteshue, Ohio .....Feb., 1925
D. Garber, Ohio .....Feb., 1925
A. E. Meier, Wisc. .....Feb., 1925
J. Beyerholm, Calif. .....Jan., 1925
C. Lake, Colo. .....Jan., 1925
H. Draper, Ind. .....Jan., 1925
J. Damm, Iowa .....Jan., 1925
E. Atteberry, Mo. .....Jan., 1925
A. Hahn, Colo. .....Jan., 1925
D. Shearer, Ohio .....Jan., 1925
H. Brecher, Pa. .....Jan., 1925
H. Compton, Tenn. .....Jan., 1925
C. Jacobits, Wis. .....Jan., 1925
A. Witt, Wis. .....Jan., 1925
J. Withers, Terre Haute .....Jan., 1925
M. Bennett, Miss .....Jan., 1925
E. Staley, Calif. .....Dec., 1924
J. Davis, Calif. .....Dec., 1924
G. Tatum, Fla. .....Dec., 1924
G. Laughlin, Ill. .....Dec., 1924
B. Bueker, Ill. .....Dec., 1924
F. Jarvis, Ind. .....Dec., 1924
W. Herdt, Ky. .....Dec., 1924
E. Naylor, Md. .....Dec., 1924
J. Klein, Md. .....Dec., 1924
M. Bailey, Mich .....Dec., 1924
L. Casewell, Minn. .....Dec., 1924
J. Ingvarson, Minn. .....Dec., 1924
D. Teeblen, Nebr. .....Dec., 1924
C. Fairley, N. H. .....Wec., 1924
C. Carlson, N. H. .....Dec., 1924
G. Parker, N. H. .....Dec., 1924
C. Klotz, N. J. .....Dec., 1924
I. Powers, N. J. .....Dec., 1924
W. Lamberton, N. Y. .....Dec., 1924
F. King, N. Y. .....Dec., 1924
J. Muller, N. Y. .....Dec., 1924
C. Moon, N. Y. .....Dec., 1924
E. Evans, N. Y. .....Dec., 1924
J. Marshall, Ohio .....Dec., 1924
J. Schucker, Pa. .....Dec., 1924
N. Quick, Pa. .....Dec., 1924
C. Birely, Md. .....Dec., 1924
F. Bradley, N. Y. .....Dec., 1924
A. Estes, Va. .....Dec., 1924
I. Clark, Va. .....Dec., 1924
J. Bailey, Manitoba .....Dec., 1924
R. Brander, Manitoba .....Dec., 1924
E. Stahl, Ill. .....Dec., 1924
J. Hoyt, Maine .....Dec., 1924
G. Rogers, Mass. .....Dec., 1924
A. Tremblay, Mass. .....Dec., 1924
W. Doremus, N. J. .....Dec., 1924
H. Roberts, N. Y. .....Dec., 1924
W. Neal, N. Y. .....Dec., 1924
J. Robertson, Ohio .....Dec., 1924
A. Kavelman, Ill. .....Dec., 1924
O. Sampson, Ill. .....Dec., 1924
G. Rummel, Mich. .....Dec., 1924
N. Kurtz, N. Y. .....Dec., 1924
Grantham Bros. .....Dec., 1924
J. Smith, Ohio .....Dec., 1924
G. Gulbranson, S. D. .....Dec., 1924
H. Ward, Ill. .....Dec., 1924
Ruddell Bros., Ill. .....Dec., 1924
C. Mattix, Iowa .....Dec., 1924
F. Raduens, Iowa .....Dec., 1924
G. Edwards, La. .....Dec., 1924
S. Searles, Mass. .....Dec., 1924
J. Dilworth, Mich .....Dec., 1924
W. Mahan, Mo. .....Dec., 1924
A. Ramsey, Nebr. .....Dec., 1924
G. Burr, N. Y. .....Dec., 1924
J. Carley, R. I. .....Dec., 1924
T. McGee, Tenn. .....Dec., 1924
M. Englebrecht, Mo. .....Dec., 1924
F. Duffy, Mont. .....Dec., 1924
T. Cranmer N. J. .....Dec., 1924
E. Wirsinger, N. Y. .....Dec., 1924
W. Osborn, N. Y. .....Dec., 1924
F. Higgins, N. Y. .....Dec., 1924

Standard Tire Repair Shop Methods

How to Repair Tubes and Casings, the Shop Equipment Necessary and How to Figure-Repair Costs

PART II.

The Inside and Outside Method

It is a common error, in making this type of repair, to remove the old fabric only part way down on the sidewalls. This causes a sharp hinge in the tire and, on account of the new materials not extending far enough down to give strength and firmness, there is a tendency

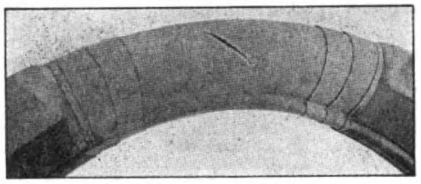


FIG. 18—SHOWING A SMALL BLOW OUT WITH THE OLD PLIES OF FABRIC CUT AWAY PREPARATORY FOR REBUILDING

for the repair to loosen. In some instances the old fabric in the case will break.

The layback method should be used whenever the tread rubber is in a condition to warrant its being put back into place after the fabric beneath has been repaired. The tread is rolled back from the section to be repaired or is cut away entirely and retained to be replaced, the breaker strip being removed with the tread.

To Tear Down

The illustration Fig. 18, shows a small blow-out and the old plies of fabric stepped down preparatory to rebuilding.

For 3 inch fabric tires, remove 2 plies.

For 3½ inch fabric tires, remove 2 plies.

For 4 inch fabric tires, remove 2 or 3 plies, depending on injury.

For 4½ fabric tires, remove 3 or 4 plies, depending on injury.

For 5 inch fabric tires, remove 3 or 4 plies, depending on injury.

For 4 inch cord tires, remove 2 plies.

For 4½ inch cord tires, remove 3 plies.

For 5 inch cord tires, remove 3 plies.

The old stock should be removed down over the beads. The new fabric applied will then secure a better hold, will not make the beads clumsy or irregular and will permit them to fit to the rim properly.

Building Up

Apply two coats of vulcanizing cement, allowing each to dry for at least an hour. Unless the cement is dried thoroughly, the repair is apt to "blow" or to loosen during vulcanization.

Apply the same number of plies of building fabric as has been removed. Cord fabric should be used for repairs on cord tires and ordinary rebuilding fabric, frictioned on two sides and coated on one, for fabric tires. Chafing strips of light weight fabric should be applied over the heads.

Over the building fabric, apply a thin sheet of cushion gum (approximately 1-32 inch thick), of a width slightly greater than the width of the breaker strip.

If the layback method is being used the tread now can be replaced.

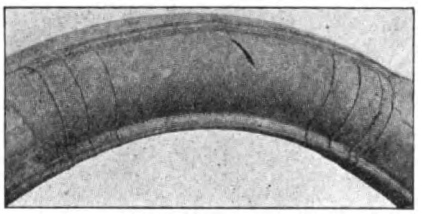


FIG. 19—SHOWING INCORRECT MANNER OF TEARING DOWN TIRE FOR REPAIR OF BLOW OUT

The joints should be filled in with tread gum and the repair is ready for cure.

If a new tread section is to be inserted, apply over the cushion gum one thickness of breaker fabric (frictioned on two sides, coated on two sides).

Over the fabric breaker strip apply another sheet of cushion gum, slightly narrower than the one beneath. The cushion rubber above and beneath the breaker should be from ¼ inch to ½ inch wider on each side than is the breaker.

Replacing Tread

The tread section may be built up and put on the section or a section of retread band or camelback may be used for the purpose. The section of retread band is used quite often when it is desirable to retain the non-skid design without the necessity of using a matrix, which retards the cure.

Some repair men build up a tread section on the case, one ply of thickness at a time. This practice is not recommended as air pockets are apt to form, more time is required and the workmanship cannot be of the best.

The several plies of tread gum first should be well rolled together on the work table and then applied to the tire.

The width of the plies and thickness of tread section must be determined by the wear and condition of the old tread.

The illustration shows the manner of beveling the old rubber to the edges of repair and the way in which the new rubber laps over. The object is to get good pressure during vulcanization, and insure better adhesion between the old and new stocks than when the edges of the repair are cut straight down.

Trim the new gum at the edges of repair, so that it tapers down nicely with the surface of the old rubber. If this is not done, the new gum will flow a little over the edges of the old rubber and may work loose after the case is in service.

In making this style of repair, it is not necessary to remove any of the old fabric from the inside of the case.

After the outside has been built up, fill the hole in the old fabric from the inside, with tread gum.

Reinforce the inside of the case. The inside blow-out patch may be

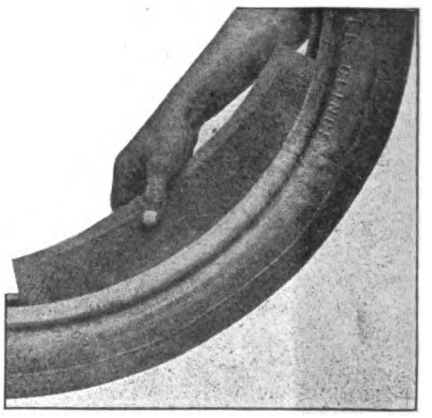


FIG. 20—THE INSIDE OF THE CASE IS REINFORCED WITH A GOOD SIZED PATCH

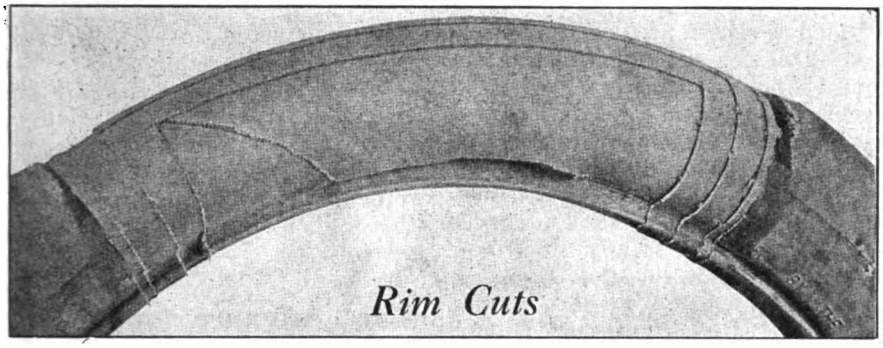


FIG. 21—THE CORRECT MANNER OF CUTTING AWAY OLD TREAD AND FABRIC FOR REBUILDING WITH NEW MATEIAL

used conveniently for this purpose or a patch may be built in over the gum filler. A small patch first should be applied over the gum filler, and over this two plies of building fabric large enough to more than cover the entire repair.

Injury Above Bead

Rim cuts, snags, breaks above the bead or cuts through it may be considered under this type of injury.

Rim cuts are common only in the smaller sizes of tires. The same method of repair is used for all of the above injuries.

Ordinarily, one or two plies of old fabric are removed from fabric tires, unless the injury is a rim cut extending for some distance, in which event three plies are removed. One more ply of fabric should be removed in repairing cord tires than in repairing those of fabric construction.

To Build Up

Apply vulcanizing cement and new materials in same manner as in building up for repair of blow-out, except a fabric breaker strip is not necessary in this style of repair. The building fabric not only extends down around the bead to the toe, but on the inside of the case far enough to secure a good hold and reinforcement.

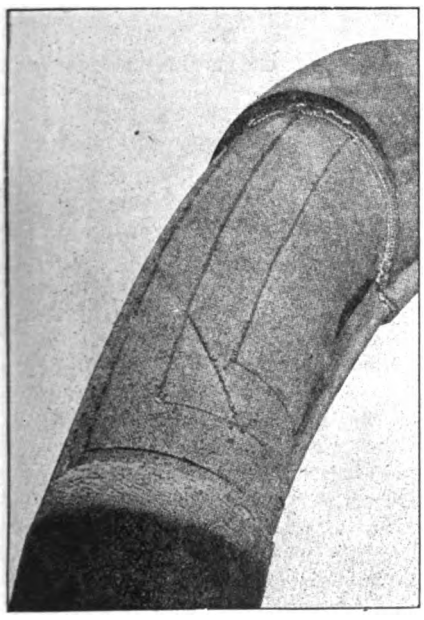


FIG. 22—THE EDGE OF THE OLD RUBBER IS CAREFULLY BEVELED

Rim Cut All Around

Remove the old side wall rubber up to the edges of tread. Remove old chafing strips and one ply of old fabric to about one inch above the beads. Cut through side wall rubber all around, and be very careful not to cut into fabric body of case. The side wall rubber and chafing strips can be removed in one operation.

Retreading

To build up the parts removed apply two coats of vulcanizing cement, and after thoroughly dry, put on one ply of building fabric and over it one ply of chafing fabric (frictioned two sides).

Over the chafing fabric apply new tread gum to the side walls. Do not apply to the case one thickness at a time, but roll this gum together on the table—thickness determined by size of old case. Vulcanize in sectional molds with sectional air bag and bead molds, or if preferred, use endless air bag, apply to split curing rim, wrap and vulcanize in heater.

Retreading

Owing to the amount of materials required, and the cost of the work, there are a great many points to be considered before retreading a tire.

The rubber on the side walls above beads should be in good condition—not affected by oil or grease, hardened or cracked from age. The fabric or cords should be solid and not separated between plies or vulcanization will not be successful.

To Tear Down

If the rubber is removed only to the fabric breaker strip, and the new gum applied over it, trouble likely will be encountered from the materials loosening afterwards, as a result of moisture or dirt that may have worked beneath the fabric breaker strip through small cuts. It therefore is advisable, in most instances, to remove the old tread rubber, the fabric breaker strip and the cushion rubber underneath. This will show the condition of the fabric or body of the case and any small breaks that may need patching may be given attention.

If the old tread rubber is badly cut up and cannot be torn off, a buffing machine Fig. 25 equipped with a rotary rasp file is very effec-

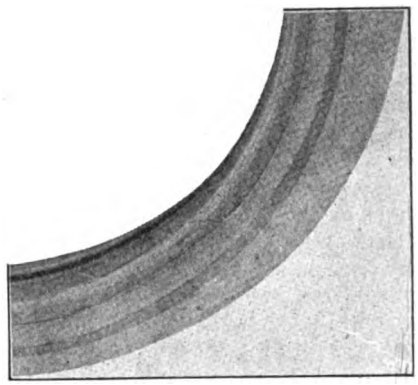


FIG. 23—IF TIRE IS RIM CUT ALL AROUND REMOVE ALL OF SIDE WALL UP TO EDGE OF TREAD

tive for the work. Care should be used that the file does not gouge into the fabric or body of the case. A rotary wire brush may be used for removing small particles of cushion rubber from the fabric.

It is important that all old rubber and foreign matter be removed from the body under the part to be rebuilt. It is a practice after buffing, to clean the fabric with swabs of muslin saturated with gasoline. This practice is not a

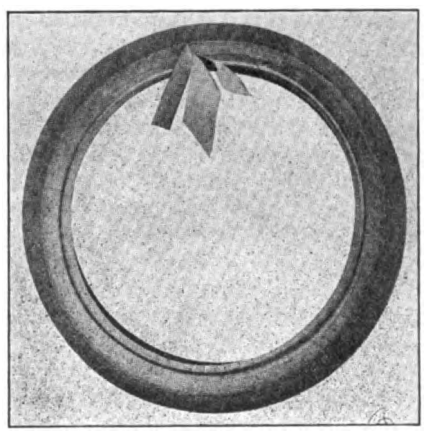


FIG. 24—THE SIDE WALL IS THEN BUILT UP WITH ALTERNATE LAYERS OF MATERIAL

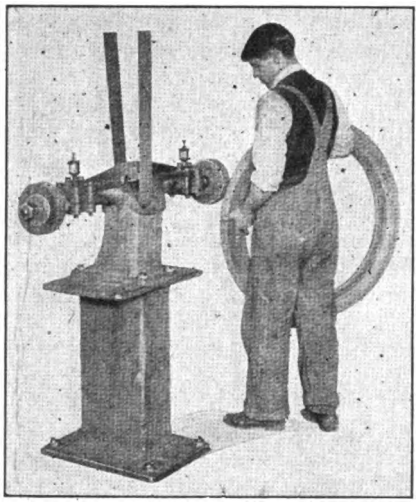


FIG. 25—A ROTARY RASP FITTED TO THE EMERY STAND WILL CUT DOWN OLD RUBBER VERY QUICKLY

necessary one and is to be discouraged. The fabric of an old tire naturally will absorb gasoline very readily, and it is practically impossible to dry it afterwards. If there is any gasoline in the fabric, a gas will form during vulcanization, causing the new stocks to loosen and honeycomb and the cure will be retarded.

After buffing, it is better to remove the loose particles of rubber from the fabric with a whisk broom or dry piece of muslin.

Four Practical Helps for the General Shop

H. W. HINRICHS

Here are four practical suggestions that will be of help at some time to the general repair shop owner.

In the engraving at Fig. 1 is shown a practical means of using old horse rasps. At Fig. 1, A this device is shown in a top view, while at B is shown a side view of the handle arrangement. This makes a very efficient tool for working hot iron and the old horse rasp is just the thing for this purpose. In the engraving at C is is shown the holder without the handle. This is made from one and one-quarter inch by one-quarter inch stock with the ends rounded up to 3/8 inch. The handle shown at C is made from old one-inch piping, and these are made about five inches long. A lip is rasped or filed into the end of the handle so as to hold the rasp firmly when the whole thing is assembled. The two ends of the piece C are threaded and the entire device is then assembled as shown at A and B. This holding device can be made during your spare time and you will find it very handy and useful in making practical use of your old rasps.

At Fig. 2 is shown a simple yet practical means of drawing a tenon to a firm seat. As shown angle irons are made from any old stock one by 3/8 inch. One of these is firmly clamped to the part which must be seated. Another clamp is then adjusted as shown at X and the screw is gradully turned until the tenon section is firmly home. This is a simple way to clamp light reaches to beds or cross heads in the vehicle shop.

At Fig. 3, is shown a very handy and practical corner wrench for turning nuts in close corners. Little or no explanation is necessary for the making of this wrench as it will be seen just exactly how it is constructed from the side view at A and the top view at B. At C is shown how the wrench is used in a close corner.

In Fig. 4 is illustrated a simple manner in which a flanged kettle or boiler was repaired when the original flange was broken off. At A is shown the original outline of the boiler while at B the boiler is shown without the flange. In order

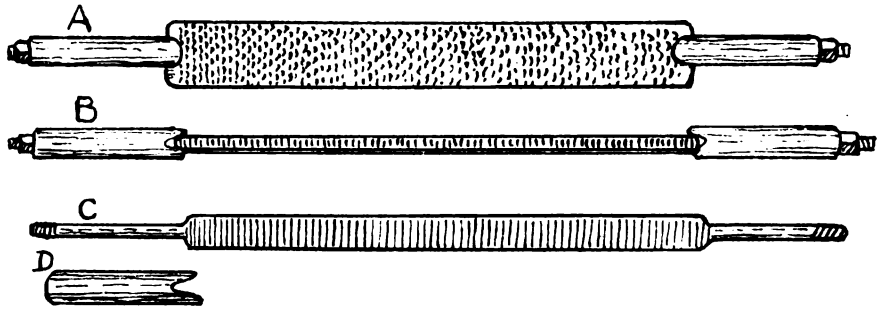


FIG. 1—SHOWING HOW OLD HORSE RASPS MAY BE EASILY FITTED WITH HANDLES

to repair the boiler, a new flange was necessary. This was fitted, and attached as follows: First, two iron curves were constructed as shown at C. These were of one by 3/8 inch iron and bent to conform exactly to the curvature of the edge of the boiler as shown at B. A strip of copper was then cut as shown at D and this was placed between the two iron curves and clamped as shown at E, with half of the width of the copper strip projecting from between the curves. This projecting edge was then bent gradually by tapping with a lightweight hammer until it assumed the positions as shown at F and G respectively. When it had been bent in the position shown at G, it was riveted to the boiler with rivets located in staggered or zigzag pattern and the finished boiler presented the appearance about as shown at I. This was surely a very simple way of accomplishing what would at first appear to be a very troublesome and rather difficult job.

The Advance of Power Farming in the East

The advance of power farming in New England and other eastern states during the year past, has been proportionately greater than in almost any other part of the country. With the diversified farming which is practiced in this region, farmers did not feel the effects of business depression so much as those farther west.

In Maine the rapid development of the use of mechanical power led to a power farming survey in 1920, from which some interesting results were obtained. Under Maine conditions it cost about $10.35 per ten hour day to operate a tractor, this cost covering depreciation, interest, fuel, oil and repairs. Tractors are used on an average of forty full days of ten hours each and the estimated life of the average machine is given as 9.2 years. Tractors were found advantageous because of more rapid work, greater crop returns and saving in both horse and man labor.

Massachusetts, under the direction of Professor C. I. Gunness of the agricultural college has established a mechanical farm, where all the work will be done by students using the latest improved automotive machinery. Connecticut is also proving to be a good power farming country, as shown by the results of the investigation conducted by the farm mechanics department of the agricultural college, which indicated that even on small farms careful management

makes a tractor economical.

The cause of farm engineering in New Jersey has been strongly promoted by the institution of regular courses in engineering in the agricultural department at

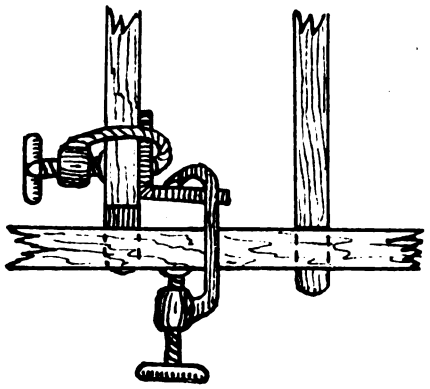


FIG. 2—A SIMPLE MEANS FOR DRAWING A TENON HOME

Rutgers. Professor M. S. Klinck has organized the courses and has already completed some interesting surveys. In New Jersey the tractor is found to be instrumental in bringing about a material increase in the proper acerage of farms and a saving of man labor on each farm of from 4.5 to 5.8 months per year.

With a new $250,000 agricultural engineering building at Pennsylvania State, Professor R. U. Blasingame feels that both teaching and extension work in this particular line will be greatly advanced. Professor Blasingame is co-operating with the American Society of Agricultural Engineers in research work on tractor lugs.

How to Apply Rubber Tires to Carriage Wheels

AN ENGLISH METHOD

The following description of how rubber tires are applied to carriage wheels is taken from the description of a writer in an English publication. We wonder if any of our readers have ever applied rubber carriage tires in this manner.

—In putting rubber tires on carriage wheels, the rubber at the joint is not spliced, but is simply butted together. Measure round the wheel to determine the length of rubber required, but cut off a few inches longer so as to be on the safe side. It can easily be cut off to the right length when the wheel is finished. For putting on rubber tires a wired-on tire is best; it requires neither cement nor a machine for fixing on the wheel. The illustration shows a section of a wired-on tire. To put the tire on, take two wires and screw the ends to suit the nuts; place the two ends level and fasten up in the vice. Then with a tape or wax-line measure round the wheel, allowing 7/8 in. more than the circumference, and mark off the two wires to the length obtained (not cut off). Now cut off the rubber,, and as it has to be cut off so much longer to allow for compression, the rule is as follows: After getting the circumference of the wheel, allow 1½ in. for every foot in length. Thread wires through the rubber, and when the screwed ends are projecting about 3 in. fasten a small clamp on each wire to prevent them slipping back. Now take the wires at the other end of the rubber, fasten them in the vice, and pull the rubber well back until the end is beyond the marks that were made at the commencement. Fix two small cramps to keep the rubber in position, cut off at the marks, and screw the ends to fit the nuts. Now circle the tire, place the screwed ends of the wire together, and fasten them by the nuts. When screwed up tight take off the clamps and let the rubber come together; put the rubber on the wheel as far as possible, and hold in position by clips. To get into the channel the remainder of the tire, work it over with a lever, gradually working all round and hammering down with a rubber mallet until the rubber is in its proper position.

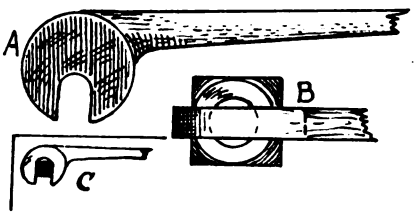


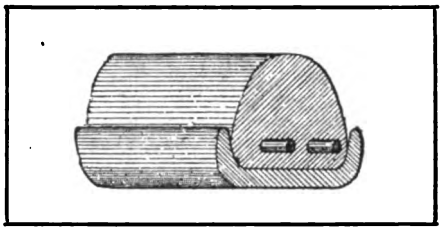
FIG. 3—A HANDY WRENCH FOR USE IN CLOSE CORNERS

Taking Down and Re-assembling the Storage Battery.

PART II.

T. A. BECKLIN

A group of positive plates that have become buckled is shown in



THE ARTICLE DESCRIBES AN ENGLISH METHOD OF APPLYING RUBBER CARRIAGE TIRES

Fig. 16. When reassembling such a group, and if they will not go into the jar readily, they should be replaced with a new set.

After the plates have been carefully examined, for buckled plates, and for other failures, pour the electrolyte into a large jar or kettle. If is it procurable, a glass jar is best suited for the purpose. If any sediment accumulates at the bottom of the jar, it may be readily seen. Sometime impurities get into the electrolyte and of course, it is not advisable to use old solutions showing much sediment.

In Fig. 18 is shown an accumulation of sediment in the bottom of a jar. In normal usage, this sediment will not appear to any considerable extent. A large amount of it however, indicates that the cell has been overheated, that the solution has not been kept above the plates as it should be by adding distilled water at regular intervals. In other words, a considerable accumulation of sediment shows that the battery has not had proper care and attention.

When the sediment has accumulated at the bottom of the jar, the clear electrolyte may be poured off as shown in Fig. 19. It is extremely important not to allow any of the sediment to get into the batteries

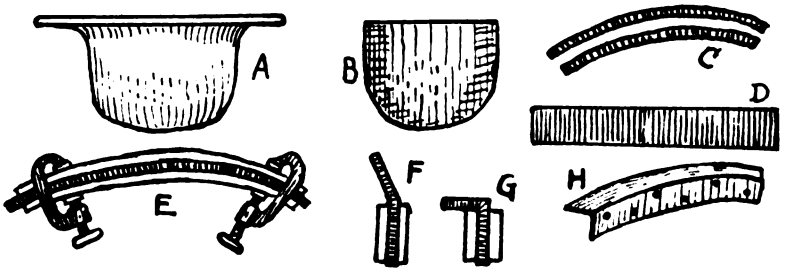


FIG. 4—HOW A BROKEN FLANGE WAS RESTORED TO A KETTLE OR BOILER

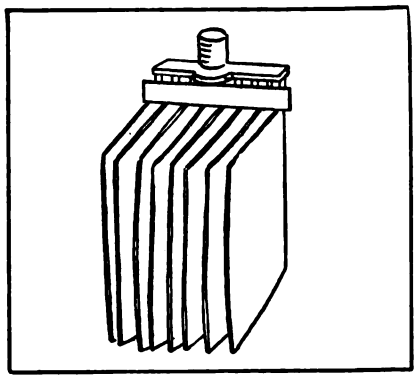


FIG. 16—SHOWING A GROUP OF POSITIVE PLATES THAT HAVE BECOME BUCKLED

when re-building and re-filling the cell. This sediment usually impairs the efficiency of the separator.

Now inspect the battery case thoroughly and carefully. Place the case on its side in the battery sink, and thoroughly clean each cell by directing a stream of water

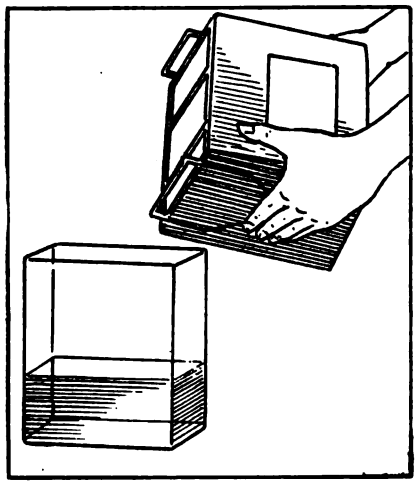


FIG. 17—THE ELECTROLYTE IS POURED INTO A LARGE GLASS JAR

from a hose with considerable force, into each jar. In this cleaning process, be sure that all sediment and foreign matteris removed from the bottom of the cells. Clean each cell thoroughly and carefully, until they are perfectly

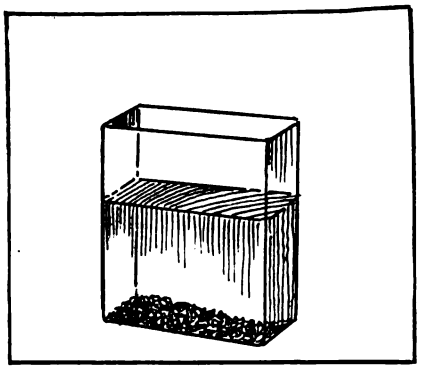


FIG. 18—SEDIMENT IN THE JAR INDICATES IMPROPER CARE AND ATTENTION TO BATTERY IN USE

and absolutely clean.

After cleaning the cells, inspect the jars carefully for cracks, or other imperfections, and any jar showing defection of any kind, should be replaced with new ones. In order to remove a jar, fill it with boiling water, and let it stand for a short time. The hot water will loosen the sealing compound surrounding the jar and then the

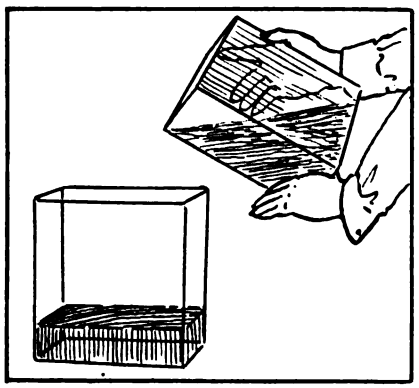


FIG. 19—THE CLEAR ELECTROLYTE SHOULD BE POURED OFF INTO A CLEAN CONTAINER

edges of the jar may be readily grasped with pliers as shown in Fig. 23 and the jar pulled out of the case. Extreme care should be exercised in this operation so as not to do damage to the adjoining jars.

The battery case itself, may sometimes be so injured or rotted to require replacement. However, unless there has been a broken jar, or unless the case has been abused, it will usually be found in good condition. If the case has become broken or rotted, a new one should be used. If all of the jars are removed from the case and the old case is used again, it should be soaked in a solution of baking soda and water. This will neutralize any acid and prolong the life of the wood. After soaking in the solution rinse with water and allow to dry thoroughly. When thoroughly dry repaint the case inside and out with the acid-proof solution, or paint formula which was given in the previous installment of this series.

If all of the jars are not removed from the case examine the case in the place where the new jar is to go, and remove any shims and sedling compound that may remain in the case so as not to hinder the jar from being placed properly.

Before replacing a new jar in the case pour boiling water into it, or if hot water is not at hand, play a light flame around the outside of the jar. When the jar has been

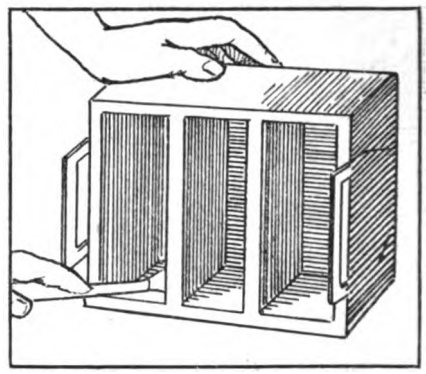


FIG. 20—THE BATTERY CASE MUST BE CAREFULLY AND THOROUGHLY CLEANED

heated, it should be pushed into place as shown in Fig. 26. Be sure that the top of the new jar is level with the top of the old one, for if they do not line up exactly, the top connectors will be uneven and as a result you will have a very poor appearing job, when completed.

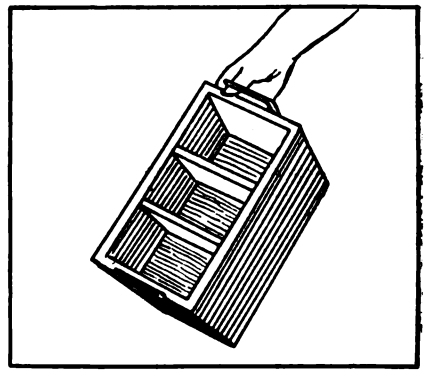


FIG. 21—INSPECT THE CASE AND CELLS CAREFULLY FOR BREAKS AND FRACTURES

In order to secure the proper spacing and a tight fit between jars, place a parafine wood shim between the jars as shown in Fig. 27.

You are now ready to reassemble the positive and negative groups for the element to be placed in each cell. This operation of assembling is a very important one and the work should be done on a

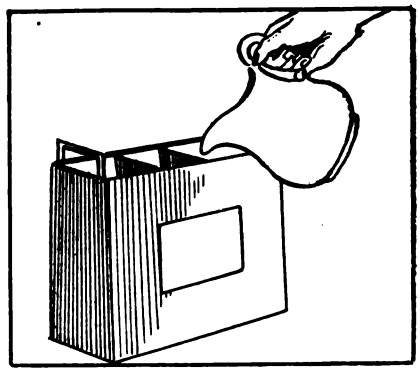


FIG. 22—TO REMOVE A JAR POUR HOT WATER INTO CELL TO LOOSEN SEALING COMPOUND

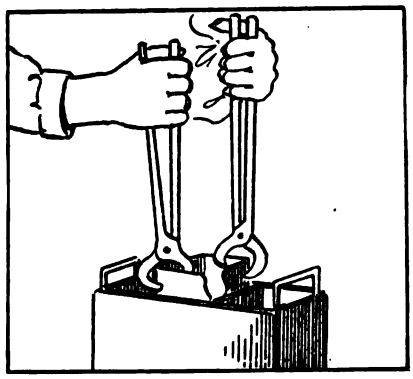


FIG. 23—GRASP THE JAR WITH PLIERS AND PULL STRAIGHT UP

table top that is perfectly clean and free from all dirt and foreign substances of every kind. After you have arranged a place which is perfectly clean and absolutely flat, place your negative groups thereon as shown in Fig. 28. Now intermesh the positive and negative groups. This operation may be easily ac-

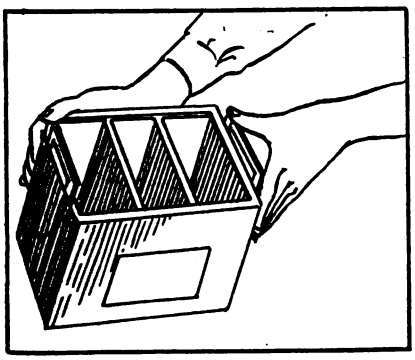


FIG. 24—THE SPACE FOR JARS SHOULD BE CLEAR AND CLEAN SO AS NOT TO OBSTRUCT THE EASY REPLACEMENT OF JARS

complished as shown in Fig. 29. Note in this connection that the negative group contains one more plate than does the positive group and therefore both the outside plates should be negative.

After arranging the two groups, a complete element should appear about as shown in Fig. 30. The element is now ready to receive the

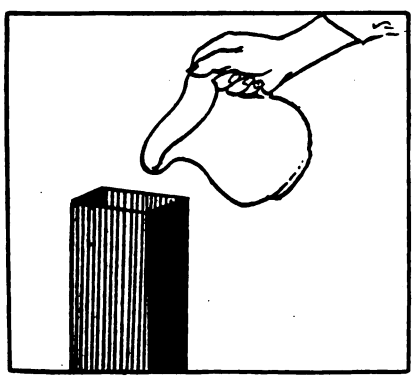


FIG. 25.—BEFORE REPLACING JARS IN CASE HEAT WITH HOT WATER

separators.

To insert the separators, lay the element on its side and insert separators in such a way that the flat sie of the wood goes against the negative plate. When rubber sheets and wood separators are used, they should be inserted together with the rubber sheet between the positive plate and the the grooved side of the wood separator. See that the separators are against the re-

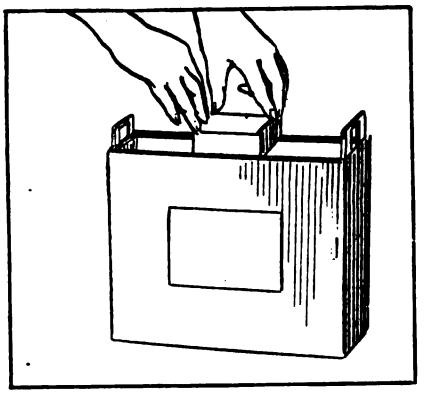


FIG. 26—AFTER HEATING PUSH JAR GENTLY INTO PLACE IN THE CASE

tainers, and that they extend equally on either side of the element. When separators are all in place, count them to be sure that none are missing. The element may now be placed upright on the table and the edges of the separators tapped with a wood block until the separators project equally on each side of the plate.

The operation of inserting the separators is shown in Fig. 31. The importance of all of the separators into place can hardly be over-emphasized, as the omission of a single separator will cause considerable trouble.

In Fig. 32 is shown a complete element. To place it in the jar, grasp the element by the pillar post and lower it gentely into place. This should be done very carefully so as to avoid breaking or injuring the jar in any way.

When overhauling a battery it is a good plan and excellent practice to put all the connectors, terminals and other removable pieces found at the top of the battery, into a strong solution of soda and hot water. If you will let them remain in this solution for about an hour, they will be thoroughly clean and in excellent condition to use again.

Before putting such parts back on the battery, coat them with vasaline which will prevent any further corrosion.

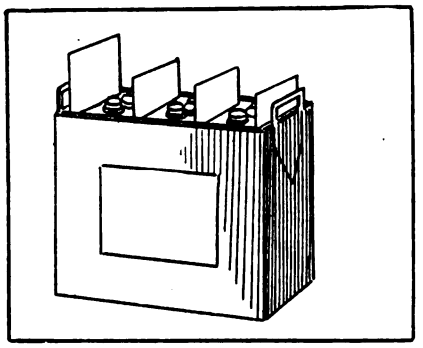


FIG. 27—PARAFINED WOOD SHIMS BETWEEN THE JARS HOLD THEM FIRMLY

Another hint in connection with the repair and rebuilding of the storage battery is never to attempt to repair a crack in a broken jar. It is always best to supply a perfectly new and sound jar in its place.

If you are going into battery service work, do not go into it by half-measures. In other words,

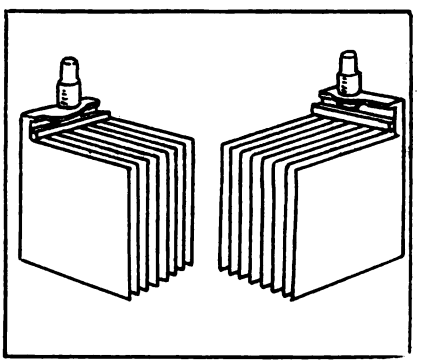


FIG. 28—TWO GROUPS OF PLATES READY TO BE ASSEMBLED

study the action, construction, and performance of the storage battery. Learn all you can about them. The more you know, the better service you will be able to deliver to your customer. Do not be afraid to repair your own electrolyte, and in preparing this use a large crock, and always pour the acid into the water. Also use dis-

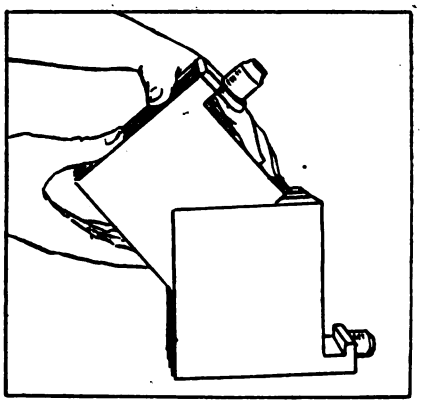


FIG. 29—THE PLATES ARE NOW RE-ASSEMBLED AS SHOWN ABOVE

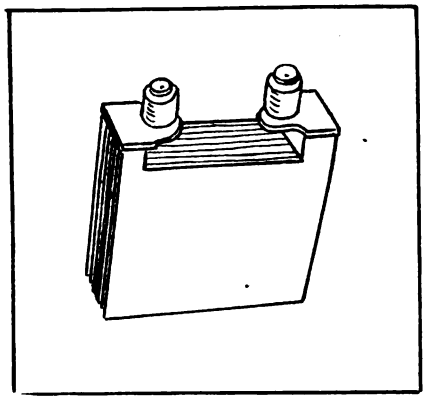


FIG. 30—HERE THE TWO GROUPS ARE READY TO RECEIVE THE SEPARATORS

tilled water always, and before putting any of the electrolyte into the cells, allow it to cool thoroughly.

Be extremely careful in handling the acid of the electrolyte. It is a good precaution to have ammonia on hand in case any of it spills or splashes on the clothing. The ammonia will neutralize the acid and prevent a hole burning into the fabric, should the acid ever splash into the eye wash well immediately with warm water, and put a drop of olive oil into the eye.

Another precaution in connection with battery work, is to avoid the use of an open flame in a room where a storage battery is being charged, or in which it has been left for some time. A mixture of air and hydrogen may be formed in such event and the open flame will cause a serious explosion.

Before discarding the old electrolyte when taking down and reassembling a battery, it is well to take a hydrometer test of the old electrolyte as this will determine the proper gravity of the new electrolyte.

Straightening a Tractor Axle and Protecting the Tractor Radiator

R. NEWBECKER

It frequently happens that an axle on a tractor will become bent and usually at a time when the farmer is busiest, and not prone to lay his iron horse up for repairs for any longer than necessary. Following the regular routine of straightening a bent axle generally

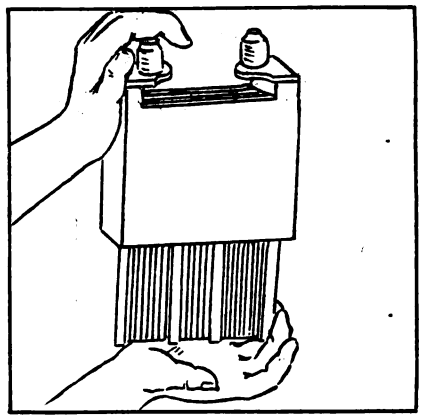


FIG. 31—THE SEPARATORS ARE NOW INSERTED BETWEEN THE PLATES

entails considerable dismantling of the machine which of course requires a certain length of time to accomplish.

Recently we employed a different method which for simplicity will appeal to all repair men who are called on for an axle straightening job on a tractor.

The illustration shows the method followed, an 8 by 8 inch maple beam was laid crosswise of the tractor with one wheel of bent axle resting on it. A heavy jack screw was placed on the beam with the top of the jack bearing against the extreme end of the bent axle. A heavy chain around the axle and the timber held the axle rigidly. Pressure was now applied by means of the jack screw and in this manner, the axle was bent back to a satisfactory position in a very short time and with very little work.

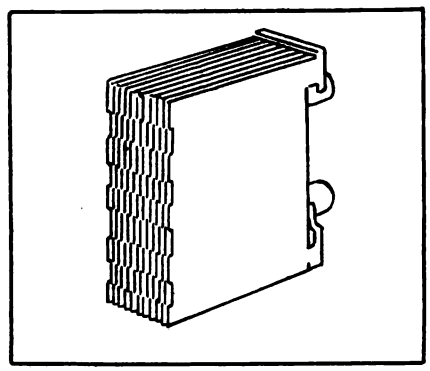
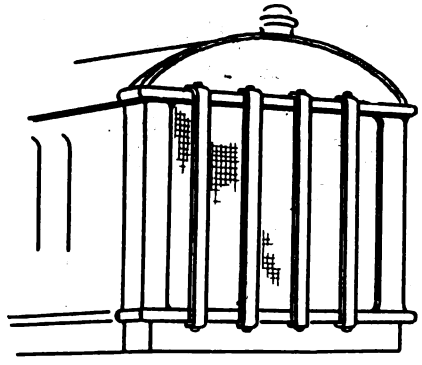


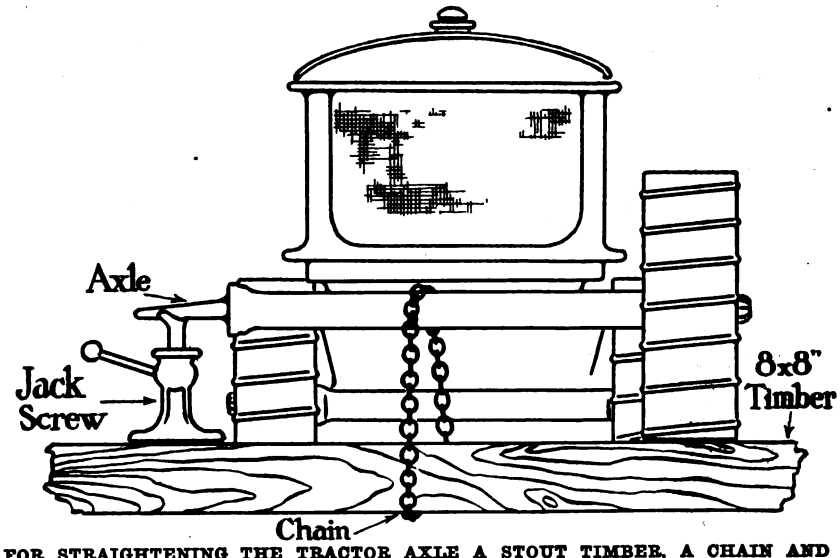
FIG. 32—HERE IS THE COMPLETE ELEMENT READY FOR THE JAR

I wonder how many repair men take advantage of the opportunities they have, for securing additional work. When a tractor is brought to the shop for repairs why not suggest radiator guards for the tractor? With the exception of only one or two makes of tractors, none have any protection whatever in guarding their radiators from damage. Yet the radiator is one of the most easily injured parts.

The illustration at Fig. 2 shows how a simple guard may be made for protecting the radiator. As the type of fronts is so varied, no definite method of application can be cited which would be applicable in every case. However, the illustration gives a general idea which may



HOW A TRACTOR RADIATOR MAY BE PROTECTED



FOR STRAIGHTENING THE TRACTOR AXLE A STOUT TIMBER, A CHAIN AND A JACK SCREW ARE USED

be followed in each case and which briefly consists of taking several strips of band iron or steel about 5/8 inch wide and attaching the same to the top and bottom of radiator by means of bolts, a piece of band iron may be run from one side to the other on both top and bottom and the strips bolted to these.

If possible, give the strips a half twist and bend at ends to fit easily. This will give very little resistance

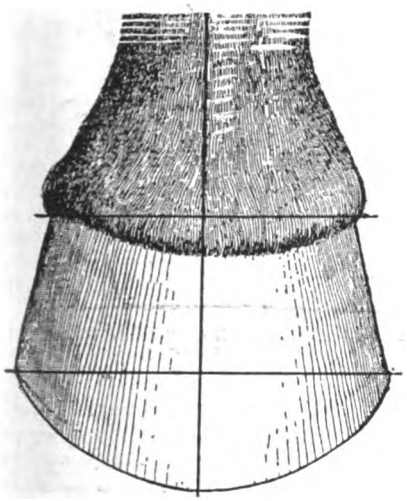


FIG. 1—THE CORRECTLY TRIMMED FOOT IS A CORRECTLY BALANCED FOOT

to a full flow of air through, the radiator and the half twist will also make the guard stronger against blows from the front.

The advantages of a guard of this kind properly explained to the farmer when he brings his tractor to the shop will nearly always result in an order being placed for the application of a set to his tractor radiator.

Preparing the Foot of the Horse Correctly

W. J. SEIMER

The discussions on the correct methods of shoeing horses would seem to be endless. Yet I suppose that just as long as there are horses to be shod, just so long will the discussions continue. To any one who has followed these discussions and read the articles on horseshoeing and the various phazes of the subject, it would seem as though the matter has been most thoroughly discussed and the vital parts of the subject most thoroughly exhausted.

The latest question of shoeing the horse's foot according to nature seems to me just another discussion of the correct or incorrect manner of fitting the shoe to the foot. If there is one phrase used more than any other, by experienced shoers attempt to teach the young shoer how to go about his art, it is the phraze "Fit the shoe to the foot". However, as in the case of shoeing according to nature, that phraze is but half a truth.

For example: Suppose that the shoer were to remove the old shoes from a horse's foot, and fit a new shoe directly to that foot without alteration—that would be a literal interpretation of fitting the shoe to the foot, but it would not be the correct or scientific basis for proper shoeing of the foot. In other words, the foot and shoe must be fitted to each other. Just as in the case of the shoer who is a "nature" crank, he will not fit a shoe to the foot which nature has permitted to grow or form incorrectly.

I think that the brother reader who wrote something on the improvement man has been able to make in nature, hit the nail right on the head. Simply because a foot has a "natural" growth, is no reason why we should allow it to continue in its abnormal state, if nature has not caused it to grow in the correct manner.

The shoe can correctly be fitted to the foot only after the foot has been properly prepared, and the proper preparation of the foot is what must receive first attention in the application of new, or the reapplication of old shoes.

Generally speaking, when a horse comes to the shoer to be shod, the feet are overgrown and not correctly proportioned. If the shoe has been thrown, the chances are that the hoof will be more or less broken and a deficiency of horn will be apparent in places. The object in both cases is to so alter

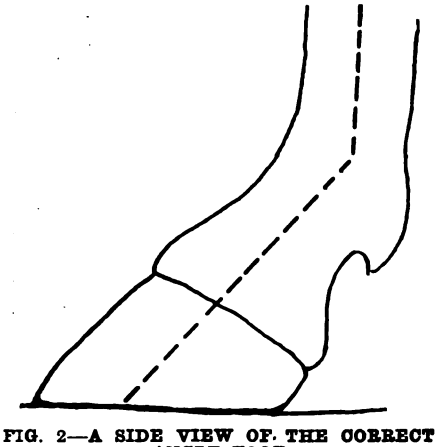


FIG. 2—A SIDE VIEW OF THE CORRECT ANGLE FOOT

the shoe-bearing surface of the hoof as to obtain the best possible ground surface.

Now let us consider the principals which must be observed in the

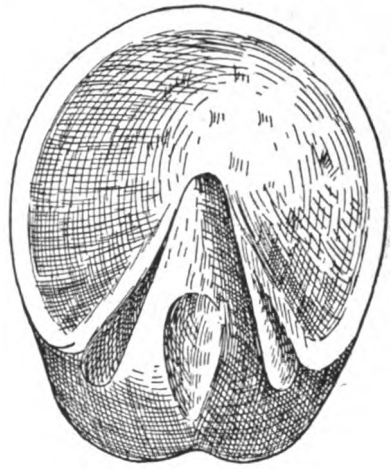


FIG. 3—THE GROUND BEARING SURFACE OF THE FOOT

correct preparation of the foot for the shoe which is to be attached to it: In the first place our first consideration must be the preparation of the foot in such a manner as to remove the superfluous horn in such a way, so as to bring all parts of the hoof into equal use or bearing. A good healthy, well-formed foot so prepared will conform to the following points: When viewed from in front the wall will be the same height on both sides, and an imaginary line drawn down the center of the leg will divide the hoof exactly into two equal parts. In viewing the foot from the side, the height of the heel and also the toe will be correctly proportioned, and in such proportion so that the axis of the hoof will be in direct line with the axis of the pasterns. From behind, this hoof or foot when correctly trimmed will show the frog touching the ground. The ground bearing surface of the wall will appear level, and upon looking into the hoof when it is raised from the ground, the sole will appear concave and have a rough appearance.

It is of course understood that the conditions and points described are ideal and are generally unobtainable in all cases. It is well however, to consider these ideal points in the proper preparation of the foot in order that the foot may be brought to a condition as closely parallel with natures intentions as possible.

No doubt, the horseshoer who first took up the cause of natural

shoeing as nature intended, wanted to explain that when he refers to the shoeing of a horse's foot according to nature, says he meant that the foot should be shod in such a manner as closely as possible following the way nature intended the foot to grow. Of course, I do not know if this is actually the case or not. I am not taking up the cause of natural shoeing, but rather of correct shoeing.

A matter which it is well to bring to the attention of the reader here is the fact that in any subject that has anything to do with the treatment of human or animal anatomny it is a fact that for almost every rule, or rather every case which can be correctly treated

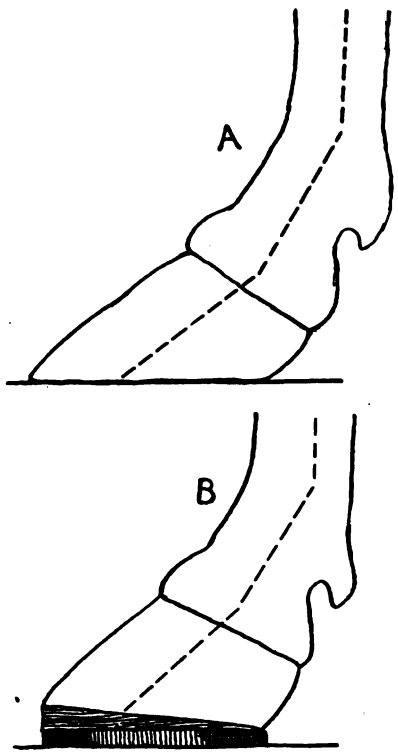


FIG. 4—THE FAULT AT A IS NOT CORRECTED BY SHOEING AS AT B

according to rule, there are twice as many cases which are exceptions.

Now let us consider a few examples of incorrectly shaped feet, and demonstrate the application of the foregoing principals and prepare these feet properly for the shoe. The first of these is the foot with an extra long toe. This long toe will throw the axis of the foot out of line with the axis of the pastern, which two factors are not considered or given proper attention by the average shoer who generally considers anatomny of the foot and leg somewhat in the nature of excess baggage as far as knowledge of practical shoeing is concerned. This type of shoer will usually attempt to correct the dis-proportion of the long toe of this foot by shortening up the hoof somewhat in the manner as shown in the engraving at B Fig. 4. This shortening results in not only a very ugly looking job but it is absolutely incorrect as far as the proper fitting of the shoe to the foot is concerned. This alteration of the hoof and this fitting of the shoe to the trimmed hoof does not alter the axis of the foot. The correct method of trimming this foot is by parring horn from the ground bearing surface of the hoof and cutting away an amount of the hoof as will restore the natural axis of the hoof to conform with that of the pastern, dropping the toe down until it reaches to the ground and conforming with the ideal situation pictured in Fig. 2.

The opposite extreme of this case is that of the foot illustrated in Fig. 5. Here you will note the foot has an excess of horn at the heel. In order to trim this foot for correct shoeing, the excess horn at the heel must be removed. This will drop the heel down and again correct the axis of the hoof and put it in line with the axis of the pastern.

Most shoers seem to think that these alterations on the hoof affect the appearance of the foot only. While the appearance of the foot should be given some consideration, it is not by any means the most important. The relation of the foot and limb are the important consideration. It must be very evident that any alteration of the foot must affect the limb with its network of muscles and ligaments. Any alterations of this kind will not effect the action of the limb if such alteration are but temporary; but should such disproportion continue for any length of time, the unavoidable alterations in the action, in the relative position of the foot, and in the changed position of the bones, ligaments and muscles, will tend to become permanent and may do a great deal of harm. When brought about slowly and gradually as is usually the case, it is not readily traced to its true cause, and this harmful method or principal of shoeing is simply because it has several adherents among the shoeing fraternity, and yet it has no basis in fact in the scientific and intelligent consideration of the basis of true and proper shoeing. There is no reason why anyone should practice horseshoeing in such a manner.

In closing, I would like very much to hear from other readers of "Our Journal", and particularly with reference to my argument in

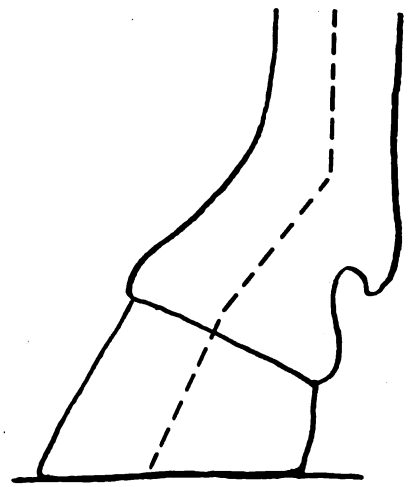


FIG. 5—THIS FOOT HAS TOO MUCH HORN AT THE HEEL

favor of the proper preparation of the foot, first, and then the proper fitting of the shoe to that properly prepared foot. It seems to me that in the shoeing of the average case this little formula sums up the entire situation.

It isn't necessary always to do more business in order to make more profit. In fact in some cases it may be better to do less business. To make more profit, cut out the losses. Let someone else do the work upon which you cannot make money. Specialize, intensify and persist in going after, getting and doing work that assures you of a real profit. It may mean less business, but if it results in more profit that's what you want.

No veteran grown old in the service knows as much as the new apprentice. If you don't believe that ask the apprentice who has worked anywhere for about a month or six weeks. If he isn't willing and anxious to "put you wise" to anything in the line, from the annexing of axles to the moteing of motors and the zoology of zinc, you can make up your mind that he's an exception and is on the road to real and quick learning.

A pane of glass beats an old rag, newspapers or even a board in keeping out wind and cold, and in letting in light and sunshine. And the cost of glass isn't prohibitive. True, it is higher than normally, but its cheaper than trying to heat all of out-doors and then too the glass appears lots neater.

Horseshoe pitching is said to have been given official encouragement by the faculties of a state college an a university, and is to be made an intercollegiate sport. It will interest "Our Folks' to know that the official rules of the game call for hand forged shoes. Wonder if any of "Our Journal" readers have been called on for "pitching shoes" for the college games.

Queries Answers Notes

Wants To Temper Springs:—I would like to know how to temper the springs of a motor car so I can put spring leaves in when they are broken. Would some one be kind enough to let me know through your paper?

Edwin Buck, Australia.

Wants to Build A Special Lathe:—Could some reader kindly give me some information concerning the construction of a machine (lathe) for the making of single trees and axe handles. I have seen one of these machines but it was some years ago and I have forgotten the feed arrangement. If some of the brother smiths could give me a few pointers in that line, I would be very much pleased.

John Rognvaldson, Manitoba.

Wants To Temper Auto Springs:—Will some brother craftsman give me a successful formula on tempering auto and truck springs. Owing to having to contend with certain grades of steel, which I would term a soft stock, I have had some little trouble with my work standing up at times. Any and all information on this subject will be appreciated as I have a large trade on this line.

Information, Virginia.

A Good Helper:—Being in need of some kind of a helper for heavy forgings, I got two sections of the heavy track for roller doors. The kind with a wheel inside. We put a large ring on the bolt attached to the wheel and onto this a small chain hoist was hooked. One end of the track was then bent in a curve, and the two sections were fastened to the ceiling, so that one end was over the fire, and the other end was close over the hammer. Thus one can take a heavy heat out of the fire, work it on the anvil, or take it over to the hammer.

Old Timer, South Dakota.

Cash or Credit — Welding Gasoline Tanks:—I am a busy man, and not a writer, but I am willing to send you a letter once in a while, and I'm willing to share my few brains with any Fellow of the Craft.

The main part in the credit or cash question is to get the money and still satisfy your customer.

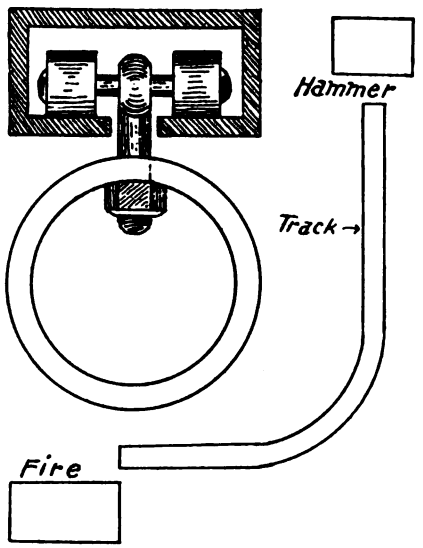
In reply to Mr. F. J. P., Wisconsin, will say—Gasoline tank repairing is a very dangerous business. I have known tanks to explode, after being idle for years. I would advise F. J. P., to let someone else do the job who knows how to handle those goods. Boiling water is perfectly safe.

H. F. Winkler, Minnesota.

A Word of Praise from Old England:—I thoroughly appreciate your efforts towards the betterment of our Craft. though it may appear I am wanting in not writing you before. I thoroughly appreciate your paper, and have given a great many to my Smith friends, and they also appreciate the publication. I do not know how many I have gotten interested in it. The Brotherhood of the Craft through your agency is World-Wide, and while we may differ with you on some things in the Old Country, it is fine to hear the voice of the Whole World of our Craft.

Rodger Wilson, England.

Wants to Dress Rock Drills:—I wish someone would tell me the right way to dress a steam drill. I have quite a lot to sharpen over and I know I am slow at it. I never had the opportunity of seeing any blacksmith sharpen them, and I though you might be able to give me a sketch of the way they do it. These



A GOOD HELPER USED BY A SOUTH DAKOTA SMITH

drills run from 2 to 10 feet long, and have a hole clear through the centre. The end is star shaped. They are used for drilling rock. I can temper them, but I I don't know just the best way to sharpen them when they are all worn off. Any advice will be appreciated.

J. J. McDonald, Massachusetts.

Wants Information on Modern Rfles:—I have read The American Blacksmith since 1907, and have derived much benefit and pleasure therefrom, but like all good things it only whets the appetite for more, so I would like to see published in the columns of "Our Journal", information concerning the tools and methods employed in the manufacturer of modern breech-loading rifle barrels. Some time ago there appeared in the "Blacksmith" a good article describing the tools and methods employed in making the old muzzle-loader barrels, but as there is a considerable difference in the bores of the two, there must also be some difference in the tools and methods used.

Otto A. Wagner, Kansas.

Straightening Auto Axles:—I would like to have the opinion of the other readers on straightening auto axles. When I started to learn the blacksmith business twenty-eight years ago, (and I am still learning),—I learned not to bend or straighten an axle cold, but to always heat it properly before bending, as bending them cold injures the steel. Now I am told by the new mechanic (the auto mechanic), that I should never heat an auto axle but always straighten it cold.

What are the ingredients of the Vanadium steel or the kind generally used in auto axles? It is best to straighten them cold? What are the bad effects by heating properly, and allowed to cool off evenly in the air

Leo A. Keller, Colorado.

Where is the Cub?—One sees this question in every trade paper that you pick up. The "cub" or apprentice of few years ago is gone, and I am afraid he has gone to stay, for many good reasons. The garage pays him a small wage while he is learning the trade. This way however is three or four times what the blacksmith can or ever did pay. In six months the boy is a full-fledeg garage mechanic while in the blacksmith shop he would just begin to know where the tools were kept and how.

In a year, the cub in a garage is driving a "Henry," and stands a good chance of being a demonstrator or livery driver; while in the shop, he would be at the fire, on the floor, or fixing an old bus that the Indians had thrown away when they left the country.

This is where the CUB is.

Old Timer, South Dakota.

Cleaning the Clogged Gasoline Lamp:—Having obtained so much information through "Our Journal,,' I wish to help by giving answers as best I can to questions in Queries, Answers, Notes.

Mrs. James Ebrite, Ohio:—I think I can help you if your lamp is the kind I have reference to, as they are nearly all made on the same principle. All gasoline lamps, I think, have in the brass tube you refer to, an asbestos wick through which the gasoline is forced by air pressure. This, when it becomes heated generates the gas to burn. These "wicks," we used to call them, can often be forced out with a small blunt punch, or if not, can be bored out. The tube is cleaned before inserting a new one, which should be put in and then lightly tamped so as not to let air spaces for gasoline to rush through. These wicks can be bought from makers or from dealers in lamps no doubt.

Care must also be taken that the fine screen at the end of the generator is perfectly clean. This can best be done by screwing this part from the brass tube, as it is very fine and easily damaged. When putting together, coat threads with a paste made of litharge mixed with glycerine. If this is carefully done, I think your lapm will work O. K.

W. R. Reagan, Pennsylvania.

From A Craft Veteran:—Your paper is worth its weight in gold to any smith conducting a general blacksmith business. I have conducted such a business of my own for a little over 49 years. My first shop was in the town of Montgomery, Orange County, New York. From there I moved to Minnesota, and next to California. I am now 74 years of age, but here, will say that I gained many a pointer from The American Blacksmith.

On August 14th, last, I attained the age of 74 years and on August 15th, I had an opportunity to sell my stock and tools for between four and five thousand dollars, so I pulled in my lines and quit business. I was physically about played out. However, since having a rest of over four months, I am beginning to feel somewhat younger. I have a good home in the finest town in California and with a good wife to help me, we are taking life easy, and getting the most comfort out of this life that it is possible to get.

I sold my business to two young men that were working for me, and if ever

two young men bought a snap,—a well established business as I said before, in one of the best towns in California, with the best line of customers in the county, they were the Two.

You ought to take time to visit California, and see if you don't think that this is the place for the old men as well as for the young ones. You know that the majority of smiths are drinking men or drunkards, but I want you to know this, that I have never taken a glass of liquor in my life, and that is one of the great reasons for my success in business.

J. J. Pimm, California.

"A Hustling Australian Firm."—The accompanying engraving shows our establishment here in New South Wales. The row of pole sulkies shown in the foreground were made by us for delivery in

CUSACK AND PALMER ARE A HUSTLING FIRM OF AUSTRALIAN CRAFTSMEN

South Africa. We do a general line of work, including coach building, general smithing, repairing of all kinds, painting, shoeing, and besides building sulkies, buggies, we also are agents for the International Harvester Company, Scripps-Booth Motor Cars, Chevrolet Cars, Eveready, Batteries, besides having cars for hire.

The Australian farmers are familar with but two lines of farming machines—American and Colonial. Hence our agency for American-made implements. American cars predominate here, and so do American-made machinery and vehicles generally, although our tariff now fosters local industries.

You will be interested to know in this connection that American hickory is now so' expensive that we are using the Australian substitute for wheels and shafts. This is the Australian spotted gum. For iron we are now paying £32 per ton, as compared with £8:15 Sh. before the war.

I am as you must judge an enthusiastic supporter of trade relations with America, and am a member of the political party in New South Wales, that first established trade connections with the United States.

Jack Cusack, New South Wales.

Favors Strictly Cash Business:—I am not a writer, but I think it is my duty to give my views on some points.

King Solomon put the blacksmith on top. Today he is at the bottom. Who put him there? The bricklayer and horseshoer as in Solomon's time. The bricklayer buys $5.00 worth of tools and makes $10.00 a day. The blacksmith buys $500.00 worth of tools and makes 10 cents a day, and that he has to put it on the books. If the bricklayer isn't paid he puts a lein on the building. If the blacksmith isn't paid what does he do? If he lives in a farming community he is paid with wood and straw, or when "the harvest comes". As a rule, it never comes.

In answer to Mr. W. A. B., N. J.—You are made of good stuff. Be a good sport and don't be afraid to lose a customer; because if they don't pay you, you will get some that will pay. I put up a sign five years ago—"Cash Only", and I lived up to it. I did not trust the preacher for 25c nor banker for a dollar. I refused to work "on tick" for the richest men in town. They give me four weeks to leave town. I am here yet and on top. That is the only system, and it works fine. No bookkeeping, no bills to make, no discounts, no disputes, and no trouble. If you extend credit to everyone, you can't pay your bills; your credit is not solid; you can't buy the baby a dress, and you can't pay for the one she has on.

When you start a strictly cash business your trade will drop at first but you will come out on top in a short time. You can't do a cash and a credit business—its either all cash or all credit. I treat everybody alike. It is the crook who makes it so hard for the honest men to live. Yours for betterment of the Craft.

H. F. Winkler, Minnesota.

Regarding Cash or Credit:—Since Mr. W. A. B. of New Jersey would like a little advice from some old timer in regard to cash or credit business, I will proceed to advise.

Although perhaps I am not just what you would call an old timer, I have been in business for myself for 21 years, and during that time I think I have learned a few things in regard to the business side of a blacksmith shop. One thing I have learned is to say NO when a dead beat or slow payer ask for credit. I never lost very much money on dead beats for I never extended credit to everyone that came along. But I used to work for men who would never pay unless I asked them for money, and then their excuse was they were hard up. And instead of sending me a check, they would send me some more old wagons and some more old stiff horses, and their accounts would continue to grow. I am still doing a credit business occasionally, but not as I used to do. I have come to the conclusion that if I can't get their money, I can get along with out their business.

I would not advise W. A. B. to do a strictly cash business. Sometimes there are good, honest men men who need credit for a few days only, and sometimes they may have a break-down away from home and not have their money with them, and often work is sent by an employee whom they do not care to send the money with. And sometimes they really forget their pocketbook though I do not believe that every time they say it. I tell them all I have to pay for my goods every 30 days, and they will have to do the same. Some men like to do business on some one elses money without paying interest, but it does not matter how careful one is, if they do a credit business, they must expect to lose a little money once in a while.

G. N. Sidders, Ohio.

A Well-Equipped California Shop:—On the first page of the November number of "Our Journal" I learn that the Editor is a "Human Being." I have read "Our Paper" for a number of years, and have thought of writing a number of times, but somehow just kept putting it off until some other time—so here goes what I have to say:

First—I think no shop is complete without your paper, as it has helped me over some hard spots several times. We always file the papers away, and when we get into trouble, we dig them out and find what we are looking for.

We live in a farming community where the largest hop fields in the world are located. There is also lots of fruit of different kinds raised here beside rice, beans, wheat, barley, hay as well as dairying. So you see we get many different kinds of work here and a fellow has to use his head and a good paper comes in mighty handy. We have four motors, a power hammer, an emery wheel, a power drill, a power bolt-threading machine, a hand saw, a planer, a share sharpener, also power blowers and air compressors. So you see very little of our work is done by hand. We sell as you see by our letter head just about anything a man wants. If we do not have it in stock, we telephone or write our order to Sacremento and next day an auto truck leaves it at our door.

When a job is done on the fire, we charge at the rate of $2.00 per hour. The stock is weighed before hand and charged at our regular selling price. If bolts, nuts and rivets are used, they are counted and charged for just the same as if our customer bought them at a hardware store. We get $3.00 for shoeing horses; $1.00 per in. for setting tires; repairs on wheels extra; share sharpening from 75c to $1.00 each; pointing and sharpening from $1.50 to $2.00 each. We keep strict account of all money received and paid out, and we mail our bills out every month. After three months, if the bill is not paid, we add 1% per month, and by carrying business on these lines, my brother and myself have been able to draw down from a very nice living. We work six days a week, as we do not believe that a man or beast can work seven days a week and last long. We work nine hours a day in the Summer, and eight in the Winter, and when a holiday comes along, we close up and take the family in the machine, to some place to spend the day. The next day we always feel better, and I think we will live just as long as if we worked all the time.

It is my advice and practice to charge what your stock and time are worth, and let them kick. The people of this age have to kick just so much, anyway.

F. F. Baun, California.

VOLUME 21 NUMBER 3

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

MARCH 1922

BUFFALO, N. Y., U. S. A.

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Contents March 1922

BUSINESS IMPROVEMENTS IN ACTUAL SIGHT

Some of you have no doubt just about reached the nail biting stage in your attitude toward the newspaper articles that have been appearing with regard to business improvement. Many business men could see very little evidence of prosperity in their businesses despite this talk of business and its "come back."

Now, however, the Government through the Department of Commerce submits actual figures showing the improvement in business in January.

For example: Take the consumption of cotton by the mills; In January 1921 this amounted to but 366,270 bales. In December 1921 the consumption climbed to 511,800 bales. While in January of this year it increased further to 526,552 bales.

The building contracts awarded during January this year shows next to the largest January figure ever recorded.

And then take the figures upon which so much of our rural business health depends—the prices for farm products. There has been a decided and very welcome increase in the price for most farm products and this should restore considerable of the confidence that has not been very apparent in the farming sections generally.

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JUST A TIMELY PICTURE OF NATURES BEAUTIES WHEN FIELD AND WOOD ARE TAKING ON RENEWED DRESS

Welding Oil Barrels Safely with the Oxy-Acetylene Torch

DAVID BAXTER

In spite of repeated warnings against the hazard of welding leaky oil or gasoline containers without first becoming acquainted with certain necessary precautions, there are a needless number of accidents from this cause every year. There seems to be a lot of torch operators who do not know that there is considerable danger attached to the work, in fact, that under certain circumstances there is very grave risk to life and limb.

This danger is increased or diminished according to the original contents of the barrel, and to the length of time it has been emptied. This cylinder oil is not so liable to cause trouble as gasoline, distillate or the lighter grades of oil or liquors. And the latter group is more hazardous if the container has been but recently emptied. In either event it is well to always be on guard and to take nothing for granted. In other words to be careful even when welding a cylinder oil barrel that is known to have been empty for months.

A torch welder may work on a number of these apparently dry barrels without any indication of trouble and then strike one in the same batch that will explode with terrific force. This may be partly due to the location and extent of the weld, but more than likely on account of a thick oily deposite in some hidden corner of the container. The barrel may seem very dry and yet have a quantity of gummy substance in the vicinity of the weld.

As a whole the welder is taking considerable risk in welding any kind of oil barrel even though the leak to be welded consists of merely "spotting" a small round hole while a long seam-weld intensifies the danger. Thick heavy containers are also worse because a greater amount of heat is required to make the weld and a larger area of the metal is heated.

As to the nature of the previous contents, it should be obvious that gasoline or other liquid which forms gas rapidly, is more dangerous than grease or thick oils, such as steam lubricated oil, etc. Although a gasoline barrel is more likely to be dry after being empty a few weeks.

The washing process such as some welders employ, does not mean entire safety in any case; even where steam is used to do the cleaning. Nor is the passage of compressed air through the container always sure as the gaseous formation is not always certain to be entirely carried away. Although plenty of live steam squirted through the barrels makes them reasonably safe this does not always result perfectly.

SPOT WELDING A LEAKY OIL BARREL

For fear of being misunderstood, it should be said before going any farther, that the danger in welding leaky steel barrels or other metal containers that have been used for oil, gasoline, distillate, or other liquid, is due to the formation of a gas of explosive force which is generated by the heat of the melting metal and the welding flame. This heat causes the original contents of the barrel to form a gas, which is ignited by the molten metal and therefor explodes. Sometimes this explosive force is sufficient to split the barrel or tank wide open. In some cases the container has been hurled fifty feet or more and in one instance while an operator was welding a steel oil barrel the force of the explosion threw the barrel upward in such a manner that the sharp edge of the barrel rim struck him across the bridge of the nose crushing the bone, smashing each cheek bone and disfiguring him for life. The accident resulted in the loss of nineteen teeth. Fortunately such mishaps are comparatively rare. Nevertheless they should serve as a warning to the torch welder.

A number of methods such as have been mentioned above have been devised to eliminate these explosions. Another method to keep a flame burning inside the barrel during the welding process, the idea being to burn the gas as fast as it forms. But the writer would recommend none of them. In fact he believes he is justified in saying that some of them are actually unsafe.

Perhaps the safest method yet devised, in fact the only one which the writer can recommend, is to fill the barrel with water before applying the welding flame. Fill it to within the smallest possible space of the leak with the idea of keeping down the area in which the gas may form. It is in reality not an additional expense since the barrels must be filled to test the welds for leaks, so it is just as handy to fill them before welding. If more than one container is to be welded the welder may economize by pouring the water from one barrel to another as fast as they are welded. In this way but little more than one barrel full is wasted; even on a large job of barrel welding.

The water may be syphoned from one barrel to the other if no facilities are at hand for lifting the barrels. Or, the water may be drained from one barrel to another by rolling the barrel up an incline to the welding table Either way it is not necessary to have an extra man.

As stated, the idea of filling the barrels with water is to minimize the space as much as possible, wherein the gas may form. Incidentally, the water keeps the barrel cool, thus tending to keep down the amount of gas generated.

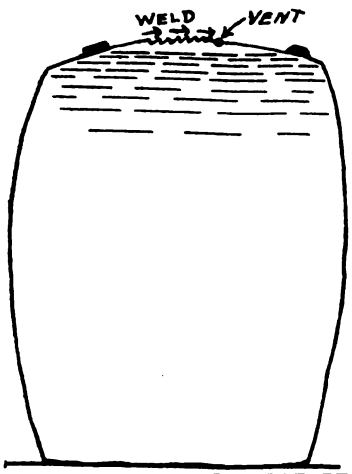
This may be further aided by confining the weld heat to a small area.

If the barrel, or other container, of such shape that the water cannot be brought up close to the weld there will at least be sufficient water to cut down the force of the explosion below the real dangerous stage. The water should if possible be within a half inch of the under side of the weld.

This practice not only decreases the force of the explosion but in most cases eliminates it entirely. In few words then, the main thing is to fill the barrel as near full of water as possible. Which does not mean half full or two-thirds full but full enough that the water level is about half an inch from the weld.

If there are several leaks in the barrel, they should be plugged with wooden stoppers or stuffed with waste or rags to make them water tight. After which the leaks are welded one at a time, tilting the barrel each time to suit the location of the weld. For as stated above the location of the leak has a lot to do with the hazard of the welding.

If the leak consists of a tear in the metal several inches around the side of the barrel, it is handily seen, that there is bound to be considerable space between the water level and the weld, even when the barrel is filled as much as possible with water. In such an event the welder should always stand to one side while welding, particularly be sure

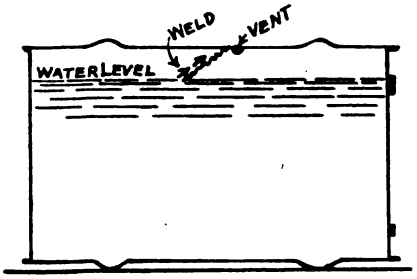


THE TOP OF BARREL IS HERE READY FOR WELDING

to keep his face and hands away from the crack. Also, in such an event it is a good idea to start at one end of the crack and weld toward the other, meanwhile providing a vent at the opposite end of the weld, by burning a small hole through the side of the barrel. The hole is easily made with the welding flame and thus provides an easy escape for the force of the explosion, in case the gas does form.

Sometimes in welding a badly torn barrel which can only be partly filled with water a quantity of scalding water is blown through the outlets. This is one reason for standing to one side while welding.

If the leak consists of a split running length-wise of the side of the barrel, or if it is merely a small round hole, the matter is greatly simplified since the water level may be raised to within a fraction of an inch of the weld. In the first mentioned cases it is a good idea to burn a vent hole in the barrel when



THE SIDE OF THE BARREL NEAR THE CENTER REQUIRES WELDING

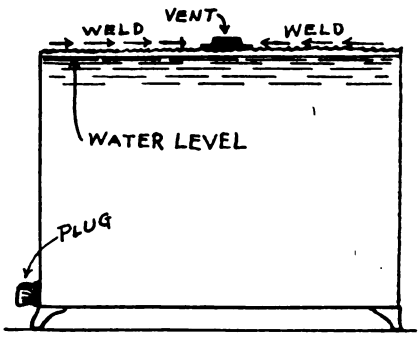
it will do the most good. In fact it is good practice to have a vent at the opposite end of every weld over three inches long, especially if the original contents of the container is in doubt.

If the leak is situated in the top or bottom of the barrel, it is much the same as a lengthwise split, since the water level can be raised to the weld. The barrel should be tilted if the leak is located in the ring of the end; that is, if the leak is located in the corner of the seam where the head joins the body.

In rectangular or irregular shaped containers, such as automobile gas tanks, the principle is much the same. The main idea, again, being to fill the cavity with water to within the shortest possible distance of the weld, previous to applying the welding flame.

Now in the act of fusing the the melting should be confined to the narrowest possible area and should be accomplished as rapidly as the ability of the torch operator will permit. For the longer he tarries over the weld, the more will the heat be conducted to the surrounding metal, thereby enlarging the chance for the gas to generate. And the greater the heat the greater will be the explosion stress of the gas.

Also, it is good practice to be a trifle more discriminating in the



THE FILLER HOLE HERE ACTS AS A VENT

choice of the proper size flame for the weld. A flame that is too large only enhances the hazards, besides contributing to the causes of a poor weld. A flame too small requires too much time to complete the weld and thereby increases the opportunities for gas to form inside the barrel. So it is obvious there is a correct flame size for barrel welding. The torch manufacturers instruction should be followed closely, too, as torches vary somewhat in various makes of the instrument.

The matter of filler selection is also important in this class of welding. For the same reasons that correct flame size is essential. On ordinary steel oil barrels a Norway iron filler should be employed, although it is sometimes necessary to use bronze. Usually a small diameter wire is utilized without flux except in case of the bronze. Cast iron or copper containers require a like filler of course.

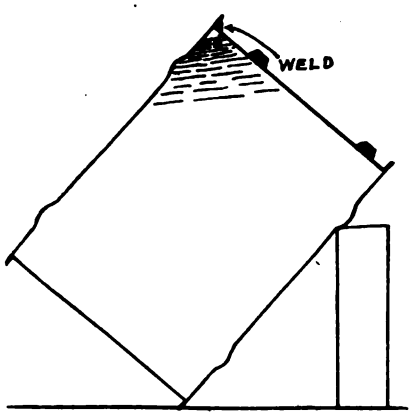
For welding large tanks like those shown in one of the photos accompanying this article, it is best to remove the entire top covering of the receptacle. If this is out of the question, the oil should be all drained out and the tank filled with water up to the leak. The space above the water should be washed thoroughly clean with live steam before commencing to weld. In fact it might be well to warn the novice to not try to weld these tanks at all without having an experienced man present.

In closing let us once more urge the welder not to weld any kind of container without first filling it with water regardless of what he thinks it has been used for. Any liquid might generate enough gas which when ignited by the torch flame will explode.

A Shop Talk on Tempering*

Tempering is a term often misused and misapplied by many who generally mean the whole heat treating process. It applies only to one specific process in the heat treating of steel, namely, the "letting down" of the hardness of a piece of steel which has been hardened by heating it above the critical temperature and quenching.

When a piece of steel is heated to a red heat and quenched, it becomes hard and brittle, and is in such a state of internal stress that its use, except in a few peculiar cases, is very limited. The hardening operation arrests the austenitic transition at the martinsitic stage, a very brittle and hard form of combined carbon, but the application of heat to the piece within certain well defined limits, will relieve this condition and permit the formation of troastite, a softer form of martinsite which is tough and ductile. This transformation begins at about 400° F., at which sorbite, a still softer form, begins to form—thus any desired "temper" may be given the steel by heating it to any predetermined temperature with these limits. It



WHEN THE INNER CORNER OF RIM IS WELDED

must be remembered that we are discussing only straight carbon steels; alloy steels work similarly, but at different, generally more elevated, temperatures.

Tempering is a process by which the temper of the steel is adjusted. It may be left hard enough to scratch glass, or toughened to serve as a spring, or softened so that it will bend readily without fracturing—all by the simple process of reheating to definite temperatures.

*Editor's Note:—Here is an article that clearly explains the tempering process in the heat treatment of steel and makes plain many points that the steel worker should thoroughly understand. We are indebted to "The Melting Pot" which is published by the Chicago Flexible Shaft Company for this article.

Tempering Colors

Nature has provided a very handy method for determining the degree to which the temper of a piece of steel has proceeded by the formation of a thin film of oxides on the bright surface of a hardened tool, which give it color. These colors are only approximate, however, and indicate only the surface temperature, leaving considerable to the judgment of the operator as to when the right color is reached.

A table giving these colors and their respective approximate temperature follows:

Tempering Heats of Steel, Showing Colors Corresponding to Different Temperatures

215.6° C.	420° F.	Very faint yellow
221.1° C.	430° F.	Very pale yellow
226.7° C.	440° F.	Light yellow
232.2° C.	450° F.	Pale straw yellow
237.8° C.	460° F.	Deep straw yellow
243.3° C.	470° F.	Dark yellow-straw yellow
248.9° C.	480° F.	Deep straw
254.4° C.	490° F.	Yellow brown
260.0° C.	500° F.	Brown yellow
265.6° C.	510° F.	Spotted red brown
271.1° C.	520° F.	Brown purple
276.7° C.	530° F.	Light purple
287.8° C.	550° F.	Dark purple
282.2° C.	540° F.	Full purple
293.3° C.	560° F.	Full blue
298.9° C.	570° F.	Dark blue
315.6° C.	600° F.	Very dark blue
400.0° C.	752° F.	Red—Visible in the dark

Tempering by color has its limitations and drawbacks, as time and human element are great factors. For illustration: If a piece of hardened steel is placed in a furnace and held at 460° F., a deep straw yellow will result, but if allowed to remain longer, even if the temperature is unchanged, a deep purple will result. The temper will be unchanged, yet the color indicator shows a much higher temperature.

Tempering Baths

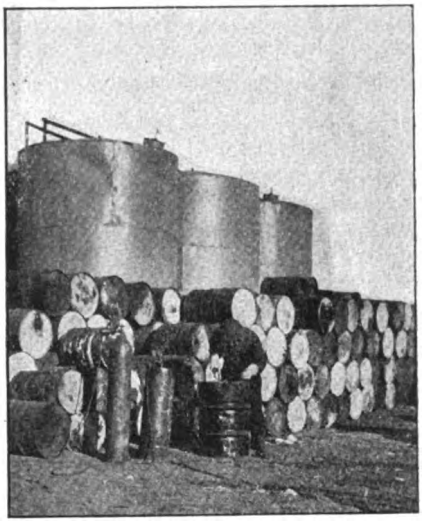
Since it has been found that tempering is governed by the temperature of reheating, tempering baths have come into extended use, the use of which has been a very important factor in the development of the steel hardening of today. The tempering of automobile gears, for instance, was a very uncertain operation until bath tempering was used. Now stripped gears are a rare event.

Exact Temperatures

Too much attention cannot be given to the obtaining of exact temperatures in the tempering process, as the range of temperatures for carbon steels is very limited, and a difference of 50° F., may make or ruin a tool.

Plate Tempering

This apparatus consists simply of a cast iron plate heated from below, on which the tools to be tempered are laid until they assume the right colors and are then quenched.



SOMETIMES A BARREL WELDING JOB INCLUDES HUNDREDS OF LEAKY CONTAINERS

Sand Bath Tempering

This is a modification of the plate method, and consists of a pan of dry, clean sand set on the hot plate, in which the tools are buried or stuck, depending on the shape, and inspected from time to time until they develop the desired color, then quenched.

Oil Bath Tempering

Oil tempering in a bath of oil is one of the most approved methods and is conducted in a pot furnace.

The furnace consists, fundamentally, of a large pot filled with tempering oil or tallow, or any oil having a high flash point of about 600° F., and equipped with some means of heating slowly, together with a thermometer for indicating when the required temperature is reached.

The method of procedure is as follows: The pieces which have been hardened and are ready to be tempered are suspended in the oil (which should not be above 400° F.) by fine wires or in a basket so as not to touch the pot, which is always at a slightly higher temperature than the oil. Then the heat is applied slowly until the tem-

perature of the oil reaches the desired "drawing" or tempering temperature, at which point the fire is turned out and the steel allowed to remain in the oil, the temperature of which must not rise any higher for about 20 minutes, dependent on the size of the pieces; after which they are removed, drained and wiped off. The resulting work turned out by this process is always uniform and will deliver service far in excess of parts tempered by other methods.

Salt and Bath Tempering

Not infrequently, when alloy steels are used, temperatures in excess of 600° F. are required, in which case tempering baths of molten salts are used. The same procedure as that outlined for oil tempering is followed, however. The furnaces are also slightly different, as higher temperatures are required.

Salt and lead baths are generally composed of the following ingredients:

450° F...Salt Peter (2 pts.) Chili Salt Peter (3 pts.) 600° to 1000° F.
800° F..Common Salt .... 950° to 1200° F.
621° F..Lead ..... 800° to 1400° F.
420° F..36% Tin, 64% Ld. 550° to 1400° F.
510° F..17% Tin, 83% Ld. 650° to 1400° F.

Cautions for Bath Tempering

Some of the cautions to be observed in bath tempering are:

First; never place the tool in the bath when it is extermely hot without first preheating the tool. This applies especially to the salt and lead baths.

Second, always see that the piece is free from moisture, or splattering will result. Last, do not remove the tool immediately upon the bath reaching the desired temperature. Let it soak and be thoroughly penetrated with the heat, which must never go above the determined temperature.

Tempering High Speed Steel

The tempering of high speed steel tools is a process similar to those outlined for carbon steels, but is commonly carried out at higher temperatures in salt or lead baths. The common temperature for the drawing of standard high speed steel tools is 1050° F., but it is best to get the recommendation of the steel maker before doing the work.

Summary

1. Tempering is defined and shown to be only that process wherein the hardness of a piece of steel is "let down" or tempered to remove the brittleness and make it tough.

2. Color tempering is a fine art in which many variables enter, the principal one being the human factor, and is not to be relied on for accurate work, except in special cases.

3. Exact temperatures are required in the tempering process to insure uniform results.

4. Bath tempering is highly recommended, whether it is to be done in oil, salts or lead. It is a process commonly used, with highly satisfactory results.

5. A table showing the proper temperatures and colors for tempering different classes of tools is given for reference.

Anvil Tools That Make Forging Jobs Easy*

GUSTAV H. RADEBAUGH

The Working Divisions of the Anvil

The working divisions of the anvil are shown in Fig. 1. The various parts of this very important tool are so that working positions of forging operations can be explained.

The best anvils are made of wrought iron or with a soft steel body and a tool steel face. This face is about ¾ inch thick. The size of the anvil is rated according to the weight and is marked on the waist of the anvil in three numbers,—the first shows the weight in hundred-weight; the second number in additional quarter hundred-weight, and the last in the odd pounds. The pritchel and hardie holes are used to hold tools and these holes are also used by the smith for making bends.

Mounting the Anvil

A solid wooden block is secured, preferably of oak, hedge, or ash. It should be cut square on each end and should be about 20 inches high.

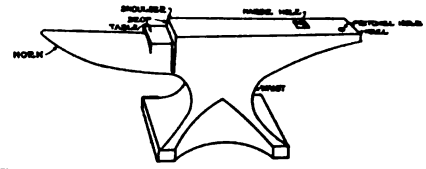


FIG. 1—THE WORKING DIVISIONS OF THE ANVIL

The face of the anvil should come to a height so that with a man standing erect the knuckles of his closed hand will touch the face. It should be set five feet from the center of the forge and directly in front of the fire. The floor should be well leveled off before placing the block in position. A piece of ¼ by 1¼ inch soft steel is secured and bent around the waist of the anvil, as shown in Fig. 2. After this steel has been shaped to the outline of the anvil at the waist a ¼-inch hole is drilled in each end of the band.

To Clamp the Anvil

Place the anvil in the center of the block and nail the straps down with spikes. (See Fig. 3). This is one of the simpliest methods for clamping an anvil and is one of the best. A wooden block is the best mounting for an anvil, as it gives the necessary cushion for the solid mass of steel. It helps liven up the tool and makes it much easier to work on. The anvil should be placed so that the horn is to the left of the operator.

Forge Shop Cutting Tools

Three cutting tools are common about the forge and anvil. The hot chisel shown in Fig 4 is used for cutting hot metal. As shown in the engraving, the tool is held by the smith and the helper strikes the tool with the sledge. When cutting hot metal the chisel should be dipped in water after receiving several blows from the sledge. This is done to prevent the tool from heating to such a high degree that the temper will be drawn and the chisel becomes soft the edge bent. Under ordinary treatment the hot

Editor's Note:—This is the Fifth article in Mr. Radebaugh's series on Standard Mechanical Practices in the Auto and Tractor Shop. Each of these articles is complete in itself. The sixth article will appear in an early number.

Tool Tempering Temperatures

Color	Temperature	Tool
Faint yellow	420° F.	Steel and wood engraving hammer faces, Paper cutting knives.
Light yellow	440° F.	Milling cutters, Shear blades, Rock drills, Screw dies.
Straw	460° F.	Dies and punches, Reamers, Stone cutting tools, Brace bits.
Deep straw	480° F.	Twist drills, Taps ½" or oved, Cold metal saws.
Brown yellow	500° F.	Axles, Dental instruments, Drifts.
Full purple	540° F.	Cold chisels, Hack saws, Rivet sets.
Full blue	560° F.	Battering tools in general, Small taps.
Very dark blue	600° F.	Screw drivers, Saws for wood, Springs.

chisel does not hold up its temper. This is the reason that the hot chisel should never be used on cold work.

The cold cutter shown in Fig. 5 is used in the same manner as the hot chisel its cutting end is however of a thicker section. It is designed so that heavy blows from the sledge can be delivered and the cutting edge will retain its shape. Compare the views of the two chisels. Notice how much shorter and thicker the cold cutter is at the cutting edge than is the hot chisel. In using this tool when cutting heavy sections the cutting edge should be dipped in oil. This assists in keeping the edge keen.

The hardy shown in Figs. 6 and 7 is used on the anvil by inserting the stem in the square hardy hole. It should fit the hole loosely enough so that it will not stick or wedge fast. It is used for light cutting and trimming on hot or cold work. The hardy for hot work is drawn out to a thin edge, while the one used for cold work is much thicker. This design is patterned somewhat from the hot and cold chisels.

In the operation in Fig. 6 is shown how the piece of stock to be cut is placed on the hardy. When cutting stock a deep cut should be made around the material. It is then placed on the edge of the anvil, as shown in Fig. 7, and a few down blows with the hammer are delivered. This will break the stock. It is understood that the stock is worked cold in this operation.

Because the hardy is a one-man tool, it has the advantage over the hot and cold chisels in this respect, however, it has a disadvantage in that it is not useful for large work. These three cutting tools are forged from .70-.80 carbon steel, and the temper should be drawn to a light straw color. When the cutting edges become worn and blunted they can be ground or redressed and tempered. The spokes of an old buggy wheel makes excellent handles for all wood-handled forging tools.

FIG. 2—A PIECE OF SOFT STEEL IS BENT AROUND THE WAIST OF THE ANVIL

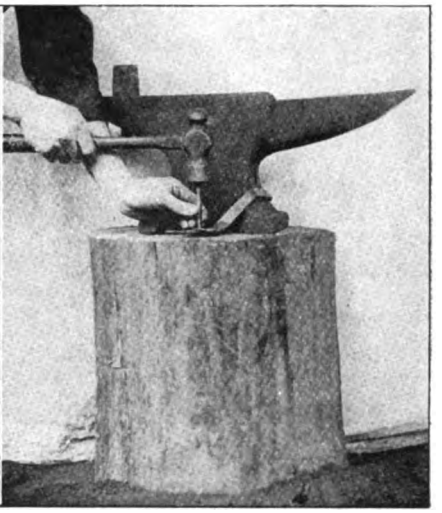


FIG. 3—THE WAIST STRAPS ARE FASTENED TO THE ANVIL BLOCK WITH SPIKES

Anvil Tools for Shaping Metal

In forging work various tools are found a necessity by the man who wishes to do a finished job of forging. The flatter and set hammer, as shown in Figs. 8 and 9 are used for practically the same purpose, — smoothing and flattening work. By using these tools when the forging is a dull red and dipping the tool in water before it is applied to the work, all the rough scale can be removed from the surface, thus leaving a smooth, finished appearance.

When making a stock gate hinge bracket a right-angle bend is made, as shown in Fig. 8. It is good practice to use the flatter instead of a hand hammer. A more even bend can be made and the surface of the stock will not be roughened by hammer marks. Flatters for general work have a face from two to three inches square. The edges of the face are slightly rounded, so that the tool will not leave marks on the work.

The set hammer is shown in Fig. 9 for making an offset on a wagon iron. When an offset is desired a piece of stock the thickness of the offset is secured and placed on the anvil, as shown. The piece to be offset is then laid upon this and the set hammer used to forge it to the desired shape. The set hammer is also found useful when squaring up right-angle bends. Set hammers are made in sizes with a face from 1 to 1½ inches square.

The top and bottom fullers (Fig. 10) and the top and bottom swages (Fig. 11) are made in pairs. The bottom parts of these tools are designed to fit in the hardy hole and the tops are provided with handles. As shown in the engravings the forging blow is delivered by the sledge, the tools being held in a stationary position. Fullers and swages are both sized by the curved edges. A fuller with a curved edge

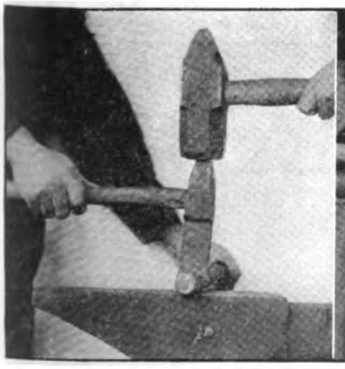


FIG. 4—CUTTING ROUND BAR STOCK WITH A HOT CUTTER

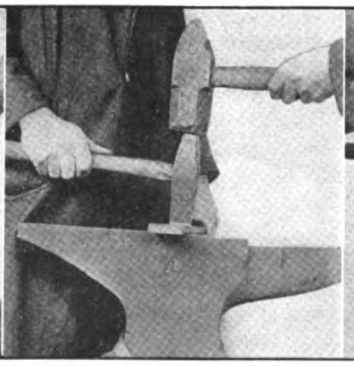


FIG. 5—THE COLD CUTTER IS BEING USED ON FLAT STOCK

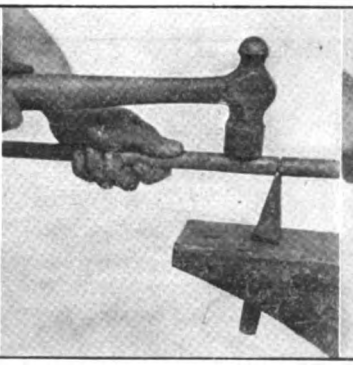


FIG. 6—THE HARDY IS HERE BEING USED FOR COLD CUTTING

FIG. 7—AFTER CUTTING THE STOCK IS BROKEN ON THE ANVIL EDGE

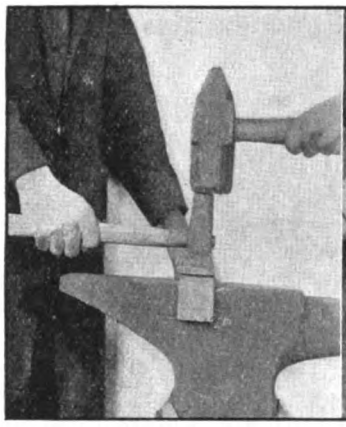


FIG. 8—THE FLATTER IS HERE USED TO COMPLETE A SQUARE BEND

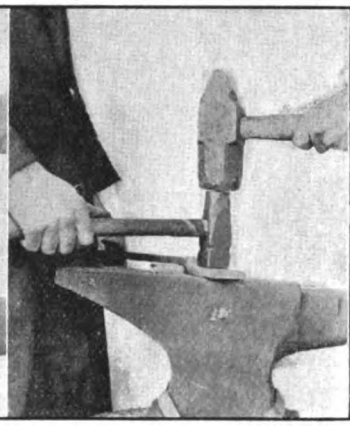


FIG. 9—THE SET HAMMER ASSISTS IN MAKING AN OFFSET

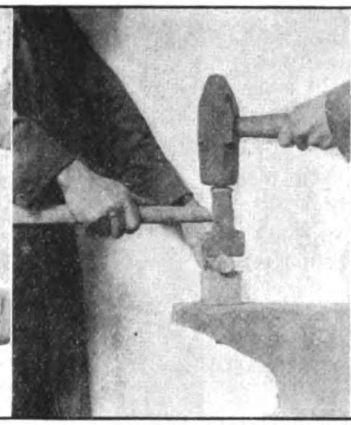


FIG. 10—THIS SHOWS HOW THE TOP AND BOTTOM FULLERS ARE USED

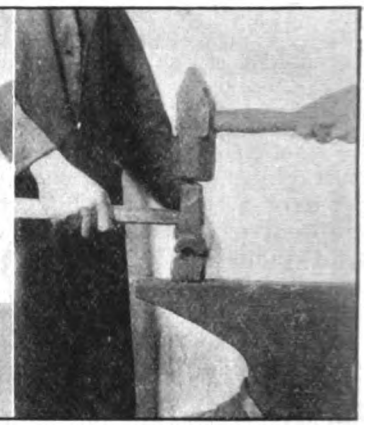


FIG. 11—SWAGES ARE ALSO MADE IN PAIRS AND USED AS SHOWN

of ½ inch radius would be called a 1 inch fuller, as the curved edge would be the same shape as a 1-inch bar.

The fuller is made in several sizes. The top and bottom fuller is used for forming depressions or shoulders on opposite sides of materials, as shown in Fig. 10. They will also be found useful when drawing out metal between shoulders or projections. The top fuller is sometimes used singly in making scarfs for welds, forming grooves, smoothing fillets, and forming shoulders on only one side of the forging.

The swage, (Fig. 11,) is used for rounding up work or forging round shapes to a smaller size. When forging stock to a circular section the swages are conveniently used for smoothing up after the stock has been drawn to about the correct size. After welding a rod the swages are useful in smoothing up the welded section.

If an extra smooth job is desired, the top swages can be dipped in water occasionally. While in use, this is called swaging.

These tools are not tempered and the best grades are made by drop forging out of 80-90 point carbon steel. After these tools have been in severe service the head of the tool mushrooms, and there is danger of chips of steel flying when the tool receives a blow from the sledge. This can be avoided by redressing the head of the tool. To redress these tools remove the handles and work the steel at a cherry red heat. Shape the head with a crowned center. After the operation is complete, permit the head of the tool to cool slowly by placing it in ashes.

Punching Hot Metals

There are two methods of punching holes in hot metal,—the hand punch (not shown, and a heavier punch shown in Fig. 12, which is provided with a handle and used with the sledge. The hand punch is made from octagonal or round tool steel and is about eight inches long. The end is forged down tapperingly and is made the same shape, but a little smaller than the size hole to be punched.

When punching, as shown in Fig 12 the hole is started by first laying the work flat on the anvil and driving the punch about two-thirds of the way through the work. It is then turned over and the punching continued from the other side. The hole is easily located by the metal being bulged from the punching on the first side. When the punch is driven through, the work is then held directly over the round hole in the anvil as illustrated in the engraving. If the punching is done in this way, the hole is left clean and to size.

When punching thick stock, after the punch is started, the tool is removed and the hole is filled with powdered coal. This reduces sticking. Tools of this kind are tempered and they never should be left in the heated work any length of time, as the end will become soft and upset when in the hole, which makes it nearly impossible to withdraw it. The size of these tools is determined by the size hole the punch will make.

Making the Tongs Fit the Job

When a piece of stock of irregular shape, as shown in Fig. 13, is to be forged, it becomes necessary to take a pair of hollow bit tongs and heat the jaws to a bright red. The jaws of the tongs are then forged to fit the shape of the stock which is to be held. Sometimes the rivet in the tongs tightens up in this operation. This may be

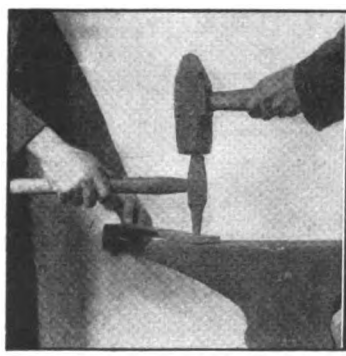


FIG. 12—THIS IS THE PUNCH FOR HEAVY WORK

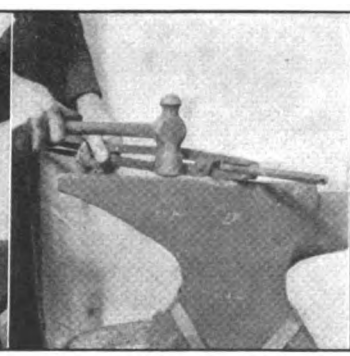


FIG. 13—TONGS SHOULD FIT THE WORK CLOSELY

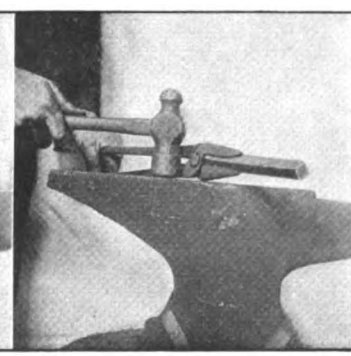


FIG. 14—THE TONG JAWS SHOULD GRIP TIGHTLY

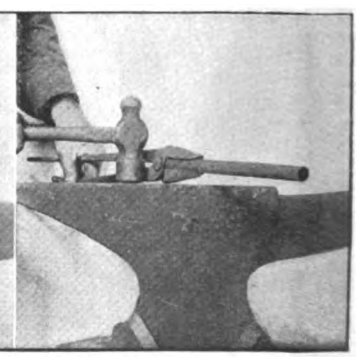


FIG. 15—THE WORK SHOULD BE GRIPPED SOLIDLY

relieved by first cooling the tongs and then delivering several blows with the hammer on the head of the rivet, which is held over the hardy hole on the anvil.

Forging Square Stock

The best method for holding square stock is shown in Fig. 14. The tongs here shown have been heated and hammered to fit the stock. In holding stock it is important that the tong jaws fit the entire length. This type of tongs is used to hold round stock (Fig. 15) as well as square. In holding the larger sizes of stock a link can be slipped over the handles, which will relieve the workman from gripping the tongs tightly and will allow him considerable freedom in the handling of the work.

The Hollow Bit Tongs

When welding a nut on the end of a rod to make a bolt, the stock is held in the hollow bit tongs. The tong jaws should fit down on the stock snugly to insure the easy handling of the piece while being forged. To make a special bolt, first cut the stock to length, then heat and round up the end of the stock, fit a blank nut and then weld together. After this operation is completed, cut the thread and the bolt is completed. The proper tongs for a welding job of this kind makes the welding operation much easier and insures a better weld.

Welding a Chain Link

The link tong, as shown in Fig. 16, is an essential when welding chain links. These tongs are made up so that the tong jaws can be heated and fitted to the size link that is to be welded. This permits holding the link more securely. When heating the link to a welding heat, hold it in the fire with a small rod until the welding heat is reached. Use the link tongs to remove piece from the fire to make the weld. It is only necessary to do this when using the smaller tongs. If they are used during the entire heating operation they heat up to such a high degree that they will not hold the link.

Flat Jawed Tongs

In bending a short piece of steel to make a wagon bed brace, the stock is held while being heated and forged with the flat jawed tongs in Fig. 17. These tongs are made in various sizes to hold different thicknesses of stock. In using any tongs the handles should be only far enough apart to permit the hand to grip the handles without unnecessary reach. When the jaws are too close together for the stock to be held the handles separate, rendering it impossible to grip the two handles with one hand. This can be adjusted by placing the tong handles on the horn of the anvil, as close to the rivet as it is permissible, and bending handles to the center until the proper distance is secured.

Box Tongs

To hold a short piece of stock securely when forging is found to be a decided advantage. The box tongs in Fig. 18 are found useful in many repair jobs, as their design permits the holding of flat stock so that it will not slip when being forged.

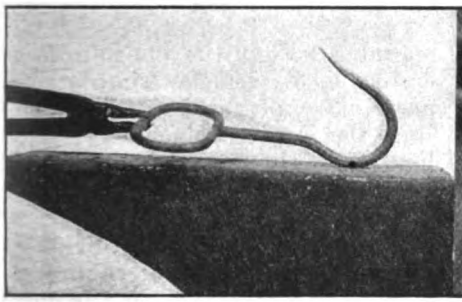


FIG. 16—AN EXCELLENT TYPE OF TONGS FOR LINK AND SIMILAR WORK

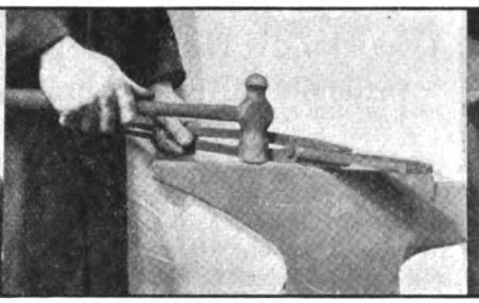


FIG. 17—FLAT JAWED TONGS ARE MADE IN VARIOUS SIZES TO FIT THE STOCK

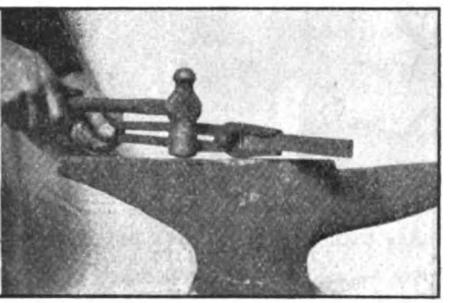


FIG. 18—BOX TONGS ARE EXCELLENT FOR HOLDING SHORT FLAT PIECES

Practical Hints for the Grinding Wheel Operator

ABRASIVE INDUSTRY

A grinding machine should be oiled regularly—not whenever the operator happens to feel like it.

Do not attempt to grind aluminum on an ordinary wheel. Special abrasives are provided for this purpose.

In mounting a grinding wheel, set the nut up tight enough to hold, but not tight enough to strain the wheel.

An accurately balanced grinding wheel is necessary in finishing precision work with a high degree of accuracy.

Increasing the speed of a grinding wheel makes it act as a harder wheel. Decreasing the speed gives the effect of a softer wheel.

For the cylindrical grinding of aluminum-alloy pistons, some operators derive excellent results by using coal oil as a lubricant.

Never permit a vitrified grinding wheel to stand partly submerged in water, as the moisture absorbed will throw it out of balance.

In sharpening a formed cutter, make sure the wheel face is in line with the center of the cutter. Otherwise, it will not mill the correct form.

Grinding machine centers should be ground frequently. Worn centers will not fit the centers in the work, which results in the finished piece being out of round.

The grinding machine operator should make sure that the wheel sleeves are tight at all times. If the wheel is allowed to slip, satisfactory work cannot be produced.

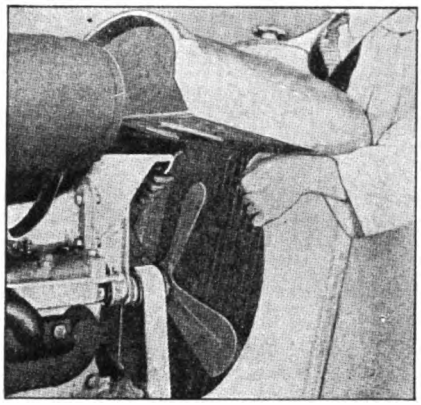
Always put on goggles before using a wheel that is operated dry. Particles of abrasive material are capable of causing painful injury to the eyes. It is better to be safe than to be sorry.

The drive belt on a precision grinding machine should never be joined with a lace, as the extra thickness at the joint results in a decided knock every time the joint passes over the pulley. A better plan is to join the belt with a blind splice.

When grinding milling cutters, the depth of cut should not be abnormally heavy, as this will draw the temper from the cutting edges of the teeth. The wheel should be of a medium soft grade, with face correctly trued so the whole cutting surface can be utilized.

Removing and Replacing The Fordson Tractor Radiator

If it is necessary to remove the radiator as when replacing the upper or lower tank, or to get at the time gears or cam shafts, says



GRASP THE RADIATOR JUST BELOW THE TANK AND LIFT

the Ford Service Bulletin, proceed as follows:

1. Drain off water by opening pet cock under radiator (it may be necessary to insert a wire in the cock to break up the sediment before the water will flow).
2. Remove the three cap screws under the bottom tank which hold radiator to cylinder front cover.
3. Loosen front fuel tank strap by removing the two nuts on cover of radiator.
4. Unscrew the four cap screws under top tank which hold radiator to cylinder head connection.
5. Grasp radiator as shown in engraving and lift it off.

When replacing the radiator insert dowel pins in two outer holes of bottom tank; see that surface of the upper and lower water connections and surface around the third cap screw hole in the lower and front cover are free from dirt or burrs which might cause a leak.

To compensate the thickness of the water outlet gasket, a spacer, placed between the tank and the cover between the third cap screw hole.

Start all the cap screws, making sure that the gaskets and spacers are in place. Run them down to an easy seat before tightening them, after which they all should be tightened.

The fuel tank may then be held up in place while the strap is entered into the tank and drawn up tight by means of the nuts, backed up by lock washers.

Two Handy Hints for the Automobile Repair Man

J. BALDWIN

Here are two hints that will appeal practically to every automobile repair man. Anyone who has attempted to deflate inner tubes will appreciate the little device shown in Fig. 1 in the engraving. This tube deflated is shown assembled at D Fig. 1. To operate it one end of the tube is inserted in the slot at X and then by turning the handle D the tube is wound up on the spindle. This will exclude all of the air from the tube preparatory for folding and packing away.

To make the device, take a piece of 1½ inch wood stock, slot one end of it as shown at A for about five inches. The other end is then cut down for a depth of about two inches to ¼ inch round, while the extreme end is made 1 inch square. Now take a piece of stock two by

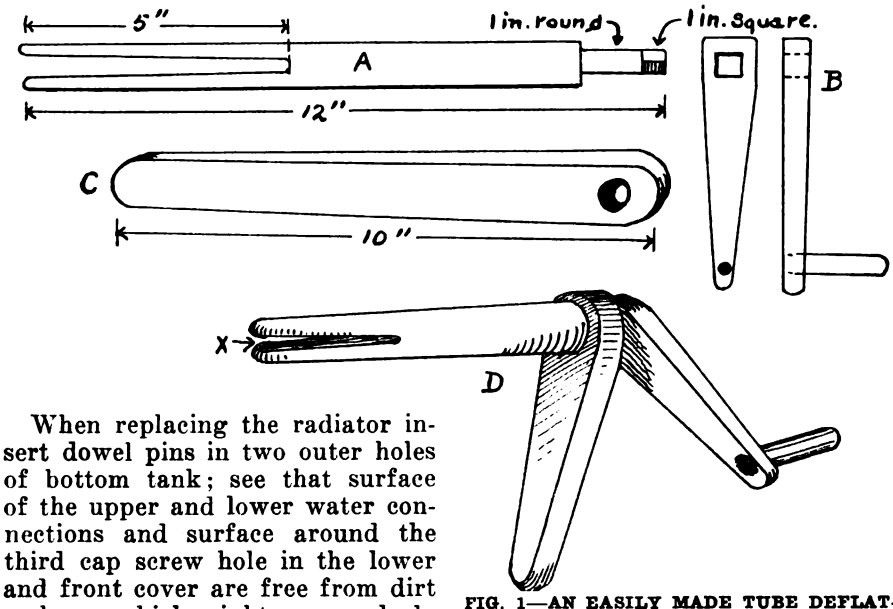


FIG. 1—AN EASILY MADE TUBE DEFLATER FOR THE TIRE REPAIR MAN

two inches in section and about ten inches long and form the piece at C. This is simply a hand hold so that the device can be conveniently

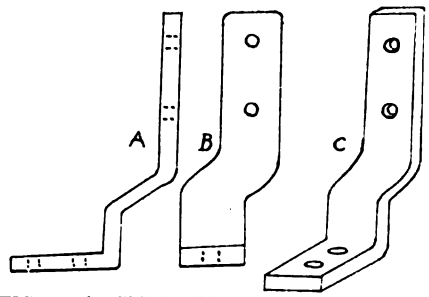


FIG. 2—A SIMPLE BRACE FOR THE FORD DASH

operated. Figure B the handle or crank is extremely simple and needs no explanation. In assembling the device, place the handhold C on the end which has been cut down and put the handle for turning in place.

Figure 2 in the illustration shows a simple brace to repair a broken one holding the dash on the Ford car to the frame. At A Fig. 2 is shown a side view of the brace while at D is shown a front view. The brace is shown in perspective at C.

This brace is made of one by one-half inch stock and offset edgeways 1¼ inch so that the foot of the brace will come to the center of the frame. This brace is very easily made and by means of it you can easily repair and thoroughly strengthen the brace originally fitted to the car when it becomes broken.

Guarding the Eyes When Using Welding Torch

The importance of guarding the eyes when using the welding torch can hardly be over-emphasized. The following suggestions from the Melting Pot are right to the point and worthy of careful thought.

An important hazard in using the welding torch is that of injury to the eyes, by the heat and glare from the work and by particles of hot metal that fly up from the weld.

Properly colored lenses fitted in goggles furnish complete protection to the eyes. Operators sometimes think they do better work without them, or are too indifferent to wear them, so the injury is done before it is realized.

Amber, yellow and greenish-yellow glasses are the most efficient

protectors. The selection of lenses, however, should not be left to chance; goggles with the proper lenses may be procured from several reliable manufacturers. The expensive colored lenses may be protected from injury from flying sparks by a clear glass lens outside each colored lens in the frame.

Goggle frames preferably should be of a material which is a non-conductor of heat. If metal frames are used they should be padded. The frames should permit free circulation of air, therefore have wire mesh or vent holes in the cups.

My Patrons and How I Keep Them

W. S. HATHAWAY

It has always been interesting to the writer to observe the different ways men have in dealing with the public, and for the amusement or benfit of the readers of "Our Journal", I am going to record a few of my observations in dealing with my own patrons, also my observations in other mens' shops.

Blacksmiths as a rule are a fine class of men, but one thing I have noticed is that a good many of them could use more tact. For instance, I was in a shop last fall watching a smith putting on horse shoes. The horse he was working on was a bit troublesome (perhaps the smith had troubles of his own), but he certainly used that horse roughly. I could see that the treatment was hurting the owner worse than it did the horse, for he remarked to me: "Jim is a good fellow but he ought to have a little more patience." Some of our patrons would sooner we abused them than their horses.

I have a number of men come to my shop who like to tell me just how to do the job. I encourage them and then go on and do the work the best I know. Invariably they say "That's just what I wanted." It does them good to get the wind off their chests.

Then there is the fellow who doesn't know just what he wants. He brings in a job and doesn't know whether you can do anything to it or not. I like to explain to that fellow what I can do for him, and then ask him if he thinks that will do. He seems to like that sort of treatment.

Then there is the farmer's wife who comes with a job for her good man and would like to have it done right away. "Oh, yes, madam" I say: "I may be busy, but one can't keep a woman waiting", and some men, I know, send their wives for that very reason.

And then there are the boys and girls—I find that it pays me to know them all.

P. T. Barnum said the people liked to be humbugged. Perhaps they don't like it all the time. But I do know that they like to be interested, and I use every means at my disposal to keep them interested in my shop. It pays me well to study the human side of my business. I keep a blackboard and write on it the best bits of wit, humor and bright sayings that I run across on it. I also have a fine magnifying glass and let people have a look at bits of broken iron and steel and a little talk on the subject makes them say,—"I never knew there was so much to a piece of common iron or steel before."

Have you ever noticed how fond people are of good drinking water? I always keep a good supply. Last summer a Winnipeg lawyer and his wife came to my shop with a broken mower knive for the friends they were staying with. It was a very hot day. The gentleman asked me for a drink and I invited him to help himself. The lady looked very dainty, but I also invited her. Much to my surprise, she took the cup with a "Thank you very much.". She then came into the shop and seemed very much intersted in what she saw.

Did you ever lay a book or paper in a convenient place with a seat beside it, and notice how many people will pick it up and have a look. Try it. It keeps people interested while you do their work, and usually makes them say: "Why that didn't take you long."

I hear someone say "What's all this talk got to do with sharpening a plough, share or welding a binder knife?" Nothing at all. But it is another part, of our business for I do know it keeps people interested in me and my shop, and I also know that when the public losses its interest in anything that thing is dead.

I could write more on this subject, but I think I have said enough to make my point clear,—That it pays to study the people who patronize our business, and in doing it, we also develope character in ourselves.

Editor's Note:—Here is a branch of business that is not given very much thought by the average shop man. In the large city stores and retail selling establishments the matter of appealing to the human interest in customers is given very serious and important consideration. We are glad to publish Mr. Hathaway's excellent article as it tells of most interesting and valuable trade bringing principles. Mr. Hathaway is located in Manitoba.

Benton's Recipe Book

Glue Will Stay Sweet if a little carbolic acid is added to it. The same applies to paste that is likely to sour before being used up.

For Welding Milk Steel, Joe Weber of Texas says to use two parts of good sand to one of air slacked line. "Use same as borax and very freely" he says. "It is cheap and nothing equals it.

A Solder for Aluminum, in reply to A. J. D. of Michigan and others is composed of the following: Tin, 63%; zinc, 31%; aluminum, 3%; phosphor tin, 3%. The phosphor tin should contain 5% phosphorus. This is a mixture extensively used.

To Drill Cast Iron, which is the information wanted by M. L. D. of Ohio, heat the spot to be drilled to a cherry red. Then place a piece of brimstone on the spot and allow it to melt and the piece to cool off in the fire. The spot may then be drilled in the regulation way as the brimstone softens the iron.

And Talking of Glue, wonder how many readers of the Recipe Book know that it is best to soak glue in cold water before cooking it. The general practice of breaking glue up into hot water is to be condemned. Glue should be cooked only long enough to thoroughly dissolve it—over cooking is injurious.

In the First-Aid Cabinet—and if you haven't one better make one up immediately—should be placed that old reliable remedy of grandmother's for burns—linseed oil and lime water. A recent accident of serious burning reminds us of this suggestion. Of course, you have a small bottle of Iodine and some cotton in the cabinet?

A Steam Pipe Cement where leaks in steam pipes cannot be stopped by calking, plugging or other mechanical means, is made by mixing finely pulverized black manganese oxide and raw linseed oil into a thick paste. It should be thoroughly forced into the leak and the pipe should be kept warm enough to absorb or remove the oil from the manganese. In about 24 hours the cement should be as hard as the iron, and should adhere thoroughly, so the leakage does not occur again

A Steel Blue on Brass, says T. M. P. of Illinois, may be secured by making up a mixture as follows:—Dissolve 1½ drachms of antimony sulphide and 2 ounces of calcined soda in ¾ of a pint of clean water. Now add 2¾ drachms of permes, filter and mix this solution with another 2¾ drachms of tartar, 5½ drachms of sodium hyposulphite and ¾ pint of water. The brass for treatment should be highly polished and then dipped into the warm mixture. The resulting coloring will be a beautiful steel blue.

High Spots

A motor cycle with a front wheel drive was one of the new models shown at the French automobile show.

Yes it is pretty hard to lose a customer after you have given him fair, square and honest service and work. In fact it is almost impossible.

A six cylinder engine equipped with three carburetors was the entirely new feature shown on a recently brought out French automobile. The engine is of forty horse power.

A street cleaning machine, built on the plan of a large truck, that waters the road and then sweeps it and at the same time gathers up the refuse and sweepings is a recent model used in England. It is said to replace the services of 40 road sweepers.

Tell your neighbor about some of the live articles that are now running in our pages. All he needs is a hint and you'll have his order and that means a six month's credit on your own account.

A new device making the automobile theft-proof when set by the owner puts the engine out of commission and in addition, when tampered with it sounds a loud siren to attract attention of owner and police.

Good work and good prices are of course necessary to reach success in the smithing business, BUT if a shopowner hasn't the respect and confidence of his community he had better sell out to some chap who can get it.

Are you getting all you can? You'll never know until you go after all you can get. But then one never knows how much business he can get until he goes after its getting with intelligent determination.

A competitor's usually a mean sort of individual—but, remember you are your competitor's competitor—and—you are not such a mean sort, are you? Think some frank thoughts along that line and you'll find that competition can be made the life and comfort of trade and business.

Some men and some of 'em are smiths too, think that profit is interest on their investment and salary for running the business. No-sir-ree. The interest on your investment is your just due. So is your salary. There should be a profit beyond these items. See that you get it.

Turn 'em out and into money. We refer to the stock and stuff you have about the shop—stuff that's been gathering dust for months, yea mayhap years. The space some of it occupies is worth more than the material itself. Turn it into something—money or more room.

Files of catalogues are as necessary as files of steel in the intelligent conduct of an efficient repair business. Keep both in the pink of condition. Catalogues are important book of the trade. They contain important information on your business. Keep them on hand in a handy place.

Read them all you cannot tell which one may have a new message for you and tell you about just the thing you want to know about. In fact, the very advertisement that you miss is very likely to be the most valuable one to you. Don't run any risk, read them all. They are valuable literature of your trade.

Try the wanted and for sale columns if you want to buy or sell a shop, a machine or anything that a smith or repair man will want to buy or sell. Remember this paper is read by just the men who will be interested in just what you have to offer if it has any connection with smithy or repair shop.

Six month's Free Subscription Credit—could you use a six-month's credit on your own subscription? It is easy to secure it. Just send us one new subscriber for one year and we'll give you six months more on your own subscription. Yes, and if you'll send in two new one's we'll give you a full year's credit.

"Figures air like bees" said old Uncle Abner whose hobby are the honey makers. "—it's all in the way you handle 'em. If y' handle 'em rong yer likely t'get stung. An' if 'y handle 'em right they'll serve y' as nothin' else in the world. To know how to handle either y've got t' study 'em. And they ain't anybody yet knows all about either bees or figures".

Seattle, Washington, has a motorists club that other cities and towns may well copy. It is known as the "Careful Drivers Club." Every member of the club carries a plate similar to a license plate and reading "Let's Drive Carefully." This naturally gives wide publicity to the careful driving movement and in addition every member is pledged to drive carefully and to see that the traffic laws are obeyed.

When in need of anything write the Subscriber's Service. This service is for the use and accomodation of our readers and they will find it of extreme value in purchasing supplies, tools and machines of all kinds. No need to write a lot of letters to a lot of manufacturers, dealers or jobbers. Just write one letter to the Subscribers' Service and they will do the rest, putting you in touch with all the manufactures and dealers of the goods in which you are interested.

A village blacksmith who in his seventy-ninth year still shoes horses, sings in the village choir and is captain of the fire brigade is Robert Vigar of Caterham, England. Mr. Vigar has been the Village smith of Caterham for years upon years. On Sunday he attends the church where he has sung in the choir for over fifty years. And for over thirty years he has been captain of the fire brigade. Truly a man of many parts and, doing them all well if we are any judge of smiths.

Several of "Our Folks" have written in lately to tell us how they have been victimized by that ever reoccuring fake the Fake Agent. Time and time again have we warned "Our Folks" about these fakers and confidence men. If you do not know the man who is asking for your order or money don't hand him anything. Get a tight grip on your wallet and change purse and whistle loudly for the dog. There are altogether too many of these chaps living easy on their wits. Of course, if you have been subscribing through an agent whom you know give him your order by all means. But don't let the stranger with the smoothly oiled tongue argue you into giving him any money. It is an excellent motto to observe. "When in doubt, DON'T."

Really now—is there anything on God's good green earth that can surpass "Our Journal" in real, true honest value for one of your Uncle Samuel's little lone dollars? If there is we would really like to know what it is. Here we have continued year, after year to get out "Our Journal" in spite of rising costs in all departments and in all supply costs, have continued the paper at the original price and—have in conquence earned fairly and squarely the gratitude and appreciation, the support and commendation of as loyal a family of readers as has ever supported a publication of any kind. We are grateful to "Our Folks" for this support of our efforts and feel well repaid in the confidence that we know "Our Folks" have in "Our Journal" and in the management back of it.

Success is more a matter of desire than of circumstances. Every one wants success of course. But the reason more men do not obtain success is because they do not want it hard enough. Certain things are necessary to obtain success. Those certain things must be done. If you want success hard enough and will do the things necessary to get it there is nothing that will keep success from your door. Success does not come from a discussion of the peace conference or the probable effect upon the Pacific problem of our attitude toward Russia. Nor can we grasp success to our breast by calmly sitting on the end of a shoe-keg and considering what a hard old world it is afterall. Backbone not wishbone is the substance from which success springs. Remember—if you want it hard enough success will stare you in the face.

Like a man who had had a long encounter with a barbed wire fence appeared Tom Tardy when we dropped in at his shop the other day. He seemed to be covered with surgeon's plaster on most visible portions of his body and with cloth bandages on the remaining parts. Upon inquiry we learned that Tom had become impressed with the possibilities of "this here new fangled oxen-an'—acidilean welding" (as he expressed it) and had decided to make his own equipment. He said he found an old acetylene generator down back of the old hotel that burned down some years ago and this he got into fairly good working order. Then he made an oxygen generator from the description of a "fellow putterer" who knew just enough to be dangerous in his knowledge, and these two old moss backs, as a consequence, came very near to calling upon good Saint Peter. Of course, we commended Tom upon his good intentions, but we also suggested that he leave the building of such apparatus to experienced engineers and builders. Tom has no doubt paid out in doctor's bills more than enough to pay for good, safe equipment which he could have purchased from a reliable maker.

OUR HONOR ROLL

There's not a single name in the 1932-class—yet it is the easiest class to get into right now, and that's why we are going to make a little special offer.

In the first place if your subscription expires anytime this year all you need do is to dig up a five spot ($7.00 in Canada and $9.00 in Other Countries) and get a ten years' credit.

Now just to make it interesting we are going to give one year's subscription free to the first reader who gets into the 1932 class. In other words, the first man putting his name in the 1932 class will be presented with a year's subscription to "Our Journal." He can do as he pleases with this—he can order it sent to a friend or neighbor, he can sell it or he can have it credited to his own account.

Now, let us see who will be first in the 1932-class—we'll announce the winner with due ceremony.

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10 yrs.	5.00	save 5.00	7.00	save 5.50	9.00	save 6.00

These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents, (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

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A. Schmitt, Nebr. ..... June, 1926
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D. Ackland & Son, Man. ..... May, 1926
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C. Seidles, Pa. ..... Dec., 1925
W. Robertson, S. C. ..... Dec., 1925
H. Collins, Ohio ..... Dec., 1925
G. Hanshaw, Okla. ..... Dec., 1925
W. Bate, Conn. ..... Dec., 1925
R. Shipley, Iowa ..... Dec., 1925
W. Nattress, N. M. ..... Dec., 1935
J. Sammerlee, N. Y. ..... Dec., 1925
D. Rhymes, Texas ..... Dec., 1925
L. Heath, Calif. ..... Dec., 1926
E. Wright, Ill. ..... Dec., 1925
C. Frazier, Ky. ..... Dec., 1925
G. Leuts, Ohio ..... Dec., 1925
J. Sebesta, S. D. ..... Dec., 1925
P. Oram, England ..... Dec., 1925
F. Wortell, Calif. ..... Dec., 1925
E. Thomas, N. Y. ..... Dec., 1925
H. Miller, Wash. ..... Dec., 1925
M. Bates, N. Y. ..... Dec., 1925
J. Woods, Oregon ..... Dec., 1925
W. Areford, Pa. ..... Dec., 1925
J. Howell, Mo. ..... Dec., 1925
J. Morrow, Pa. ..... Dec., 1925
A. Darling, Sr., N. Y. ..... Dec., 1925
J. Goebel, Kans. ..... Dec., 1925
C. Ransch, Ohio ..... Dec., 1925
R. Noble, Jr., Ont. ..... Dec., 1925
C. Lynch, Oregon ..... Dec., 1925
H. Clauson, Pa. ..... Dec., 1925
Neles, Bros., Calif. ..... Dec., 1925
H. Lefler, Mich ..... Dec., 1925
D. Bullinger, Mo. ..... Dec., 1925
A. Potter, Conn. ..... Dec., 1925
R. McMains, Calif. ..... Dec., 1925
W. Jordan, Maine ..... Dec., 1925
R. Fisher, Pa. ..... Dec., 1925
P. Kaimulos, T. H. ..... Dec., 1925
H. Hesse, Kansas ..... Dec., 1925
A. Wassmuth, Idaho ..... Nov., 1925
G. Illsley, Mass. ..... Nov., 1925
A. Speir, Ohio ..... Nov., 1925
W. Clepper, Texas ..... Nov., 1925
J. Mallett, Queensland, Aust. .. Nov., 1925
J. Dribble, South Aust. ..... Nov., 1925
W. Schaid, Wis. ..... Nov., 1926
L. Krause, Ind. ..... Dec., 1925
M. Pople, N. S. W., Aust. .. Sept., 1925
J. Wilkinson, Queens, Aust .. Sept., 1925
C. Williams, Victoria, Aust. .. Sept., 1925
Reynolds Bros., Pa. ..... Sept., 1925
F. Krens, Calif. ..... Aug., 1925
D. Allen, Mont. ..... Aug., 1925
G. Fisher, & Bro., Ohio ..... Aug., 1925
W. Dixon, Ohio ..... Aug., 1925
F. Shupe, Pa. ..... Aug., 1925
W. Wright, Va. ..... Aug., 1925
H. Knoues, Ill. ..... July., 1925
J. Stadler, Calif. ..... July, 1925
Sligo Iron Co., Mo. ..... July, 1925
G. Hogoboom, N. Y. ..... July, 1925
H. Schriber, Pa. ..... July, 1925
H. Fast, Manitoba ..... June, 1925
G. Broughan, N. Y. ..... June, 1925
D. Conillard, Vt. ..... June, 1925
Rasmussen & Baasch, Nebr. ... May, 1925
J. O'Rourke, N. Y. ..... May, 1925
A. Spangberg, Oregon ..... May, 1925
C. DeVore, Pa. ..... May, 1925
Halvorson, Bros. ..... May, 1925
A. Lemmon, Utah ..... May, 1925
H. Leadbitter, N. S. W., Aust. .. Apr., 1925
J. Matthews, England ..... Apr., 1925
M. Duvoisin, Ill. ..... Apr., 1925
E. Ellsworth, Iowa ..... Apr., 1925
G. Gullgren, Iowa ..... Apr., 1925
H. Wiese, Iowa ..... Apr., 1925
Heart's Delight Farm, N Y. .. Apr., 1925
S. Wilkin & Sons, N. Y. ..... Apr., 1925
P. Wand, N. Y. ..... Apr., 1925
M. Settle, Ohio ..... Apr., 1925
D. Kille, Okla. ..... Apr., 1925
J. Helms, Calif. ..... Mar., 1925
E. Moon, Ind. ..... Mar., 1925
A. Holmquist, Iowa ..... Mar., 1925
G. Fredericks, Minn. ..... Mar., 1925
O. Martinson, Minn. ..... Mar., 1925
C. Lindquist, Minn. ..... Mar., 1925
F. Locke, N. Y. ..... Mar., 1925
G. Follmar, Nebr. ..... Mar., 1925
C. Alexander, N. Y. ..... Mar., 1825
P. Chemin, Ohi ..... Mar., 1925
F. Faistinger, Pa. ..... Mar., 1925
E. Roseth, S. D. ..... Mar., 1925
V. Priessnits, Wisc. ..... Mar., 1925
A. Hersog, Misc. ..... Mar., 1925
J. Taugher, Ont. ..... Feb., 1925
G. Lawton, South Aust. ..... Feb., 1925
E. Dillabough, Tnt. ..... Feb., 1925
J. Ford, Wash. ..... Feb., 1925
J. Kers, Ill. ..... Feb., 1925
E. Price, Ill. ..... Feb., 1926
R. Nystrom, Mich. ..... Feb., 1925
E. Hiteshue, Ohio ..... Feb., 1925
D. Garber, Ohio ..... Feb., 1925
A. E. Meier, Wisc. ..... Feb., 1925
J. Beyerboim, Calif. ..... Jan., 1925
C. Lake, Colo. ..... Jan., 1925
H. Draper, Ind. ..... Jan., 1925
J. Damm, Iowa ..... Jan., 1925
E. Atteberry, Mo. ..... Jan., 1925
A. Hahn, Colo. ..... Jan., 1925
D. Shearer, Ohio ..... Jan., 1925
H. Compton, Tenn. ..... Jan., 1925
C. Jacobits, Wis. ..... Jan., 1925
A. Witt, Wis. ..... Jan., 1925
J. Withers, Terre Haute ..... Jan., 1925
M. Bennett, Miss. ..... Jan., 1925
J. Howard, Jr., Ala. ..... Jan., 1925
J. Flynn, Iowa ..... Jan., 1925
S. Bradford, Miss. ..... Jan., 1925
E. Staley, Calif. ..... Dec., 1924
J. Davis, Calif. ..... Dec., 1924
G. Tatum, Fla. ..... Dec., 1924
G. Langhlin, Ill. ..... Dec., 1924
B. Bueker, Ill. ..... Dec., 1924
F. Jarvis, Ind. ..... Dec., 1924
W. Herdt, Ky. ..... Dec., 1924
E. Naylor, Md. ..... Dec., 1924
J. Klein, Md. ..... Dec., 1924
M. Bailey, Mich. ..... Dec., 1924
L. Cassfell, Minn. ..... Dec., 1924
J. Ingvarson, Minn. ..... Dec., 1924
D. Teeblen, Nebr. ..... Dec., 1924
C. Fairley, N. H. ..... Dec., 1924
C. Carlson, N. H. ..... Dec., 1924
G. Parker, N. H. ..... Dec., 1924
C. Klotz, N. J. ..... Dec., 1924
I. Powers, N. J. ..... Dec., 1924
W. Lamberton, N. Y. ..... Dec., 1924
F. King, N. Y. ..... Dec., 1924
J. Muller, N. Y. ..... Dec., 1924
C. Moon, N. Y. ..... Dec., 1924
E. Evans, N. Y. ..... Dec., 1924
J. Marshall, Ohio ..... Dec., 1924
J. Schucker, Pa. ..... Dec., 1924
N. Quick, Pa. ..... Dec., 1924
C. Birely, Md. ..... Dec., 1924
F. Bradley, N. Y. ..... Dec., 1924
A. Estes, Va. ..... Dec., 1924
I. Clark, Va. ..... Dec., 1924
J. Bailey, Manitoba ..... Dec., 1924
R. Brander, Manitoba ..... Dec., 1924
E. Stahl, Ill. ..... Dec., 1924
J. Hoyt, Maine ..... Dec., 1924
A. Tremblay, Mass. ..... Dec., 1924
W. Doremus, N. J. ..... Dec., 1924
H. Roberts, N. Y. ..... Dec., 1924
W. Neal, N. Y. ..... Dec., 1924

Taking Down and Re-Assembling the Storage Battery

PART III.

T. A. BECKLIN

We now come to the sealing of the battery cells in the battery box. If the covers have not been cleaned, take a putty knife and heat it up in the flame, Fig. 33. With the heated putty knife, the sealing compound is now cleaned from all of the covers. The method of cleaning the cover with the heated putty knife is shown in Fig. 34.

You will now need some of the heated compound for sealing up

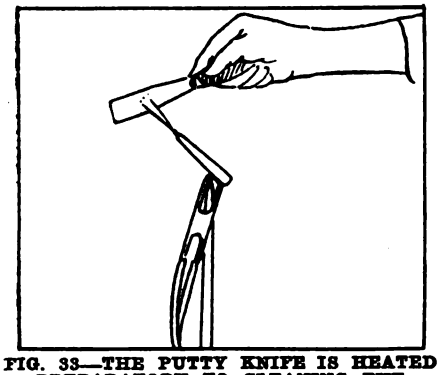


FIG. 33—THE PUTTY KNIFE IS HEATED PREPARATORY TO CLEANING THE COVERS

the battery. This is best handled by placing it in an old coffee pot or other suitable vessel with a pouring spout. The compound may be heated in this over an ordinary gas plate, as shown in Fig. 35. While the compound is heating, place your bottom cover into position. If there is any difficulty in fitting them properly over the terminal posts, use a pair of pliers, as shown in Fig. 36. This will enable you to find the centers without difficulty and to have the covers fit properly. If the bottom cover does not fit closely at the terminal posts or at the wall of the jar these openings should be carefully calked with

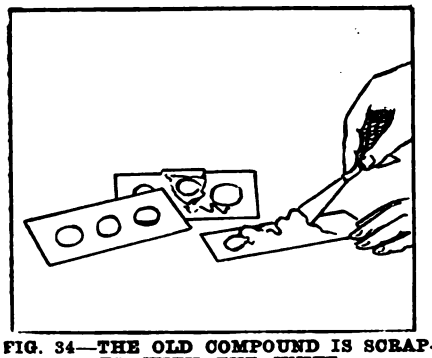


FIG. 34—THE OLD COMPOUND IS SCRAPED WITH THE KNIFE

twine or tow to prevent the melted sealing compound from flowing into the jar.

It is well before attempting to pour the compound, as shown in Fig. 38, to apply the sealing compound around the edges of the cell cover a little at a time with the putty knife. This will keep the compound from flowing into the jar which is likely to happen if there are any wide spaces when the compound is poured upon the surface of the cover. The bottom cover should be well-fitted in to place before the top covers are placed. When pouring the compound, as shown in Fig. 38, fill all spaces, and see that the compound flows evenly over the entire surface of each cell. If there are any rough places throw the flame on the sealing compound and smooth with the heated putty knife.

Before putting on the top cover, heat the cover slightly and also heat the surface of the compound. This will cause the top cover to imbed itself in the compound. Then put on the form as shown in Fig. 49, which has of course been previously prepared. This wooden

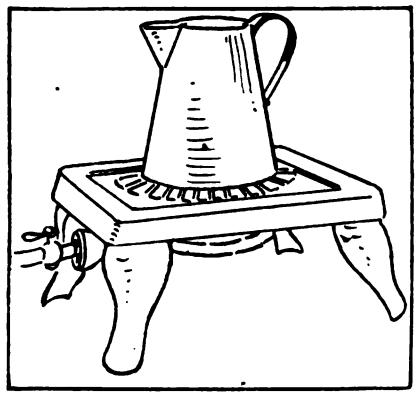


FIG. 35—A GAS HOT PLATE AND AN OLD COFFEE POT ARE EXCELLENT FOR MELTING AND HANDLING THE SEALING COMPOUND

form is used to hold down the covers in proper position while the compound is cooling. The wooden form is placed over the covers as shown in Fig. 41, with a heavy weight on top of the form. That should stand for about 10 or 15 minutes, or until the sealing compound has cooled and set perfectly. The excess sealing compounds can then be scraped off with a hot putty knife as shown in Fig. 42.

Now see that the post and eyes of the lead connectors are cleaned and bright. If the disconnecting and taking down has been done carefully, the post and connectors will

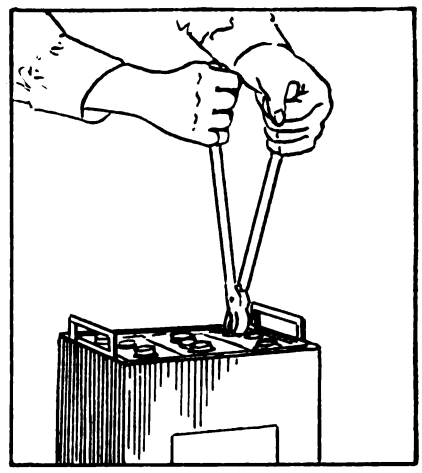


FIG. 36—USE A PAIR OF PLIERS TO LOCATE CENTERS SO COVERS WILL FIT PROPERLY

be in good condition for replacement. Before replacing them wash them with ammonia, dry them carefully and thoroughly and then polish sand paper. A scraper may also be used as shown in Fig. 43. The inside of connectors should be carefully scraped with a knife as shown in Fig. 44. It is of course impossible to do a good job of burning unless all of the parts are properly cleaned and bright. The top of the connectors may be cleaned and brightened up with a file as shown in Fig. 45.

Before applying the terminal connectors test all cells with a voltmeter, to see if they are set properly. If a voltmeter is not handy, scrape the rubber bushing on each side of the post. The red bushing is positive and the black shows the negative side. The connector should of course be applied so that the positive end of one cell is connected with the negative side of the next cell.

Now place the connectors over the posts lightly taping them to a firm seat, and burn the joint, as shown

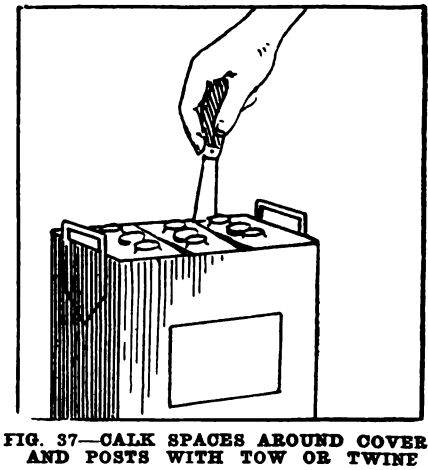


FIG. 37—CALK SPACES AROUND COVERS AND POSTS WITH TOW OR TWINE

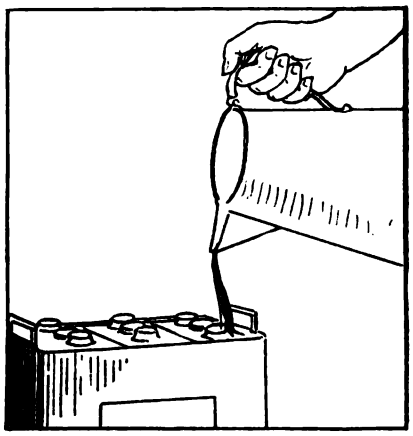


FIG. 38—THE COMPOUND IS HEATED AND THEN POURED AS EVENLY AS POSSIBLE OVER THE COVER

in Fig. 46. In burning connectors and terminals to the post melt the top of the post and then the edges of the hole in the connector. Strips of antimonious are then melted and the melted metal allowed to run into the hole in the connector. Care must be taken to see that the top of the post and the inside edges of the connector are melted thoroughly together before applying additional lead. If this is not done, the connection will pull loose. Care should also be exercised not to melt the outer edges of the connector. Practice in this work is very necesary in order to do it properly.

If a burning outfit or torch flame is not available, a soldering iron may be used in this work, but do not under any circumstances, use any soldering acid or other flux.

After burning the connectors and terminals, mark the positive terminal with a plus sign (+) or "Pos" while the negative terminal is marked with a minus (—) or "Neg."

Sealing Compound

The composition or make-up of the sealing compound that is used in sealing up the cells and the covers of the battery was given in the first installment of these articles,

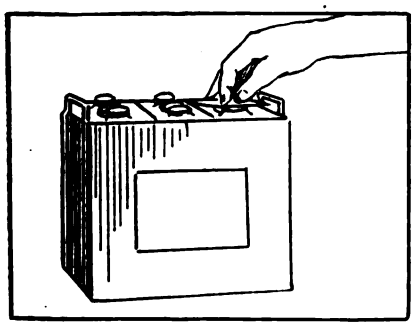


FIG. 39—HEAT THE TOP COVER AND THE COMPOUND BEFORE PLACING TOP COVER IN POSITION

but its is again stated here for the convenience of readers who prefer to make up their own compound: Take one-half gum asphaltum, one-fourth paraffine wax and one-fourth ordinary rosin. Melt these ingredients together and apply as stated in the foregoing.

In this connection a little stunt that will save the battery repair man much time, trouble and work, may be mentioned. When the compound around the top of the cell covers crack, heat an old cold chisel or similarly shaped tool, and use this to melt the edges of the cracked compound and work the edges of the crack together and smooth up the compound so it presents a neat appearance.

Charging the Battery

The battery cells are now filled with the electrolyte of proper strength. The mixing of electrolyte was explained in the first article of this series, while the de-

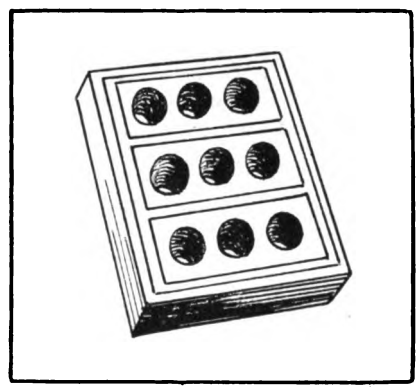


FIG. 40—THIS WOODEN FORM IS USED TO HOLD COVERS DOWN WHILE COMPOUND IS COOLING

tails and cautions in connection with charging will be taken up in a later article. Reference to and instructions in charging will be taken up only in a general way now.

When the battery is filled with electrolyte, it will heat up and should not be put charged till the electrolyte has cooled which will take from six to twelve hours.

Start the charge at one half the normal charging rate and continue until the gravity of each cell has remained stationary for five hours. During the development charge take occasional temperature readings and if the temperature of any cell exceeds 100 degrees, lower the charging rate, or discontinue the charge until the cell has cooled.

If the battery has new plates, 60 hours will be required for the development charge. If the plates

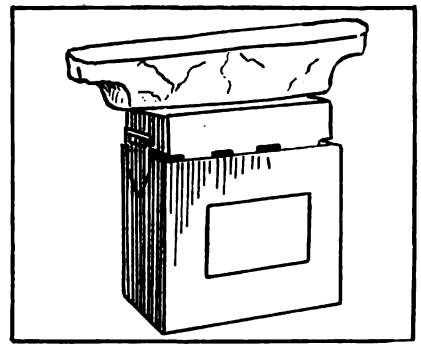


FIG. 41—A HEAVY WEIGHT IS PLACED OVER WOODEN FORM UNTIL COMPOUND HAS SET

are old and badly sulphated more time may be required.

If any of the these have not been torn down for repairs these should be left out of the circuit during the first thirty hours of the developing charge. They may then be connected into the circuit and the whole battery brought to full charge.

When the charge is complete, adjust the gravity of the electrolyte to between 1280 and 1300. To do this remove some electrolyte from the cell and replace with pure water until the desired gravity is reached; or remove all of the electrolyte from the cell and replace with acid solution of proper strength according to whether the cell is reading high or low.

Education and Character are the Keystones in the Arch of Craft Betterment

GEORGE ABBEY

I have read with mueh interest the article entitled "The New Era Blacksmith", and like many other smiths who have made a success of the business, have hoped that we might in some way unify our ef-

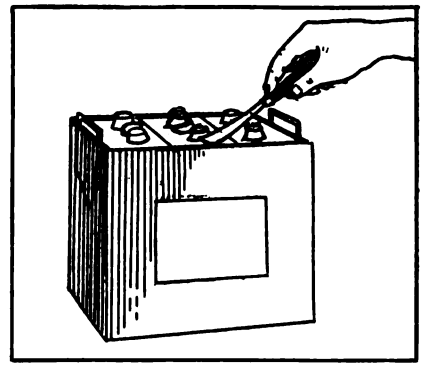


FIG. 42—REMOVE THE EXCESS SEALING COMPOUND WITH THE HEATED PUTTY KNIFE

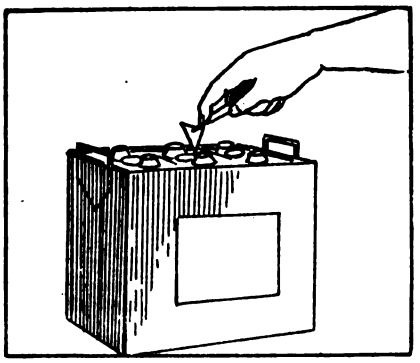


FIG. 43—ALL TERMINAL POSTS ARE NOW SCRAPED BRIGHT AND CLEAN PREPARATORY TO BURNING ON CONNECTORS

forts and so raise the standard of our profession to its proper sphere of usefulness.

What then is involved in this accomplishment? Isn't it our own character?

We have been branded as a set of guzzlers. Booze and its consequent inefficiency is largely responsible for this condition and it has proven a great handicap.

The Village Blacksmith who so inspired Longfellow in his immortal poem was the type of man we should all emulate so that the "Children coming home from school look in at the open door, and catch the burning sparks that fly like chaff from the threshing floor". And this applies especially to the boys.

The smith to equal the character of other high grade business men must of necessity have an ideal character ever before him, and constantly strive to attain it, so that his character will be seen and felt in all his mechanical operations pertaining to his chosen profession. He should be able to stand a rigid examination and so prove his ability. This should be exacted of all smiths under the age of 50 years, exempting all others for two reasons. First—We find very few who have reached this age who are not good smiths. Second—Men of this age are today the back bone of the profession and while they would not be able to stand the technical examination they turn out better work than those who have passed in a theoretical class. What we must strive for is, that both the theoritical and the practical are incorporated in the one man. They must be combined to get the best results. We must assuredly be accomplished to the extent of being able to figure the circumference from a given diagram; to take certain stock and forge to given lengths and thicknesses. We must pass up unreliable guess work. Guess work goes all too largely into smith work, but if we combine our theoretical and practical knowledge, that of itself will eliminate much that is not right in the trade.

When you hire a man, get the best. Don't hire a man because he is cheap. He will ruin your business just because he can and must give you and your patrons only the type and class that is in him.

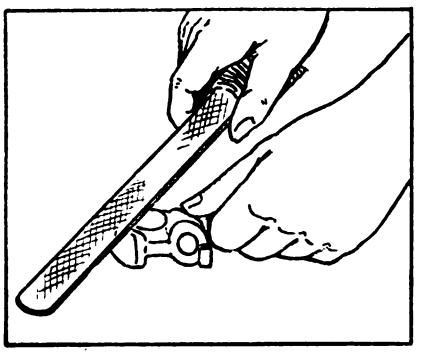


FIG. 44—THE TOPS OF CONNECTORS MAY BE RASPED BRIGHT TO CLEAN THEM

In my estimation fifty percent of the smiths are bitterly opposed to book learning. What would some smiths do if they were handed a set of blue prints and asked to make a set of lathe tools, which they had never seen? But if he were a practical man who had been trained properly he could get them out in good form, and catch an inspiration from the drawing that would help him visualize other work of similar character. And let me make this point: Be careful with your drawing. It will elevate the class of your work. It will facilitate the work, and eliminate many errors that would occur were it not for the drawing. Make your drawing full size on sheet iron if possible.

Let us do better work and thus turn the imcompetent botch out of the craft. You don't hear of incompentency in railroad shops.

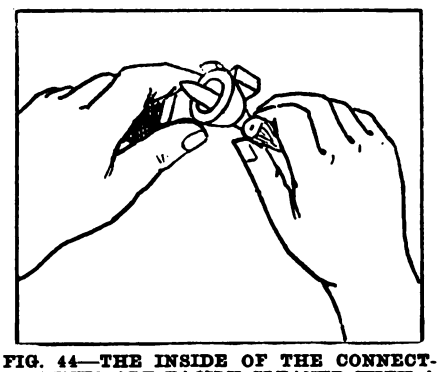


FIG. 44—THE INSIDE OF THE CONNECTOR LINKS ARE EASILY CLEANED WITH A POCKET KNIFE

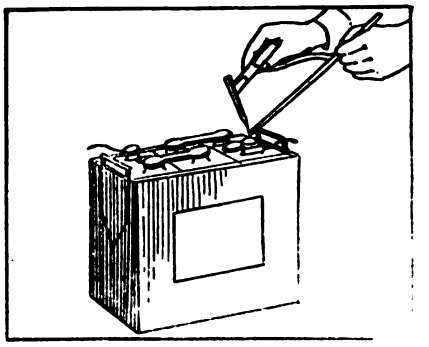


FIG. 46—THE CONNECTORS ARE NOW BURNED INTO PLACE ON THE TERMINAL POSTS

Some who call themselves blacksmiths could not even strike for this class of workman. It takes some skill to be one of three strikers on an important forging? And what of the skill displayed on the other side of the Anvil? There's no comparison between the botch farm smith and this man.

What are we going to do about it? That is the problem, as Mr. F. J. Price has outlined in "Our Journal". We've simply got to organize and get county and state laws framed, and enacted and thus demand efficiency, especially in the horse shoer.

The writer once saw a horse being shod with a lathing hatchet, a draw knife, and the shoe nailed on with a eight-penny wire nails. Talk about that man being allowed to be in competition with a scientific horseshoer? We must get together and cut out these trade butchers and inefficiency.

We must branch out into the newer business that naturally belongs to the Smith. We must weld auto springs. We must put in power tools.

We must carry all sizes of spring steel and make up new spring leaves. We must learn the principal of auto axle setting. Your knowledge of wagon axle setting

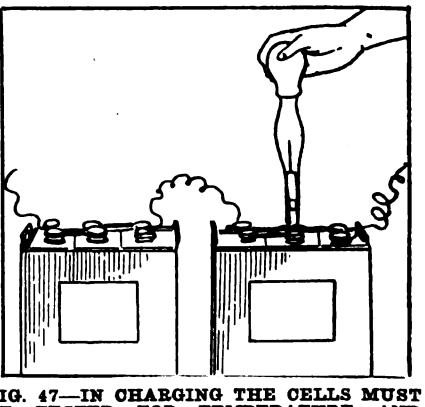


FIG. 47—IN CHARGING THE CELLS MUST BE TESTED FOR TEMPERATURE AND SPECIFIC GRAVITY

will help you. Put in an oxy-acetylene welding outfit. With modern tools and your skill you'll soon put the smith out of business whose work looks like that of a house carpenter on a wagon bed. But let us not get hidebound, and think we can't be taught a better way of accomplishing the same ends.

I have noticed that the higher class smiths get along the smothest even in competition. We must remember that no man lives above his character. Let the best men get together and form a class peculiar unto the craft. It is a well known fact that a first class farmer seeks a first class smith. He demands good service and the smith of today must be prepared to give it. Farming like all other businesses, is

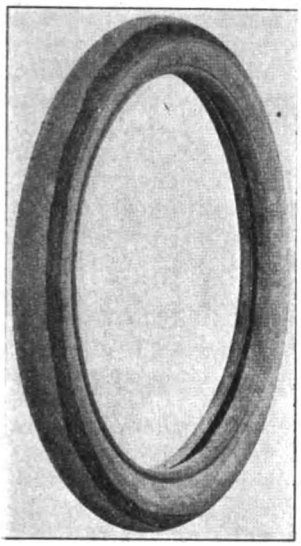


FIG. 26—WHEN A TREAD IS BADLY WORN WITH SIDE WALLS IN GOOD CONDITION THE TIRE MAY BE RETREADED

becoming more scientific. The horse is being superseded by the tractor.

The market for farm produce is constantly changing, and it necessarily follows that we must keep up with the mighty strides of progress, and take our stand up in the front rank where we belong, by faithfully meeting all these requirements.

"Our Journal" has been of incalcuable service to the craft along this line, yet some of us have not kept pace with its progress. Let us put thought into our reading, that we can apply its substance to our business. Both must be closely associated to be of the greatest mutual value. The Editor gladly offers more space to the educated smiths, who can describe advanced methods in the business of blacksmithing.

I have not attempted to answer Mr. Price, with reference to the New Era Blacksmith, but have attempted to roughly outline what should constitute a good smith and a good shop. I hope there-by to elevate and stimulate our craft into the higher channels of business, so that we can take our stand with the foremost rank. This must be done through educational forces that come to men through intelligent organizations. "Our Journal" must be our text book. Every copy must contain food for serious thought. The apprentice, the finished smith, the foreman, and the office force, these elements brought together will result in more intelligent co-operation, that will at once be renumerative and helpful. These are just a few general hints as necessity and experience has shown them to be expedient.

Standard Tire Repair Shop Methods

PART III.

To Build up for Retreading

Apply two coats of vulcanizing cement, the first coat light, so that it will soak into the fabric and the second coat heavy so that it will form a body. With a view to outlining a most effective manner of building up a retread and establishing a cost basis, the Firestone Co., have figured out a table showing the number of plies of gum to be used for each size of case, the thickness and width, also width of the fabric breaker strip, together with other specifications.

It is not necessary to rebuild as thick as the original tread; in fact it is not advisable because it requires a long cure to vulcanize, and the weight is detrimental to the carcass of an old case that has been in service for several months.

Further than this, the case would hardly be expected to give enough more mileage to wear out a second tread as heavy as the original, although this is not an uncommon occurrence. From numerous experiments, covering a long period, the Firestone Co., finds the following combination to be most suitable from points of workmanship, durability, cost and general adaptability to climatic conditions.

Cushion: When ordering this gum, specify thickness to be 1-32 of an inch. Apply one thickness underneath and one thickness above fabric breaker strip, extending from one-fourth to one-half inch on each side of the breaker strip.

Breaker: The fabric breaker strip should be cut straight with

FIG. 27—THE NEW TREAD IS BUILT UP FLAT ON A TABLE BEFORE APPLYING

threads and not on bias and of length to permit ¼" lap at ends.

Tread: When ordering, specify thickness to be 1-16 inch. The tread should be built up flat on a table as shown in Fig. 27. The narrow ply to be applied toward the fabric. The width of the **over all** ply should be determined by the condition of the case after buffing and cementing.

Retreading

When applying built up tread, be careful to center same all around on case before rolling down edges. See illustration Fig. 28. The new material should be carefully rolled down to work out all air pockets and secure good adhesion. Air pockets should be opened with a sharp awl.

The corrugated stitcher is very effective for rolling down gum at edges of plies.

Fig 29 illustrates the stepped

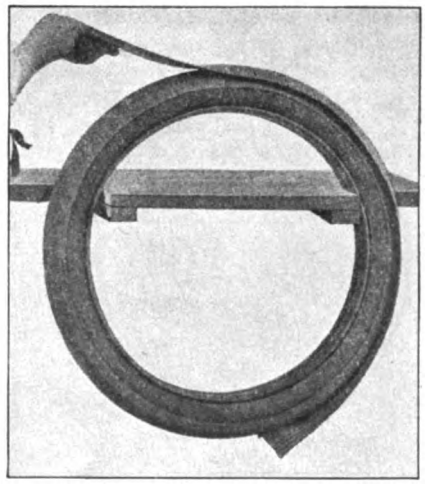


FIG. 28—APPLY TREAD CAREFULLY TO CENTER OF TIRE CASE AND THEN ROLL DOWN EDGES

plan of construction and relation of materials in built up tread after being applied to case.

Recovering

In Fig. 30 is shown the fabric body cleaned and ready for cementing the entire old tread, side wall rubber, also chafing strips removed.

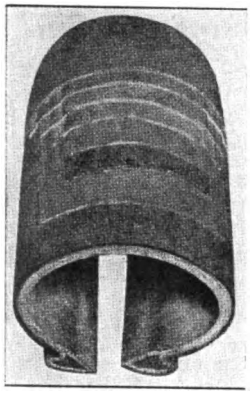


FIG. 29 — SHOWING HOW THE BUILT UP TREAD IS STEPPED

The method of recovering —by this we mean the application of new rubber on side walls and new tread —is identical with the operation of retreading, except that new gum is applied to the side walls, and a new tread put on afterwards. When recovering it is advisable to always apply new chafing strips over beads all around on both sides. This results in better adhesion of the new rubber and the side walls.

In Fig. 31 is shown the relation of the materials after they have been built up and applied to the case.

Curing

The common method of vulcanization is in the sectional cavity with air bags.

If the shop is equipped to do so, the cure can be made by using an endless air bag and applying the tire to a splic curing rim and wrapping it with a muslin jacket applied circumferencially. The tire then should be cross wrapped twice around and vulcanized in heater. A tire thus wrapped and ready for the heater is shown in Fig. 32.

Relining

Quite often cases in good condition on the outside are not safe for service, due to fabric breaks on the inside. In this case a reliner properly applied will give an opportunity of securing longer mileage from the tire.

Either cord or fabric tires can be relined successfully and the chief difference in the method is that in one case cord rebuilding fabric or cord reliners are used, and in the other the fabric rebuilding material is used.

If the breaks are small, the application of one ply of building fabric will sometimes be sufficient reinforcement to secure considerably more mileage. Before application of new fabric, however, the soapstone, white paint, and all other foreign matter should be removed from old fabric with a wire brush, and two coats of vulcanizing cement applied. If the fabric is broken all around, it is then advisable to reline the case with two plies of building fabric (stepped per illustration), the under ply being frictioned two sides, and coat one side. The upper ply should be frictioned one side only, the side toward the tube being bareback.

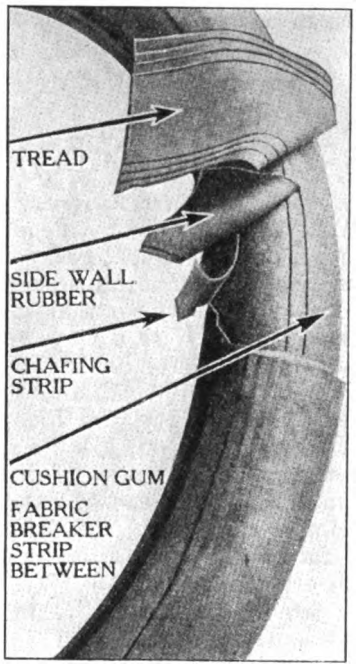


FIG. 31—SHOWING THE RELATION OF THE MATERIALS AFTER APPLYING TO CASE

Some repair men turn the inside of case out to apply a reliner. When this is done, the reliner will, after the case has assumed its normal shape, buckle and be rough. The better way is to apply the reliner as shown in Fig. 33.

Use endless air bag for internal pressure, apply to split rim, wrap and vulcanize in heater, from 35 to 40 minutes at 40 pounds steam pressure.

If a wire coil be used for internal pressure, a fabric pad should be placed around the coil to prevent marks to the reliner. When using coil, it is not necessary to apply case to a split curing rim.

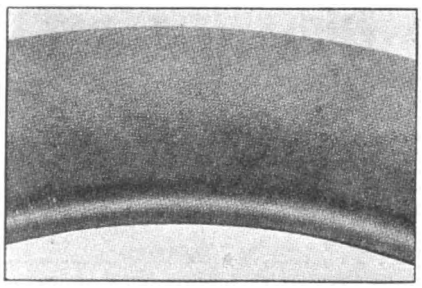


FIG. 30—SHOWING THE FABRIC BODY CLEANED AND READY FOR CEMENTING

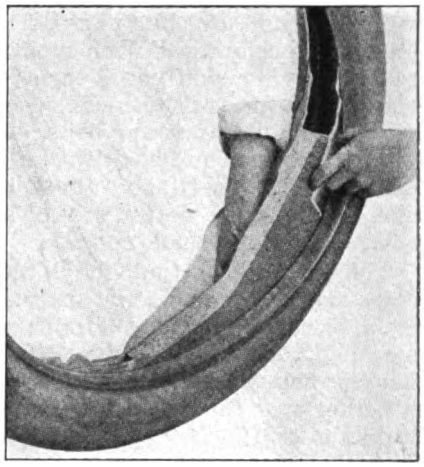


FIG. 33—A RELINER PROPERLY APPLIED WILL LENGTHEN THE MILEAGE OF TIRES WITH INSIDE FABRIC BREAKS

Labor Saving Hitches for Large Teams

WAYNE DINSMORE
Secretary, Horse Association of America.

Practical farmers operating large farms, realize that the cost of production, yield per acre and selling price of grain are THE factors which make or break the operator.

Editor's Note:—This article with its very practical illustrations of large team hitches and eveners will be of unusual interest to our readers. We are indebted to Mr. Dinsmore for special permission to publish the data and to reproduce the very practical diagrams of hitches that have been successfully tested out.

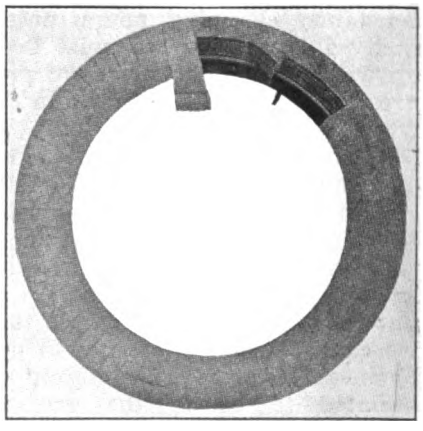


FIG. 32—HERE THE TIRE IS ALMOST COMPLETELY WRAPPED AND READY FOR THE HEATER

Selling price is governed by world wide conditions beyond the control of any individual, but the cost of production, and the yield per acre, are partially within the control of each farmer. The time and man labor required to fit the land, and to seed and harvest the grain, can be greatly reduced by the use of large team units which enable one man to do the work of two or three men per day. The more perfect sed bed preparation resulting from the use of large units and the more timely tillage rendered possible, are both conducive to increased yields per acre.

The number of horses required to accomplish a full day's work with any given implement, depends upon depth of tillage, hardness of soil and weather conditions. Each man must apply horse sense to the problems confronting him, but it should ever be borne in mind that enough horses should be put on the implements to permit drivers to actually turn dirt for 20 miles per day.

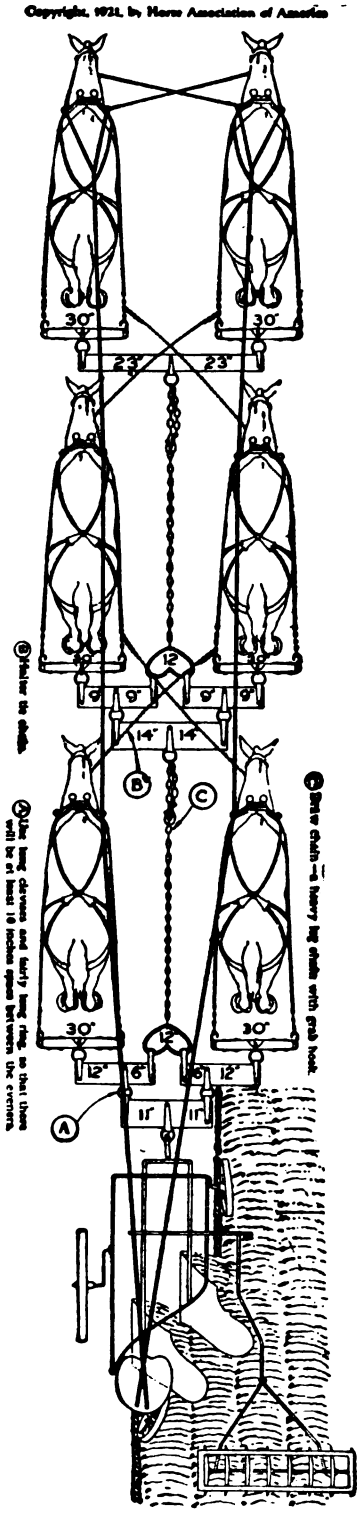
With this as a standard three bottom gang plows (14 inch bottoms) will turn 8.4 acres per day; four bottom gang plows (14 inch bottoms) will turn 11.3 acres per day; two 8 ft. discs hitched abreast with trailer attachments (double discing a strip 16 ft. wide), will double disc 38 acres per day; an eight section harrow (5 ft. sections) lapping one foot each round, will harrow 94 acres per day, and the three seeders (one 12 ft. and two 11 ft.) will seed 80 acres per day.

Seven big draft horses, weighing 1700 pounds or over, or eight medium sized horses, weighing 1400 to 1500 pounds, will handle a three bottom gang plow under ordinary soil conditions, and make the standard distance of 20 miles, day after day. Nine big draft horses, weighing 1700 pounds or over, will pull a four bottom plow and make round for round with seven horses hitched to three bottoms.

The majority of men prefer the abreast hitches, because of greater ease in handling the horses and keeping each animal up to his share of the work. Others, who have more skillful teamsters available, prefer the tandem hitch where the pairs are strung out.

Important Suggestions

In using the tandem hitch, units should be made up exactly as shown, and the heart-shaped ring, should follow the diagram both as to shape and dimensions shown in the center. The distance between the eveners, adjusted by the length of the log chain, should be no more



A SIX HORSE HITCH TO PLOW AND DISC. MULES ARE ESPECIALLY ADAPTED FOR THESE TANDEM HITCHES AS THEY ARE BORN "TRAILERS"

than just enough to permit the horses to walk without stepping over the evener in front of them. It will be found that they can touch noses to the tails of the horses ahead and still not interfere with the evener. At the turns, the eveners drag on the ground, but the horses soon learn to avoid them, as well as the draw chain and singletrees. The records of farms where the hitches have had long usage, show that this is not a source of accident or injury for the animles. Halter tie chains extend from halter to traces of horse diagonally ahead. Adjust length as needed to let horse work with free head.

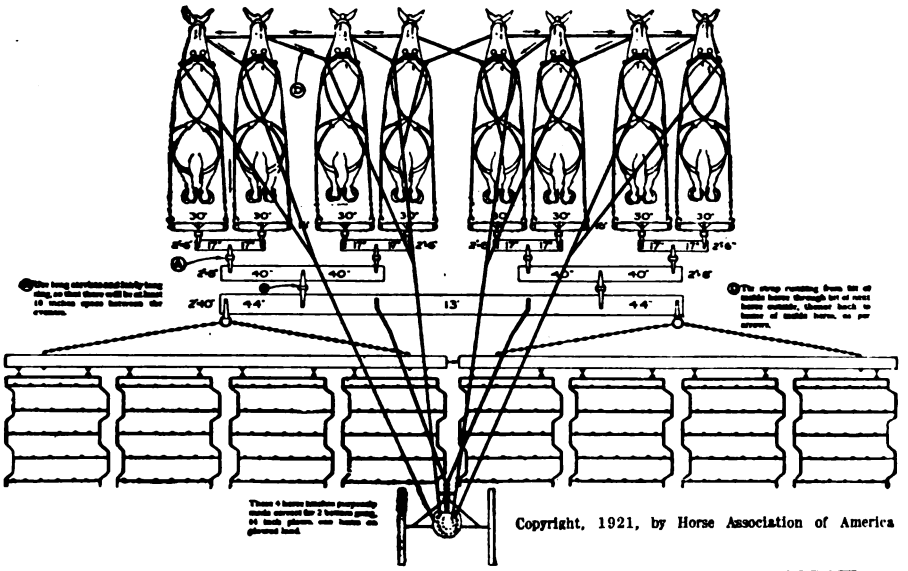
It is very important that the traces on the swing and lead teams pull at right angles from their shoulders to the singletrees,—the same as on the wheel pair. If, instead, they tend to run parallel with the horses' backs, the teams work at great disadvantage and in many instances sore shoulders result. The condition when encountered, can be remedied by attaching a weight to the evener or to the chain just in back of the evener, sufficient to bring the traces of the lead and swing pairs to a right angle with the shoulders, as observed on the wheel pair. Also, if any horse seems persistently inclined to forge ahead, tie a strap from check rein back to the heart-shaped ring, making the length such that he will be pulled back whenever he tries to advance too much. This is called "bucking back," but will seldom be needed if the draw chains are adjusted so as to bring the eveners back close to the horses' front feet.

Handling the Large Team

It may be argued that it is impossible for one man to take these large teams to and from the field and to hitch and unhitch them alone. That this is erroneous is shown by the fact men who have never driven more than four quickly learn how to take 12 horses to the field, hitch, drive and unhitch without assistance. On the Noble farms, where these 12 horse teams have been in use for several years, teamsters are paid a bonus of 50 cents a day for each pair used in excess of four pairs. One man receiving a bonus of one dollar per day accomplishes as much as two men under the old system. The saving is obvious.

In taking such teams to the field, the horse in each pair is tied to the hame of the near horse and the near horse has his tie chain fastened to the left side of horse immediately ahead, at a point where

back band crosses traces. The three pairs on the right are thus attached tandem fashion, just as they work in the field. The three pairs on the left are hitched together in the same way and the driver can either lead his teams to the field four abreast, or, if the road is narrow, the lead pair in the left six can be dropped back of the wheel pair in the right six. On arriving at the field, the left six is untied and led up beside the right six. The horses are then led directly into their respective positions. The four lead horses are then hitched. The first step is to snap the lines into the bits, then run them back through the hame rings on the swing and wheel horses, tying lines to the seat. Traces of the lead four are now hitched and tie straps of the swing four attached thereto. Traces of the swing four are then hitched and tie straps of the wheel four attached thereto. Traces of the wheel four are next hitched and driver swings to his seat and drives off. In unhitching, reverse steps just described.



AN EIGHT-HORSE HITCH WITH EVENERS TO AN EIGHT-SECTION HARROW

Construction Details

All eveners shown that have to withstand the full pull of eight or more horses, should be of 2x10 or 2x12 material. The larger size should be used if evener is long as in the 8 or 9 abrest plow hitches. The short eveners in tandem hitches that withstand pull of four or six horses should be 2x8, and the smaller eveners can safely be made from 2x6 material. The eveners should all be made of the best hickory. Where this cannot be obtained, other materials, such as oak or ash, are sometimes used but are liable to give way under heavy pull. Hickory alone can be depended upon to stand the strain.

In the six abreast hitch for plows or discs the longer evener (each end 58 inches) should be of 2x10 or 2x12 material. The next corner (24 inches each end) should be of 2x8 stuff and the smaller evener (22 inches one end and 11 on the other) should be of 2x6 stock.

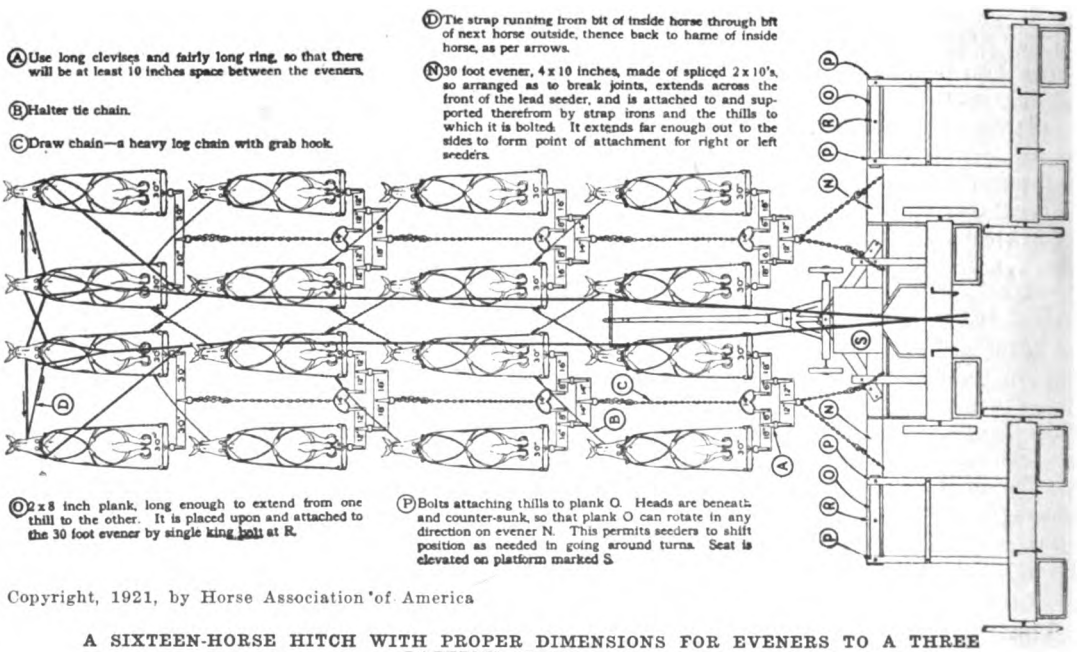
In the tandem hitches, the rear evener (11 inches each end) should be 2x10. The next (12 inches one end the 6 on the other) from 2x8; the next (9 inches each end from 2x6-inch stock.

The heart-shaped ring shown in the diagrams is made of 5/8 inch round iron rod and should have a width in inches in the widest part equal to the figure given in the center of the heart in each diagram. It is absolutely essential that this ring be heart shaped so as to maintain equal draft.

The Importance of Proper Draft

In every plow, whether one bottom or more there is a point of hitch termed the "center" of draft," and when the hitch is made at this point, the plow pulls with less exertion than when the hitch is made at a point more distant from the furrow. When three or more horses are hitched abreast with one horse in the furrow and the rest on solid ground, it is necessary to hitch at a point farther away from the furrow than the point at which the plow operates with the last exertion. This extra load, due to disregard of the true center of draft is called "side draft."

For the plow hitch for six horses the same identical eveners and manner of hitching are used as for the six horse hitch for the double discs. The eveners are purposely made of such length as to bring the point of attachment over the true center of draft (16 inches from the furrow wall and 23 inches from



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A SIXTEEN-HORSE HITCH WITH PROPER DIMENSIONS FOR EVENERS TO A THREE BATTERY SEEDER

center of furrow on two 14-inch bottoms), when the third horse from the right is walking in the center of the furrow, two horses are walking on plowed land. The use of a single section from a disc harrow, attached behind the plow bottoms by means of a frame made of piping or ordinary bar stock, breaks up clods and leaves the land leveled and packed. It also makes better footing for the horses walking on the plowed land.

weight of the log chain and eveners keep them down when the load is moving. It is important that the traces on the swing and lead pairs maintain same angle of draft as on the wheel pair.

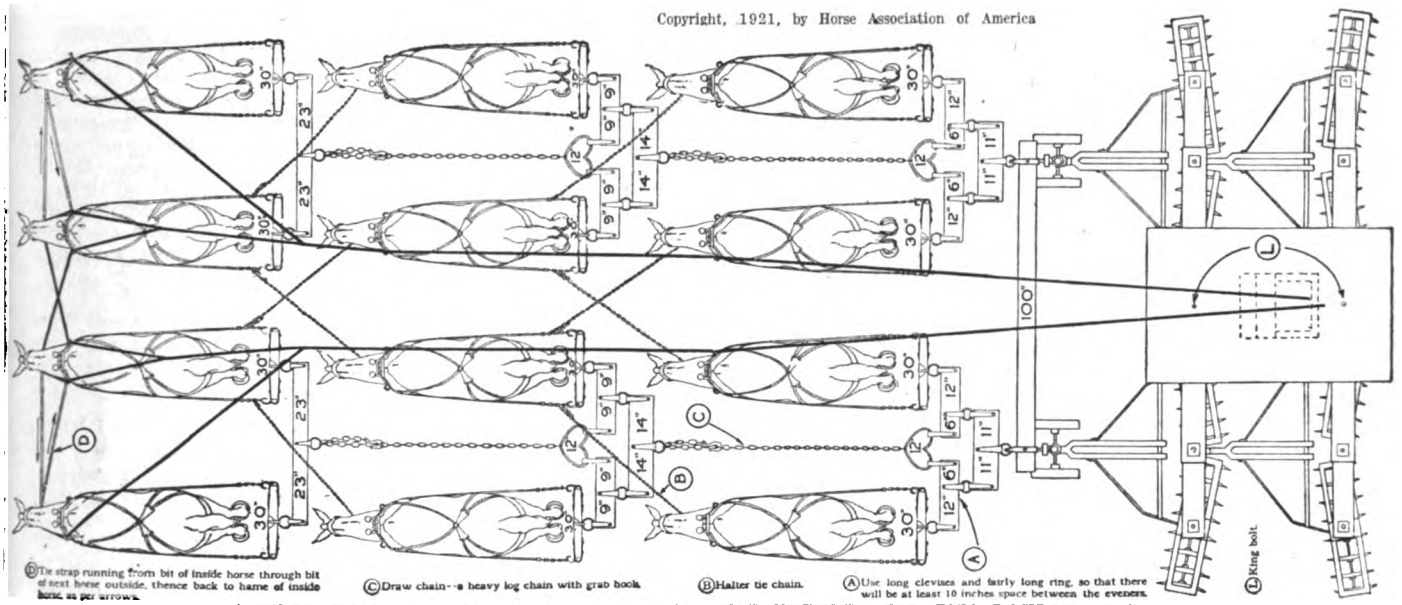
On the basis of the 20 miles a day for actual tillage operations, referred to in the beginning of this article work with the following implements will be done at rates as follows:—Plowing, gang plow, two 14-inch bottoms, 5.6 acres per day.

On Fitting the Shoes

F. R. H.

I usually agree heartily with most that I read in "Our Journal" on horseshoeing but good shoeing for one horse isn't always good shoeing for another. I think you will all agree that the hip boots that the Mississippi river logger uses are not quite the footgear for the college foot-racer.

A horse that is going to be put



A TWELVE-HORSE HITCH WITH DIMENTIONS FOR EVENERS FOR TWO DOUBLE DISCS

Another Good Plow Hitch

On large farms where fields are long and where first class teamsters are available many prefer a plow hitch with the pairs strung out. The point of hitch is on the true center of draft and the tandem hitch has the advantage of taking all the horses off plowed land, one horse in each pair walking in the furrow.

The draw chain, extending from the heart-shaped ring forward to the next evener ahead, should be adjusted to such length as to prevent the rear team from stepping into the singletrees of the team but no extra clearance should be allowed. In actual work, the horses in each pair cant touch the tails of the horses just ahead with their noses, without stepping on the eveners or singletrees. They may, in turning, step over an evener, singletree or draw chain, but they very quickly learn to keep clear of them, as has been demonstrated in daily experience on farms where such equipment is being used.

The eveners drag on the ground in swinging around ends and the

Discing 120-blade disc, 10 feet wide, 24 acres per day. Harrowing, 6-section harrow, 5-foot sections (lap one foot), 70 acres per day.

This standard is not a difficult one—it only requires implements to be in actual tillage operation for 8 hours at the rate of 2½ miles per hour. In a 10-hour day this allows 2 hours for various time losses. On fields a quarter of a mile long it calls for 82 times across or 41 rounds, for a little distance is lost at each end.

It means however that no time is included to rest tired or overheated horses and it therefore necessitates the use of enough horses to avoid over-exertion by any of them. The teams should be watched and if 4 or 5 animals cannot make the 20 miles per day without injury, put on six.

Note:—Space this month does not permit the reproduction of all of the illustrations showing hitches and eveners that accompany Mr. Dinsmore's article. Engravings showing his hitches and eveners for six, eight and nine horses will appear in succeeding numbers.

to heavy loads will require a somewhat different shoeing than the race horse. The draft horse should be shod so he can put out his strength in pulling without injury to the leg muscles. A horse pitches his foot forward in heavy pulling. The shoe should help strengthen the foot in this position and should help protect it from strains and sudden wrenches in this position.

If the case of the racing horse or more commonly, our driving or buggy horse, greater freedom of limbs are sought, and to prevent his legs coming in contact with one another.

In order that a man may know how to shoe each horse, he must know something about the anatomy of a horse's leg. He must know where the muscles are, he must know where the strain is in pulling, and in moving, so that he may shoe so as to help the horse perform his task.

One may gain much by reading the papers relating to shoeing and from specimens. And another way is to take pointers from the best smiths in reach of us.

Queries Answers Notes

Wants Some Price Lists:—I wish some of the Brothers would give us some of their prices. Here we have a hard time getting together on prices. There are only three of us who see alike and the rest of the smiths won't even answer our letters. I would therefore like to have some of the boys send in some good price lists that we can show to these chaps that are hard to get in on an agreement.

J. M. Gaza, Kansas.

Charging Batteries from Batteries:—I wonder if anyone can give me information on battery charging. I am running current almost all day charging batteries, but have no night current. What I would like to know is whether I can charge one or two batteries during the night from a group of batteries that I have charged during the day. Can any reader tell me who has tried this if it is practical and successful. Con Schallan, Iowa.

A Veteran Shoeing Expert:—I have shod horses for 8 years and had to contend with all kinds of horses from the little mustang to the great big horses. I have also had all kinds of feet to shoe, and will say that I have had to study how to shoe them but have had good luck so far.

I am now seventy-two years old and would say for the benefit of the young man that is starting in the business; try to do each job better than the one before, and you will succeed in the trade. If you do not like the trade quit it and get into something you like better, for a man who doesn't like his trade will never make a good smith.

When I started I was determined to be a good horseshoer. I have had the name of being the best in the country. I am now working with a young man trying to teach him how to do the work and make a success of it.

My success has been in shoeing horses that interfered and forged, and I have gotten that down fine.

Clayton Platt, New York.

Appreciates the Little Kinks:—I always like to read the paper when it comes and have gotten lots of pointers out of it. The things that have done me the most good are the "little kinks" as you call them.

This is the day of the gas engine and gasoline motors although there has appeared in the journal at different times objections by different readers or members to your taking up so much space on the auto, but I cannot see how you could have done otherwise and give to the readers what they need.

Your articles on acetylene welding I think have been fine and everything else so far as I can see, but as I said before, personally it has been the little kinks that has helped me the most.

Frank T. Berry, Arizona.

To Repair Scored Cylinders:—In reply to Brother Blacksmith A. Melville of Canada, on repairing scored cylinders.—I am doing quite a lot of that kind of work, but in my experience I do not think it a good idea to weld a "score" in a cylinder with a torch. You run the chance of cracking the cylinder. The best method for doing this work, to save time and to get good results is to use Kelly metal. It will withstand the heat and also the pressure. Use a soldering iron and have the score clear of all dirt and grease. In applying the metal use acid and you will get a perfect job. After filling score use scraper to fit cylinder and scrape out high spots left by the metal. The price of Kelley metal is $6.00 per pound.

B. J. Grimm, Texas.

An Up-to-Date Carolina Shop:—I know you have given me up but I am in the boll wevil section, and am hitting it hard, but I am trying to stick, so I am asking you to please excuse my carelessness in not writing to you.

I am doing auto work in connection with my blacksmith shop and want all the information I can get on this work and want to read up on wiring and ignition system, as I am not up on that part. I have done lots of other repairing on cars.

Will give you some idea of my shop and equipment: I have a 15-Horse electric motor; an electric blower; a band saw; electric drills; a power drill press; a wood jointer; a rip saw; a wood lathe; an oxy-acetylene welding outfit and of course all the necessary hand tools. I am figuring on building another shop, 35 by 60, if the boll weevil don't take the pep out of me. W. G. Robertson, South Carolina.

Wants Bus Body Prices:—We have some rural consolidated schools in our neighborhood, and they are asking us to bid on the making of wagons. Some of them just want the bodies to be used on farm wagons and on trucks. Can anyone give me any dope on this subject? Are there any specifications and prices for this work available? If so we would appreciate being put next. H. A. Law, Missouri.

Regarding the New Era Smith:—Now we will say just a little to the New Era Blacksmith, Mr. F. J. Price. First of all, if we are efficient at our craft, the overnight smith will not hurt us. Every community has enough patrons to sustain the man who knows how, and the other fellow will soon blow out, or puncture so badly, that he will go out of service.

There are just as many kinds of blacksmiths as there are individuals. And it is just as impossible to standardize them. As to prices, these are as impossible as the individuals, as costs of materials in different localities are as different as are the prices obtained for work. Then also the unscrupulous man or smith would want no better thing than to have the New Era plan work successfully for a time. He would get into it, use the weapons and sure slay the enemy to the extent that disgrace would surely come to the organization.

I know it is easy to find fault with another man's plan, but my thoughts are intended constructively favor the social part of it, and agree that we must visit more through the medium of our standard bearer—The American Blacksmith, Auto & Tractor Shop. I like a man with ideas of his own even if I do disagree with him so let us be sociable and swap ideas and trade recipes and help the younger ones out of the hole by writing for "Our Journal" regularly. This will help all of us and the trade will be better off then any company we can organzie. From an Old Timer Who Has Made Good.

H. A. Law, Missouri.

Ignorant Shoers and Cheap Shoeing:—I am 74 years young, and enjoy reading "Our Journal" very much. I want to tell the boys how they have to go up against men that do not learn the trade. About eight years ago I was running a shop in a good-sized town, and about five miles out in the country was a coal mine. One day the mine smith was away and a mule had a shoe off. The foreman asked one of the young men. "Can you drive on that shoe?" He said yes and he did. From that day he considered himself a full-fledged smith. He came to town and worked for a horseshoer for six months and then went back to the country and opened a shop for general repair. He did not know any more about repairing a wheel than the mule upon which he drove the shoe. He drove shoes for ten cents and did other work at proportionate prices.

There was a farmer near him who had a horse with very bad feet, the sole dropped very badly. I had done his shoeing and I put on bar shoes at $1.00 each. The new man put them on for 50c. After a time the farmer came leading his horse into me, and said he wanted me to drive two front shoes. I looked at them and told him that it was a good job and that I could not better it, but he insisted on my doing it. So I removed the shoes. They were made from snow shoes, and all shoers know that the beveled part of the shoe is on the ground with the flat part to the foot. I removed the calks, turned the shoe over and put the calks on the opposite side. Then I set the nail holes back so the nail head would be about half way out and drove them on. That gave a clearance near the drop of the sole. This job put a stop to the cheap shoeing. That smith lasted two years. An Old Penn. Smith.

Straight from the Shoulder:—We are again writing a few lines as this is again nearing farming time, and smiths are urging the farmers to get their old disk harrows in to be overhauled and sharpened, forging out plow points, re-arranging the machinery to give better service then last year and talking nicely to delinquent customers to get a new start on a clean page in the old or possibly new book.

And this brings us to our text "Success." Are you a success or a fizzle? Are you a real mechanic? The roads are good opportunity inviting. Wake up, don't imagine that the get-rich-quick garage man has it all, not by any means. He couldn't make a spring to save his life unless he is a smith as you are. So you have boasted, he cannot sharpen a plow nor mend a binder nor shoe a sled. He cannot weld a draw bar, nor bend a crank, so don't worry. Just get ready to do business this Summer just as though there were no cheap job smiths and fly-by-night garage men in existence.

If you can do your work and do it well you are about as good a fellow as the town has in it so save that grouch which doesn't get you anywhere.

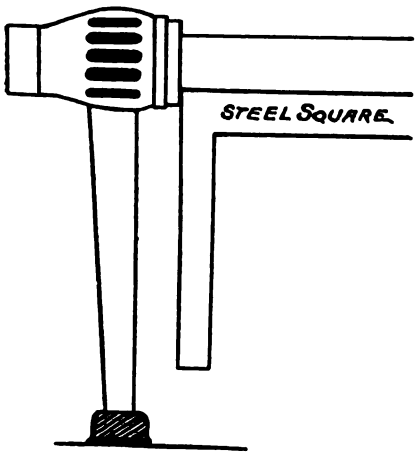
I have been at the trade 35 years, 32 of them right here at the same old town,

which is just a wide place in the road; in a cross-road town with two stores, churches, and schools. Have all kinds of machinery for wood and iron, thus none goes by me, for anything in the way of repairs or repairing. We build several articles of our own invention as well as wagons, sleds, wagon-boxes, shoveling boards, truck bodies and stock racks. We work from one to 5 men and could use more. So you see Folks it depends pretty much upon the kick you want to put into the business

It certainly makes me tired to hear a man complain of business being dead. The fact of the matter is that usually the fellow is no live wire and his old battery is not worth charging. There has been no shoeing here this winter. We've had no snow, nor mud but we have good roads. We have made four new wagons and have rebuilt several old ones, and made several boxes; so you see there isn't any cause to kick as the smith who knows his business can make it anywhere.

We are sending you some pictures of a blow torch that we are getting a patent on, and expect to market soon. This is what we call a happy thought, as we had to have something of the kind and so we made it. It was so good we are going to sell it to others so cheap that everyone can have it who needs one.

We will gladly answer any questions of



SETTING THE AXLE FOR A PLUMB SPOKE

anyone who is stuck on a job if we possibly can. Readers of "Our Journal" are entitled to our experience. We cannot take it with us and we want to make this world as much better as we can after having lived in it. H. A. Law, Missouri.

Setting Axle for Plumb Spoke:—I have been a subscriber of "Our Journal" since 1902, and I certainly think I have received every benefit from it.

In regard to axle Setting, which A. A. Klein of New Brunswick, wants information about, I will explain my way.

My way of setting axles is to a plumb spoke; that is, when a square is placed on the under side of the axle the tongue of the square is parallel with the under spokes as shown in the engraving. Where I have axles to set, I take the wheel and fit the end of a thin piece of board into the wheel with the bottom edge straight. One end is fitted to a taper in the box of the wheel and when it fits in the wheel so it measures to a plumb spoke, you have the proper pitch for any amount of dish. You can use this piece of board for a guage or set your guage by the board, and the wagon will run right. I know of other ways, but I think this is the most simple way. There should be a very small amount of gether out.

Henry H. Smith, New York.

Pistons Pump Oil:—I have been taking your paper but a very short time, but enjoy its valuable helps very much. Noticing the questions and answers of difficult problems from different persons, induces me to ask a question or two that has been puzzling my mind for some time.

What causes a new Ford to pump oil in one or two cylinders causing it to skip and run bad with the best of spark plugs? I also know of a Nash that uses about a half gallon of cylinder oil to ten of gas. What is the cause of this?

I also wish to thank Mr. Ira W. Surrite of Kansas, for the nice letter he wrote on burning carbon from cylinders. It is very helpful.

R. A. Murdock, North Carolina.

In Reply:—The trouble is probably due to excessive clearance in the cylinders and to poorly fitting piston rings. There are other causes for this trouble but we suggest you investigate along these lines.

An excellent means of remedying the trouble is to cut a narrow groove or channel around the cylinders in the skirt portion or that part below the piston ring. Then drill five or six small holes at equal distances around the piston, and at an angle upward and inward so that when piston descends in the cylinders this groove with the oil holes will automatically scrape the surplus oil from the walls of the cylinder and return it to the crank case. The engraving will show location of groove and direction of oil holes.

S. S., New York.

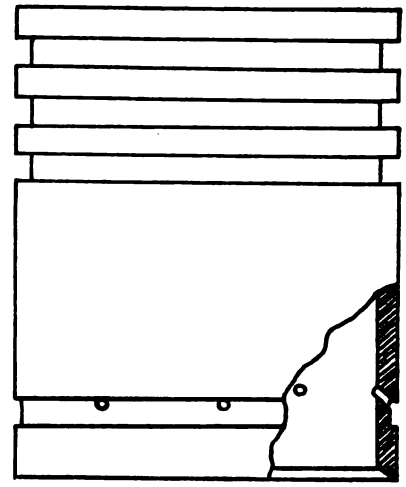
A Progressive Veteran Talks on Many Topics:—It has been several years since I said to myself that I would not write any more for publication, but in looking over the sayings of some of "Our Folks," I cannot keep still any longer.

In the first place, I want to call the "Old South Dakota Timer" to account. He has a method for repairing old rim lugs, where he says to weld an ⅛-inch cast iron on them to build them up. Now almost all of the rim lugs are malleable iron, and to weld cast iron, on them only spoils the lug. His method would be fine if he told the "Folks" to build them up with tobin bronze.

Another one of our old timer's tells the "Folks" to tighten rims on cars by using canvas to fill up with to enlarge the wheel. Now I have done a great deal of that kind of work, but I always use strips of galvanized iron, then you can set the Rim as tight as you want to, and heat the rim red hot and it will not burn.

"Old Timer" suggests a way to preserve the holes in broken castings that come to be welded by putting in a piece of carbon in the old hole. He has the proper dope on that I want to add that to get the pieces of carbon all you have to do is to take old batteries and break them up and you will find a piece of carbon in each one of them. These old pieces of carbon are also mighty handy to make brushes for motor fans, small brushes. You can make them yourself, and they will cost you nothing but your time, and that should not exceed 30 minutes. I know because I have made them for my fan.

Now I am going to say a word about the "New Era Blacksmith" I want to change the name to "Modern Blacksmith." A great many of the old boys cannot modernize themselves and they consequently stay in the old rut. I say get out of the old rut, and start something. If nothing more than grind knives or file saws. I have been in the game for



WHEN THE PISTONS PUMP OIL

42 years and am still in the game. I can make more money in one day with my acetylene torch than I can make in one week at the old game. I still have the old forge and use it every day, but the jobs that a torch will bring in are so different and also so easy to do that before you know it you have done a job and gotten several dollars for it, and are looking for the next fellow. And the fellow you did the work for feels good because he has been able to have the job done so quickly and has saved so much time that he laughs at the price. And you of course wonder that you did not charge him more.

Now as to the Organization that Mr. Price speaks of; neither he nor anyone else every saw a bunch of blacksmiths stick together for any length of time. I have helped form unions and organizations of many different kinds, and have yet to find any blacksmith organization do as agreed.

Here in South Dakota, the blacksmiths formed an organization called a State Organization. They got out price lists and agreed on many other things. The first thing they did after meeting in executive session. was to admit the heavy hardware jobbers. The jobbers listened to all that they were going to charge for repairs. We were buying wagon tongues for $1.25 a piece before the blacksmith meeting and the next day after the meeting, tongues went to $2.50 and everything else along the line was raised. Of course the jobbers wanted to be good fellows so they had a lot of price lists printed for their customers.

Now I want to ask some of the old timers if they ever had the following experience with customers. Did you ever have a man drive up to your shop and ask you what you would charge him for a certain job, he telling you what he wanted done? And after you figured up the job and gave him your figures for what you would do the job for in a good

workman like manner and use good material and then have him say, "Oh you are too high. So and so down the line will do that job for a great deal less." And then he tells you what your competitor would do the job for, and you find that he is a lot under you. And then you say that if he can do it for that why you will do it for the same, and then you go ahead and do the job and lose money on it.

I used to listen to that kind of noise, and I found out to my sorrow that the man who gave you that kind of talk had never seen your competitor but used that kind of dope to make you reduce your price. When one of these chaps came to me and wants a job done on those conditions he gets a chance to go to the other fellow, and most always he says I do not like the other fellow's work. I simply tell him, it makes no difference to me whether he likes the other fellows work or not, the other fellow will have to do his work. Then the chances are that he begins to beg you to do his job at your figures, but he will usually say that he has not the money to pay cash for the job, and wants 30 or 60 days time. I know these chaps very well and I tell them that they can borrow money just as cheaply as I can, and that in order for me to pay my bills, it is necessary to have cash for my work. You will find that there are all kinds of tricks to stand the blacksmith off, and if you let the tricksters do that you are the looser. And usually after they owe you a bill, they never come near you again, and when you want your money, they just laugh at you.

So I say to the brother who askes if cash or credit were best, by all means get the Cash. When you have the money you can pay your bills, and it will make your jobber feel good when you discount your bills.

A. J. Yeager, South Dakota.

Good Advice from an Old Timer.—With reference to Mr. Price's New Era Blacksmiths:—I have had the pleasure of visiting among a great many of the shops and blacksmiths in my time, and am at present retired from the trade as a successful man from my point of view.

Mr. Price's statement regarding the smith and the public is correct in most cases where small and unsuccessful shops are run. But, who is to blame the Smith or the public? Nine times out of ten it is the smith. Suppose a bank, a wholesale house, or even a common country store were run like most shops are, and the proprietor would dress the way that lots of smiths do—would they fail? Of course they would.

Now, here is a letter from Mr. Price, one from me and several other men and "Our Journal" has always been full of them. But the trade slacker reads it considers himself the wisest guy in town, with dirty clothes and black greasy hands. He never keeps a book. Half of them never have a bank account, never go to church, dances, or public affairs, and if they do, they are often drunk or dirty. Usually there is one in a very small village. He only exists while others run their shops neat and clean; wear good clothes, do nice neat work, are careful with their accounts. Their books are always in good shaps, and they can tell you what they made last year. They know just what they must charge, and can get the price without argument, because the people or public know they are a business man. Often you will find one of them a city father or a school director. He shows and uses his ability among his fellow men, and is noted to be a correct man. You find him living in as good a house, and with just as nice a car, and sometimes better, than your banker.

Now instead of organizing or forming a co-operative association let us first by taking an invoice of all the good stock in the shop. Put all the junk in the junk heap and sell it. Clean up the shop inside and out. Then get some letter files and bill files. If you cannot afford to buy them make them. And then some day when work is slack sort out the old stuff from the new. Throw out the old useless stuff, sort and arrange the good and put it in its proper place.

Install a good wash stand, place a water can on the shop stove and when you get through with a particularly dirty job wash up. It won't take long, and if you use good soap it won't hurt you.

One smith I know has two sturdy suits of working clothes. While one is being worn he has the other cleaned. He bathes at least three times a week and sometims oftener; daily in the summer time, and shaves often enough to present a clean smooth face. He never leaves the shop without first removing his work cap, and overalls and he has made a fine reputation for himself, his shop and his work.

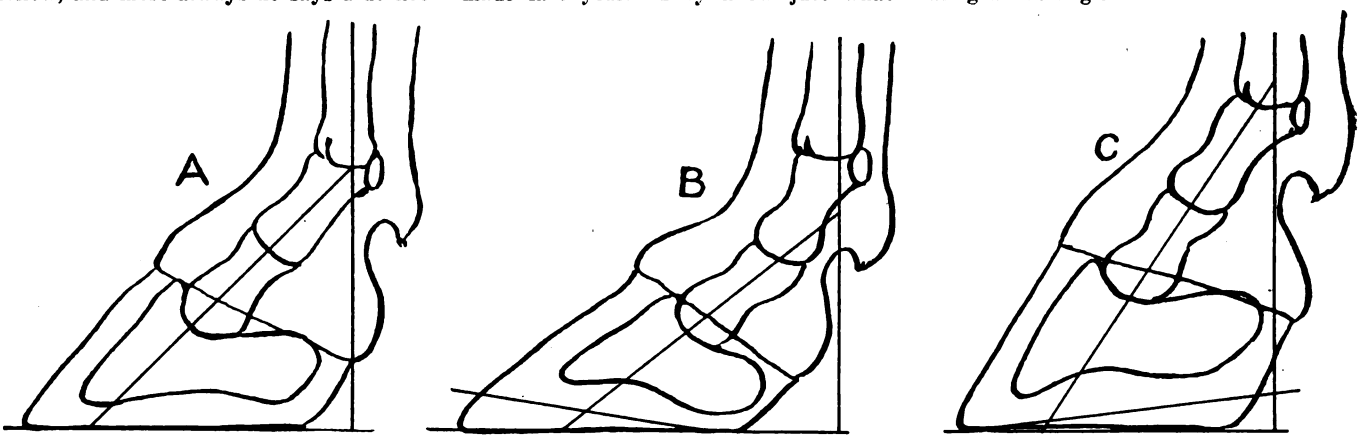
A great deal depends upon personal appearance these days and members of the craft can do much toward an elevation of craft standards by paying more attention to this matter.

Another suggestion for a great many is the prompt payment of their bills and the prompt collection of what they have out standing. Don't bear the name of a poor collector.

Of course there are other matters that deserve and demand attention, but I know that if the smith will work along the lines suggested for a few years he is bound to prosper, no matter what comes up. Try it you brothers who are not prospering as you should. If you do, you will never go back to the old rut.

An Old Timer, Minnesota.

Foot Angles and Colt Shoeing:—Here's to Mr. Hall who talks on the correct angle for the horses foot. I for one think him right, but how many shoers know anything about angles.



A NOVA SCOTIA SHOER SHOWS THE CORRECT ANGLES FOR THE NORMAL FOOT AND DISCUSSES THE SHOEING OF COLTS

The accompanying engravings show three different angled feet. Some of the shoers may not agree with me but I will admit that I don't know it all and am willing to learn. At A in the engraving is shown my idea of a correct angled foot. The one at B shows the toe too high; while the one at C shows one with the heels too high. The angle of the foot to be correct must be the same as the angle of the pastern. And this angle in front should be 50 degrees, and for the hind feet 48 degrees.

There is one thing in which I don't agree with Mr. Maloon. He said if a horse inferred to take off his shoes and he would wear the bearing right. Now, Mr. Maloon, suppose you had a colt come to your shop that had never been shod, and you shod him as you said flat shoes fitted up nice and very light shoes, and he goes to cutting. The owner brought him back and you take off his shoes. He goes out and in three days he brings him in again and he's cutting so bad he has a cut place on each ankle that is a sight to look at. Tell me how you would stop him. I will tell how I stopped him in my next letter, if they would like to know.

Blue Nose, Nova Scotia.

Likes "Our Journal"—I have been a reader of "Our Journal" since the first copy was received, and each and every copy is full of valuable information and hints. It certainly seems too long from one copy until the next copy arrives. And the next wonder is, that for its size, the price is very small. I am also a reader of another paper which costs more and is smaller in size.

J. J. Stubbs, Canada.

VOLUME 21 NUMBER 4

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

APRIL 1922

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There are many unauthorized agents and unscrupulous collectors representing themselves as agents, and collectors for American Blacksmith, Auto & Tractor Shop, and we warn every one of our readers against them. Under no circumstances give money to any agent who is unknown to you. It is a very simple matter to send money order, check or stamps direct to Buffalo, and it is always best to send your order and remittance direct.

Contents April 1922

TEN MILLION AUTOMOBILES

Anyone supposing for one minute that the automobile has reached its limit will do well to pause a moment and consider the facts as demonstrated by the recent figures gathered by various organizations both government and commercial. These statistics show that there are over ten million cars in use in the United States. The sales of cars during 1921 numbered 1,700,000. Now, if, as is generally considered, the average life of a car is six seasons, and the present ownership is over ten millions, it does not take a very high degree of mathamatical ability to show that it will require somewhat more than the annual sales of 1921 to merely keep up with the renewal demand by those already owning cars.

Consider now the natural increases in population, the new sales made to new owners each year and you may have some idea of the possibilities in the automobile industry, the sale of accessories and the repair of the machines.

Surely there are tremendous opportunities knocking at the doors of the repair shops. Consider the data summarized on the cover of "Our Journal" this month. With the horses and mules, the horse vehicles and tractors, the trucks and passenger cars and the innumerable other sources from which the repair shop owner draws his trade, there is truly a larger and brighter future in store for "Our Folks."

NEED ANYTHING?

During the past month we have been instrumental in putting some of Our Folks in touch with manufacturers and dealers in a great many different lines and this reminds us to remind you of a part of our service that some of you may forget.

When you are in the market for any machines, tools, supplies, accessories or parts write us and tell us what you want. We will gladly pass the information along to the right manufacturers or dealers and thus enable you to get just what you want.

No need for you to write seperate letters to each manufacturer or dealer of the things you want to buy. Just write one letter to us and we will do the rest.

From the number of requests we have had recently from readers, we are inclined to feel that a great deal of new equipment is going to be placed in the shops of Our Folks this spring and summer. There also seems to be a feeling that this spring and summer is going to see a renewed activity in rural shop circles and that the smith and general repairman is going to find himself extremely busy.

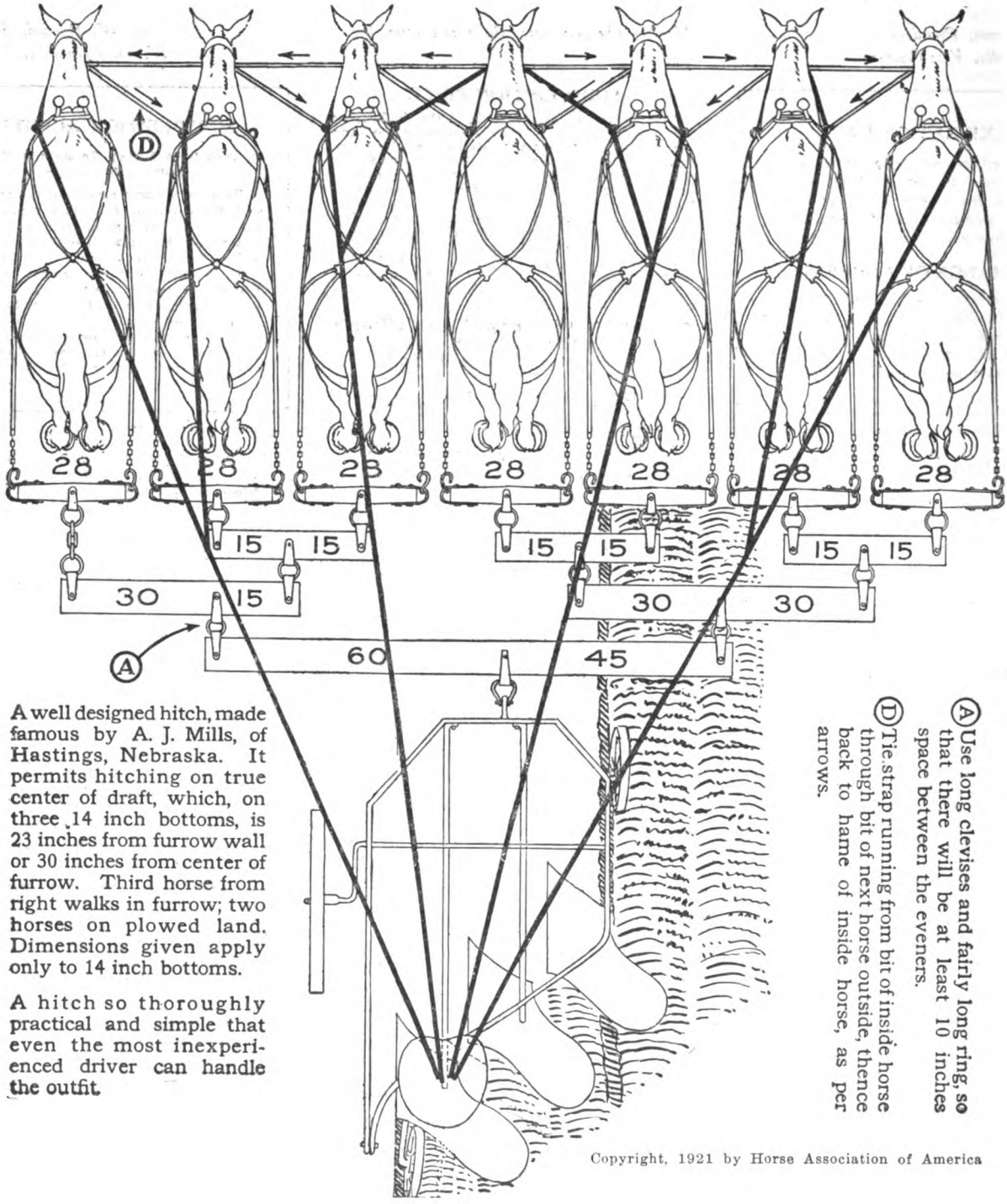
If you have not already put everything in the shop into ship shape for the coming season, better get busy immediately so that you can cash in on the opportunity. We'll be glad to help you all we can in the way of telling you where to buy what you want and need. Just write our Subscriber's Service Department for anything.

THE ARTICLES ON COLLECTING ACCOUNTS

Since our book "How To Collect Shop Accounts" has been out of print, we have had many requests from "Our Folks" for another edition of this very helpful little adviser. After a very careful consideration of the matter it has been decided to publish a new series of articles on this very important subject and the first installment of this series appears in this issue.

It is hardly necessary to say a single word on the subject of collections as it is surely agreed by everyone of our readers, that there is no branch of business more important than this matter of collections.

In connection with these articles we would like to have as many suggestions as possible from our readers. We want particularly actual collection methods and stunts used by "Our Folks"—schemes and methods that have been used with success —odd stunts and exceptional ideas that have secured the money. We also want "Our Folks" to tell us of any collecting problems that they may have.



A well designed hitch, made famous by A. J. Mills, of Hastings, Nebraska. It permits hitching on true center of draft, which, on three 14 inch bottoms, is 23 inches from furrow wall or 30 inches from center of furrow. Third horse from right walks in furrow; two horses on plowed land. Dimensions given apply only to 14 inch bottoms.

A hitch so thoroughly practical and simple that even the most inexperienced driver can handle the outfit.

(A) Use long clevises and fairly long ring, so that there will be at least 10 inches space between the eveners.

(D) Tie strap running from bit of inside horse through bit of next horse outside, thence back to hame of inside horse, as per arrows.

ANOTHER HITCH TO ACCOMMODATE SEVEN HORSES WHEN DRAWING THREE PLOW BOTTOMS

How To Collect Shop Accounts

Cash or Credit?

The matter of operating a business on a strictly cash or part cash and part credit basis, or an entirely credit basis is not a matter for discussion in this series of articles. To declare arbitrarily that a smith shop should do a cash or credit business, without taking into consideration the location of the business and the class of customers upon which it must depend and the exact nature of the business to be done is, of course foolish without a true consideration of the facts. The question of cash or credit system must therefore be left entirely to the business or shop proprietor, and we will accordingly proceed with the matter of collections and their relation to successful business.

The failure to turn unpaid accounts into bankable cash has meant near failure or actual ruin to many a promising business. The average shop owner does not seem to realize what an enormous load he is carrying when he is careless about the unpaid accounts upon his books. The blame lies not so much with the customer as it does with the shop owner or business proprietor himself. Shopowners are unnecessarily acting as bankers in altogether too large a measure for their own good. If the shop owner would consider that the function and duty of the bank is to loan money to responsible persons he will then realize that when he is too lavish in the extention of credit he is actually acting as a banker for his customers in permitting them to carry unpaid accounts on his books for long periods. This is entirely uncalled for and as a general thing these shop owners have no regular system for collecting accounts, and they allow them to pile up to unreasonable amounts simply through neglect.

This failure to insist upon prompt payment of a just obligation simply encourages slow-paying customers and dead-beats. The longer an account runs, the harder it is to get the money for the debtor it finally arrives at a point where it is much like paying for something he never received. Then too on the, average it is harder to collect a large bill than a small one. If a customer persists in falling behind collecting becomes increasingly difficult. Better to lose a small account than a large bill and a good customer,—but better still to collect a small bill when it is due and hold the customer as well.

Also there is a most important business-building principal at stake when collections are not pursued persistently. It is a well known fact that the customer who keeps his accounts paid up feels a certain satisfaction in dealing with those establishments at which he has accounts. He is a privileged person when his account is paid. He is made much of and receives service, which the ordinary customer does not receive. But when an account is overdue, the delinquent customer is tempted to cross to the other side of the street, to deal with your competitor, and to even avoid you when meeting you about town.

Most Men Are Honest

Most men are desirous of paying their just debts. In pursuing collections, no matter what method you use, whether you follow up your debtors personally or by mail, do not consider any customer dishonest until he has proven himself so. A willingness to be fair and reasonable will go farther towards getting the money, than a persistent threatening attitude which generally leads nowhere. Be reasonable, be fair, and be firm; should be your guiding motto in the collection of accounts. Do not threaten your debtor until you are ready to carry out your threat. There is a psychological and also a legal reason for this.

In the first place, repeatedly threatening a debtor and not carrying out the threat, results in the weakening of your argument for the collection of the account. In the second place, if you threaten your debtor with suit, for example, and then do not carry out your threat, the debtor can sue you for intimidation and thus turn the tables upon you.

When a customer is slow in paying, endeavor to speed him up, and find out just what his trouble is if possible and endeavor to make some sort of settlement with him. Be reasonable and fair. Show an honest, courteous willingness to help him settle his account, but in your negotiation with him, be firm and insistent upon a settlement. Do not grant discounts to which the customer is not rightly entitled. Insist upon your bills being paid in full. Do not make excuses for the collection of the account. Make it plain to your customer that you are rightly entitled to the full payment of the account, that he received full value for the money for which you are asking, and that while you were prompt in delivering the service and doing the work you expect him to be just as prompt in paying for that service and work. There is nothing to be gained by an avoidance of the just and honest facts of the case.

The matter of making collections is one of great importance not only as insurance against the lack of necessary cash, but it is also vitally connected with the expansion and the growth of your business. Properly pursued collections insure

Date .....

I agree to pay my accounts with

John Jones, 24 Repair street,

Jonesville, N. J.

on .....

(value received)

Signed .....

.....

A CREDIT AGREEMENT WHICH ARRANGES FOR DATED SETTLEMENT

proper working capital, and a fund for the growth and expansion of your business. Unreasonably long credit deprives the shop owner of money which rightly belongs to his business.

A Definite Understanding

It is generally well-known that collections are helped very much if a definite understanding is had with the customer at the time he opens his account. A great many subjects and a number of important matters can be discussed at that time which the shop owner will hesitate to even mention later on when the customer owes him money. Because of the seemingly delicate situation created by the changed circumstances, it is an excellent idea to have a thorough understanding as to just when payment may be expected, and in the case of a large job, or in the case of the purchase of any large items likely to run up into considerable money, it is a good thing to know at the time of the purchase just when payment may be expected. If payment is to be made in several installments, you want to know just when such installments are to be paid. At this stage of the business transaction between the customer and the shop owner it is well to leave the exact time of payment to the customer if he is inclined to be reasonable in his request for credit. This leniency on the part of the shop owner and the shop owners willingness to grant him any time within reason, can later be brought to bear with considerable force, and an insistence for prompt payment which cannot be combatted with reasonableness by the debtor.

Thus, when a customer says he will pay on a certain day of the month, insist upon a settlement of the amount exactly on that day. A policy of this kind will soon gain for you a reputation that will be of material assistance in your efforts at collecting. When customers know that they are expected to pay their accounts when the account is due, they are more likely to have the money ready for you, than if you are easy with them and do not follow them up persistently. It is of course, unnecessary to be discourteous or "nasty" in your insistence upon payment, but it is absolutely necessary that you be courteously firm with a show of reasonablenes when the case requires it. Make your customers believe in your fairness, liberality, and firmness.

When Granting Credit

When a customer asks for credit the most natural question to ask a customer is when is payment to be expected. When he mentions a date, it is a most natural thing to to tell him "Very well, Mr. Blank, I will expect you to pay at that time. I can operate my business successfully only on a business basis. My dealings with supply houses and my credit standing makes it necessary that I get your money exactly on the day that it is due. If you cannot pay me at that time, you injure your credit, and I am unable to make good on my promises to jobbers, supply houses and manufacturers, and thus my credit standing is also injured."

A talk along this line changed of course, to suit the particular case, will let your customer know that you do business in a business way, and that a promise of payment of the first of the month does not mean that the account will be allowed to lag for days and perhaps weeks. When agreement such as this is duly made, between the customer and the shop owner, it is not so difficult to be firm and courteously insistent when the account becomes due.

A Formal Agreement

It may be necessary in some instances to have a regular form of agreement, which you can have your customers sign. A formal agreement of this kind usually has the effect of making the customer feel a just sense of responsibility for his account. Such a form of agreement is shown in the accompanying example. You will note that this form is worded very simply. It is worded in this way deliberately so as not to scare off the customer which is usually the case when a form of this kind is written in legal phraseology.

$\$$..... Date .....

.....after date.....promise to pay to the order of John Jones, 24 Repair Street,

Jonesville, N. J. .....dollars at ..... Value received.

Due Signed .....

....

A NOTE FOR A DEFINITE AMOUNT. AN EXCELLENT IDEA WHEN THE CUSTOMER ORDERS A NEW VEHICLE OR A CONSIDERABLE AMOUNT OF REPAIR WORK

In the cases where an agreement of this kind has been signed, call your customers attention to the matter of his account in a courteous way two or three days before this account becomes due. Keep the card in a follow-up file arranged for just that purpose. If the cards are filled according to the date upon which the account becomes due, you will have no difficulty in notifying the proper customer at the proper time.

Always make it a point, in all cases, to call attention to your unpaid account on or before the date your customer agreed to pay you. Careful attention to this will soon gain for you a reputation that will be of very material help in your collection efforts.

A method of collecting accounts not generally used by the repair shop owner, but which is used very effectively by dealers in implements, trucks, and tractors, is that of securing the customers note. It is simply another application of the idea of having a definite understanding as to payment. It is better to know before the work is turned over to the customer that

you can count on your pay in 60 or 90 days, than to find after 6 or 9 days you will very likely never get your money. Keep a few note blanks on hand. When the customer says I will pay you next month, he may mean it or he may not. Ask him what date, and he will probably reply that he will be able to make payment some where around the 10th or 15th. Then is the time to pin him down to something definite. Just go around about it like this.—"The 10th of the month will suit me fine. I've got a big bill for stock to meet on that day, and if I can count upon something definite it will help me out. Of course, everyone knows that your credit is as good as gold, so if you will just sign this note, I will make the time right and will be able to meet my own obligations."

A good strong talk along this line will usually get what you want, and the customer cannot consistently refuse without appearing as unwilling to pay the account when due. When you get a note take it to your bank, they will tell you what to do with it, if you do not know.

The New Wiring Charts for Ford Cars

The Ford Motor Company has redesigned the wiring of Ford cars.

All cars are now being equipped with improved wiring assemblies as listed below:

T 5031-7502 Commutator wire assembly
T 5041-7682B Wiring assembly on chassis
T 5042-7685B Wiring assembly on Sedan body
T 5043-7686B Wiring assembly on Touring body
Torpedo, Coupe and Truck with starter)
T 5030-7502A Commutator wire assembly (cars without starter)
T 5041-B TT7682 Wire assembly on Chassis (Truck with starter)

The new design cable looms (Fig. 1) carry not less than No. 16 gauge wire throughout and are heavily insulated in accordance with the specifications of the insurance underwriters.

The mechanical strength of the new looms and wires is much greater than that of ordinary or cheap looms. This reduces the possibility of breakages and shorts and makes for increased operating efficiency.

The Ammeter to cut-out wire is included in the commutator loom assembly, and Wiring Assembly on Body, thus affording a compact protected wire with short outlets at the terminal block and cut-out. This point should be particularly emphasized as with this design there is practically no chance for short circuits and fire.

The appearance of the new looms has been materially improved by the black glazed loom covering.

The advantages of using standard Ford wiring assemblies should be called to the attention of car owners.

Figs. 2, 3 and 4 show the wiring arrangement of Ford car equipped with starter, Ford truck with starter and car or truck without starter.

In order to rewire a car so as to incorporate all of the latest changes it is necessary to bear in mind several points of instalation which we will cover briefly for the benefit of the repair man.

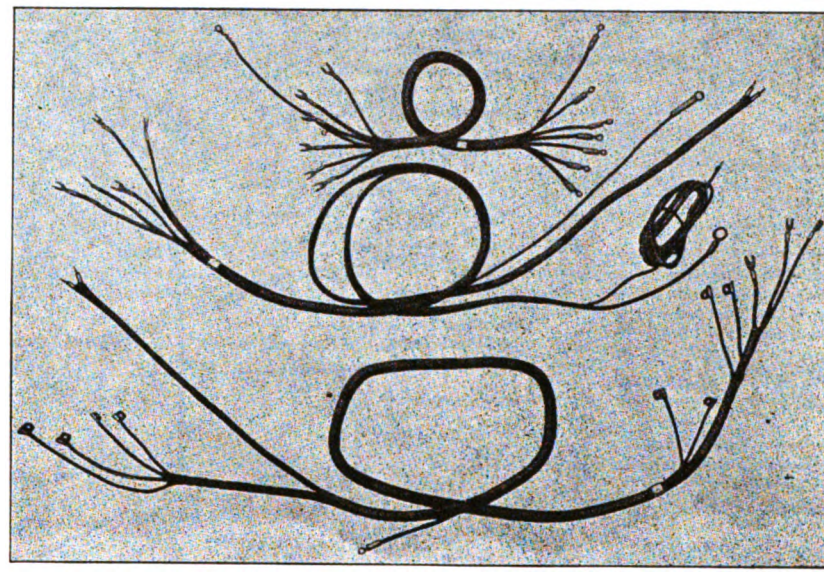


FIG. 1.—THE NEW CABLE LOOMS CARRY NO. 16 GUAGE WIRES AND ARE HEAVILY INSULATED

The T-5044-1950 Terminal block (5-way type) has been replaced with a redesigned 6-way block. The new terminal block is installed one inch higher on the dash than the old one.

It is necessary to bore a 7/16-inch hole one inch below and 1⅛ inch to the right of the present ¾ inch hole for the wire on the dash assembly. This new hole is for the Horn Switch Wire and Terminal Block to Switch Wire. Also, a ½ inch hole should be drilled in the dash opposite the point where the Red Magneto Wire comes out of the wiring assembly on the Chassis loom. This is 1-7/8 inches from center of upper dash bracket Bolt and 1-inch below.

The T-5033C-7688 Wire on dash clip has been redesigned. Six of these clips are used on the front of the dash and one on the rear. One replaces the radiator rod washer and holds the commutator wires at the center of the dash.

In the new wiring arrangement, T-5033-1390 Wire support has been replaced by T-2916-2118 Wire clamp. The installation of these require longer bolts. Accordingly, T-4808-C-4088 Bolt has been lengthened. Eight of these clamps are now required on the Commutator Wire Assembly and the Headlight Wires to the Frame. One is installed in place of the washer on the lower left hand bolt of coil box to dash and clamps Horn Wire and Coil-terminal to Switch Wire.

T-2122X Headlamp wire bushing has been designed to go through hood blocks. In order to install these bushings it is necessary to file out holes in hood blocks. If desired new style hood blocks with holes of the proper size to take the bushings can be purchased.

The T-5033B-2124 Commutator wire Terminal Retainers have been designed to fit on commutator terminals. These are fiber insulators and their purpose is to prevent the terminal turning in the case of a loose terminal nut and chafing of the insulation against the commutator case. The method of installation is shown in one of the small details of Fig. 2.

The Wire from Ammeter to Cut-Out is included in Commutator Wire Assembly and Wiring Assembly on Body connecting together at terminal block on dash.

The switch to the motor cable together with the tail lamp wire and the wire to the starting switch are

new enclosed between the starting switch and starting motor in T-5051-B-2119 Switch to Motor Cable Sleeve. This replaces T-2105X and 2106X Cable Clamps.

T-5047-E-2120 Battery to Switch Cable Sleeve replaces T-2115X Battery to Switch Cable Insulator. T-2121X is the retainer which holds this sleeve in position.

4	T-5038C	Terminal block
1	T-5044	Head lamp bulb (double filament)
2	T-6572E	Wood screws
6	1-2073X	Ammeter to switch wire
1	T-5038	Ammeter
1	T-5016	Ignition switch
1	T-5012	Instrument panel
1	TT-6602X	5/16-18 Carriage bolt (Inst.
3	T-3513C	Panel and wire to dash)
8	T-8514	5/16-18 Nut
2	T-925X	Washers
1	T-5051B	Switch to motor cable sleeve
1	T-5047E	Battery to switch cable sleeve
1	T-5014	Starting switch
2	T-3452	Starting switch bracket

Besides the foregoing the following additional material is required to install starter equipment on trucks built previous to November 1st, 1921, providing the truck has a starter block motor:

Quan. Req.	No.	Material
5	T-2916	Wire clamps
2	T-5033B	Commutator Wire term, retainer
2	T-2122X	Headlamp wire bushing

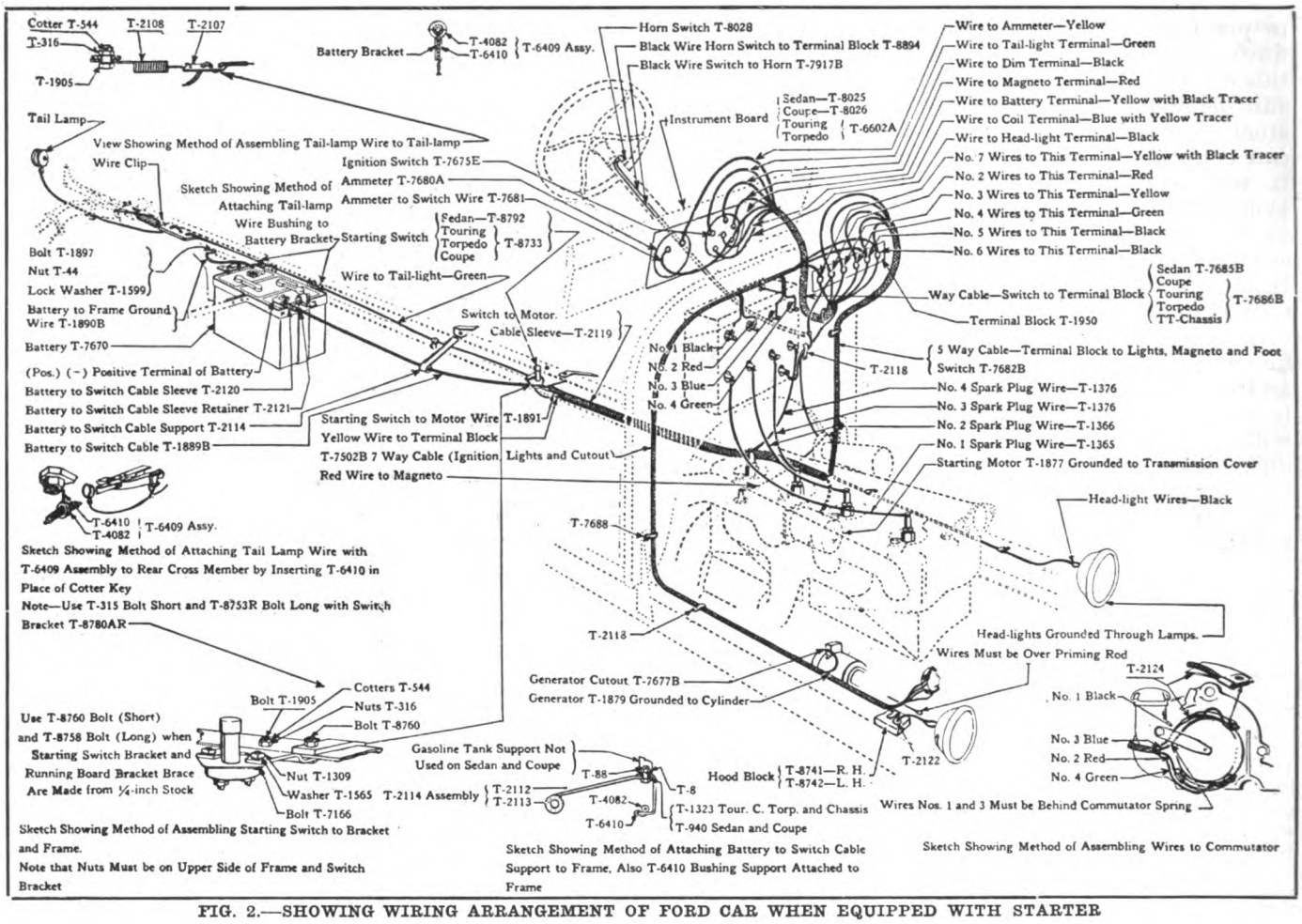


FIG. 2.—SHOWING WIRING ARRANGEMENT OF FORD CAR WHEN EQUIPPED WITH STARTER

Instead of anchoring T-6409X Lamp Wire Bushing Assembly to Tail Lamp Wire Bushing Assembly to the tire carrier bracket bolt it is fastened to rear spring clip in place of cotter formerly used at that point.

Installing Starter Equipment on Ford Truck

The Installation of Starter Equipment on Ford Trucks built since November 1st, 1921, requires the installation of the following parts:

Quan. Req.	No.	Sterling Motor
1	T-5099	Starting Motor
1	T-5018	Bendix assembly
1	T-5119	Generator complete
1	T-5055	Cut-out
1	T-5081	Commutator wire assembly
1	T-5048	Wiring assembly on body
1	T-5041B	Wiring assembly on chassis
1	T-5051	Switch to motor cable
1	T-5046C	Battery to switch cable
1	T-5049	Battery to ground cable
1	TT-8821G	Tail lamp to ground wire assembly
1	T-5048	Wire clamp
4	T-2916	Wire on dash clip
1	T-8780A	Starting switch plunger extension
1	T-5015	Bolt (starting switch brkt to frame)
8	T-8452B	Nut
2	T-544	Cotter
2	T-7166X	Bolt (starting switch to brkt)
2	T-8088E	Nut
2	T-8261C	Washer
1	T-6409X	Tail lamp wire bushing assembly
1	T-5014B	Bolt
1	T-5047B	Battery to sw cable support
1	T-5047D	Battery to sw cable support bushing
1	T-5158	Battery support angle
2	T-5154	Battery box support
1	T-5155	Battery clamp support R H
1	T-5156	Battery clamp support L H
1	T-5159	Battery box cover assembly
1	T-5158	Battery box less cover
5	T-3074	Bolt
1	T-4808	Bolt
6	T-2515	Nut
5	T-88	Cotter
1	T-4806C	Spring washer
5	T-1905X	Bolt
2	T-5152B	Battery clamp
2	T-5151	Battery clamp bolt
2	T-5151B	Battery clamp nut
2	T-3078C	Battery clamp bolt washer
1	T-2107X	Tail lamp wire clip
1	T-2108X	Tail lamp wire spring
1	T-7669X	Electric tail lamp assy
1	T-8380	Bendix cover
3	T-5033C	Wire on dash clip
4	T-4808C	Fender apron to frame bolt
1	T-3513C	Bolt
1	T-3514	Nut

The trucks built since November 1st have holes punched in the frame and left running board brackets for starting switch and battery supports.

Starter installation on Trucks previous to November necessitates drilling the following holes:

Two 11/32 inch holes in frame for starting switch.

One 13/32 inch hole in top of each left running board Bracket for T-5153-TT-8816 Battery Support Angle.

Two 11/32 inch holes on inside of each left running board bracket for T-5155-TT8818 and T5156-TT-8819 Battery Clamp Supports.

Two 13/32 inches holes in Run-

ning board 7/8" from inside edge for T-5154-TT-8177 Battery Box Supports.

In installing tail lamp on Truck with starter, it must be borne in mind that if tail lamp bracket is fastened to wood frame of body it

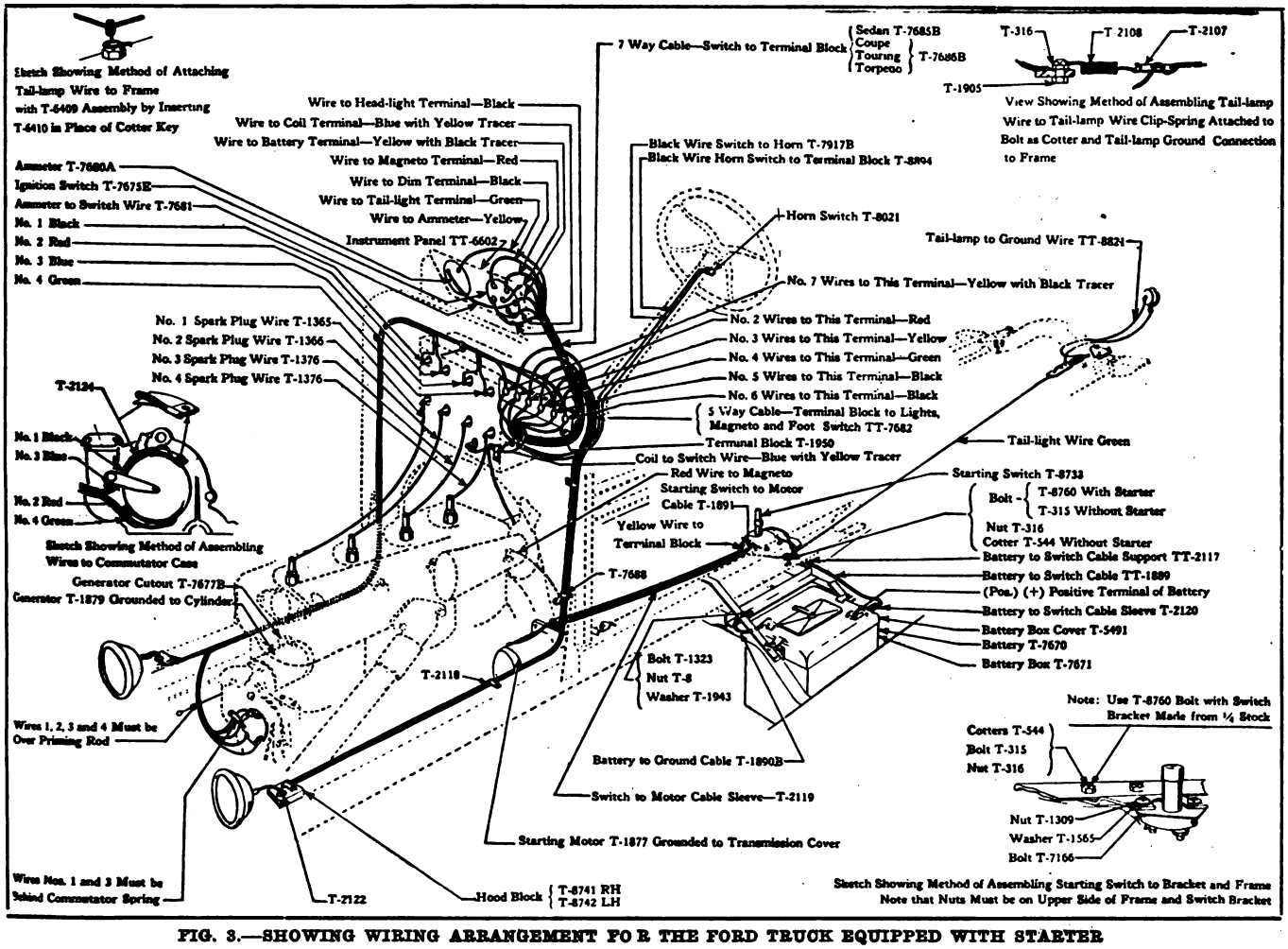


FIG. 3.—SHOWING WIRING ARRANGEMENT FOR THE FORD TRUCK EQUIPPED WITH STARTER

will be necessary to connect shell of lamp to chassis frame by TT-8821X Tail Lamp to ground wire assembly. (See small detail of Fig. 3).

Facts About Cyanide Hardening*

Cyanide hardening of steel had its beginning when a foundry workman discovered that a steel rod dipped in molten cast iron and quenched, had a hard case, or was case hardened. Upon further investigation it was found that if the steel were dipped in any molten salt containing carbon, case hardening resulted—and thus case hardening was the name applied to the process, the pack hardening process then being known as the cementation process.

High melting salts were used at first, due to their similarity to cast iron, but later it was found that lower melting salts containing carbon worked equally well, provided they were heated to or just above the critical temperature of the steel being treated.

The cyanide, ferrocyanide and carbonate compounds of potassium or sodium were all found to be excellent salts for the process, and continue to be used today almost exclusively. The predominance of the use of the cyanide salt, however, lead to the process being called cyanide hardening, and the term case hardening was then applied to the pack hardening, or cementation, process

General Rules

Cyanide hardening follows the self-same rules as pack hardening, or case hardening, namely, the rate of penetration and the contentration of the carbon content in the case depend primarily upon the temperature and the time of heating, but in either process the temperature must be at or above the critical point of the steel being treated. To heat the cyanide bath to a temperature much in excess of the critical point of the steel causes a loss of cyanide by volatilization, which is dangerous to all workmen in the vicinity, and leads to a concentration of carbon in the case, thus producing a high content steel case which chips off readily. The most satisfactory temperature is about 1450° F.

The following table plainly illustrates this point:

Relation of Temperature and Penetration

Temp. of Cyanide	Penetration in Inches	% Carbon in Case	Time of Immersion	Percentage Cyanide in Bath
1450° F.	.009	.45	1 hr.	10%
1500° F.	.012	.50	1 hr.	10%
1650° F.	.016	.60	1 hr.	10%
1750° F.	.022	.65	1 hr.	10%
1850° F.	.031	.70	1 hr.	10%

The time the part is immersed in the molten cyanide is a very important factor, yet it does not apply in the same manner as in the pack hardening process, where penetration is almost directly pro-

*From "The Melting Pot" by Chicago Flexible Shaft Co.

portional to the time, a point which is very ably brought out by the work of E. F. Lake.

Relation of Time and Penetration

Temp. of Bath	Time in Cyanide	Penetration Depth	% Carbon
1450° F.	¼ hr.	.006	.35
1450° F.	1 hr.	.009	.45
1450° F.	2 hrs	.018	.55
1450° F.	4 hrs	019	.75

The reason for the practice of immersing the pieces being cyanide hardened for only 20 minutes may be readily seen in the above table.

It will be observed that the carbon penetrates .006 inch in the first 15 minutes and only .003 inch in the next 45 minutes, and only .004 inch in the next hour. The wastefulness of heating an article more than the specified 20 minutes is self evident. If a greater penetration is desired, pack hardening should always be used.

Considerable controversy has arisen as to the most efficient percentage concentration of cyanide in the bath. The following table should serve to emphasize that a greater concentration than 25% is wasteful:

Relation of Cyanide Concentration to Penetration

Concentration Percentage Cyanide	Time	Penetration	Time	Penetration
10%	¼ hr.	.006	2 hrs.	.013
25%	¼ hr.	.007	2 hrs.	.015
50%	¼ hr.	.005	2 hrs.	.014
75%	¼ hr.	.004	2 hrs.	.016

The penetration, it will be observed, actually falls off as the percentage cyanide increases. The reason for this is not readily explained. A parallel case may be cited, however, wherein concentrated sulphuric acid may be shipped in steel tank cars without any injury to the steel tank, while dilute sulphuric acid would dissolve the steel of the tank car in a very short time.

A large user of the cyanide process finds the following mixture gives excellent results: 35% sodium cyanide, 33% sodium chloride, and 34% sodium carbonate.

Advantages of the Process

The cyanide process has many advantages which tend to lesssen its shortcomings. The customary pack hardened parts is a common practice.

The grinding of cyanided parts is not recommended, as such an operation removes all of the hardened shell and puts the piece of steel in the same condition as it was before cyaniding as far as case hardness goes. In other words, cyanide hardened parts are not to be ground.

For the production of beautifully mottled work by this process it is imperative that the work be clean and free from oil before entering the bath, and that the cyanide salts be as near commercially pure as possible. Chemically pure salts are too expensive, except in rare cases, and are not recommended.

Furnaces for Cyanide Hardening

The furnaces commonly used for cyanide melting are of the crucible type.

The furnace is equipped with a hood, a detail which must not be overlooked, as cyanogen compounds are deadly poisons, and every precaution should be taken when using them.

The crucible which has been found to be most satisfactory for cyanide hardening furnaces is the pressed steel pot, as under normal usage it will outlast any other kind of iron pot several times.

Heating Parts

Cyanide baths, unlike lead baths, permit the steel parts to sink to the bottom, and as the bottom of the pot is generally at a temperature slightly higher than that recorded by the pyrometer the parts should be suspended in the molten cyanide by a fine wire, or if the parts be small and numerous, a basket should be used. This last method, namely, the basket heating method, is the ideal way for hardening small parts such as screws and parts with threads or definite markings on them, as the resulting work comes out perfectly smooth, clean and unchanged as to dimensions.

Quenching

Articles heated in cyanide are generally quenched in lime water or pure cold water, very seldom in oil, as this would not give the hard case so much desired. When quenching parts from the process, the operator should hide behind a light sheet iron shield, as the parts enter the water with a sharp report and a splattering of hot water.

Tempering

The tempering of the parts

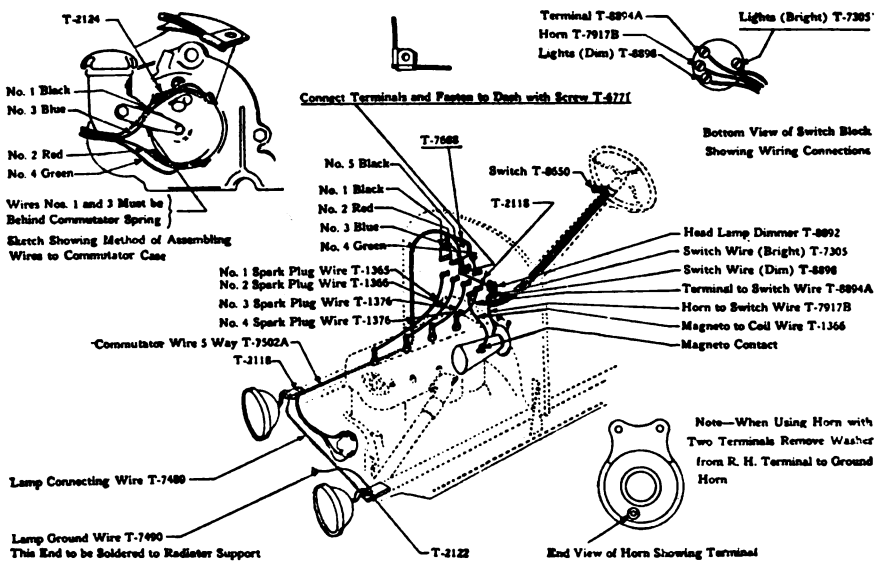


FIG. 4.—THIS SHOWS WIRING OF FORD CAR OR TRUCK WITHOUT STARTER

purpose for which it is used is the production of a pretty mottled finish, together with a finished piece of work free from oxides and scales and to a certain extent rust-resisting. The process is not used by manufacturers of high standing on any work where a real hardened case of any appreciable depth is required, as the penetration is too small. Steel engravers, however, find it highly satisfactory for the hardening of engraving plates; in fact, it is the only practical process available for the hardening of steel engraver's dies.

Tools heated in cyanide are generally free from warping and retain their original dimensions, due primarily to the uniformity of heating; therefore it is widely used in the hardening of delicate parts where dimensions are of prime importance. To use the cyanide process for reheating and hardening

hardened by the cyanide process is in no way different from the general practice for all steels.

Summary

1. The cyanide process produces a "case" hardness of only a few thousandths of an inch, in fact, "skin hardening" would be a more fitting name.

2. The cyanide process is recommended primarily as a finishing process where accurate dimensions are essential, or finish is desired, and secondly, as a method of reheating case hardened parts where minimum deformation is desired and finish is important.

3. Time of immersion in the cyanide and the temperature of the bath are vital factors, having much to do with the success of the process. The standards found to be best are 1450° F. with 20 minutes immersion.

4. The concentration of cyanide in the bath is very important, and has been found to be best maintained at about 25% for economy and maximum case.

5. Cyanide furnaces should be of the crucible type and have pressed steel pots for durability.

6. Hoods should always be placed over all cyanide furnaces, as the fumes are very poisonous, and every precaution should be taken.

7. The heating of parts to be cyanided is best accomplished by suspending them in the molten bath by wires, or if very small and numerous, by the use of a wire basket.

8. Cyanide hardened parts are best quenched in cold water or lime water—oil is seldom used, as it dulls the finish and gives a much softer case.

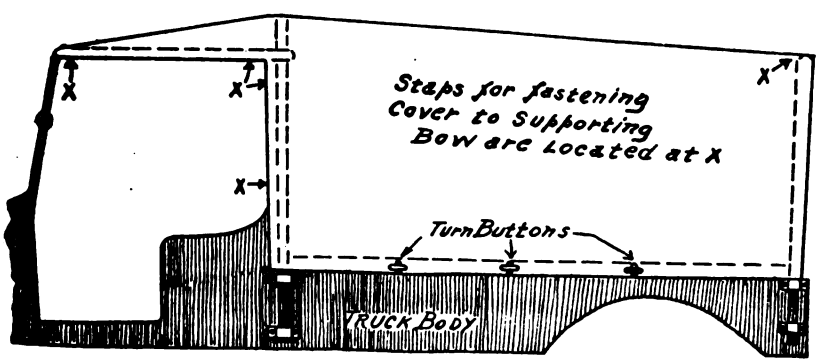
An Inexpensive Top for the Delivery Car

E. A. LUERS

The accompanying engravings show a very simple top construction that was devised by a mail carrier operating a rural delivery route in Southern Maryland. This top has the combined advantages of servicability and inexpensiveness. It can be very easily and quickly made and will no doubt appeal to a great many truck owners.

The top is very easily and quickly detached when not required on the truck, and can be stored in a very small space. The frame for the top may be made of light gas pipe, or wood construction may also be used. In the engraving it will be noted that two U-shaped bows form the main support for the top. These supports are inserted in the socket at the side of the truck body, similar to the manner in which stakes are held. The forward bow or support has an extension bow which holds the top over and above the driver. This attaches to the wind-shelf support if desired. The cover or canvass is laced to the bows and secured at the edges of the body with turn fastener. The cover may be of any suitable waterproof material as the truck owner may decide.

No dimentions are given as they are hardly necessary as this top support may be made to practically any size depending upon the nature of the material to be carried in the truck and, of course, the size of the truck body. Should wooden bows be used in fastening this top, the builder will want to protect the end of the bows where they are inserted into the sockets with light band iron to prevent wear.



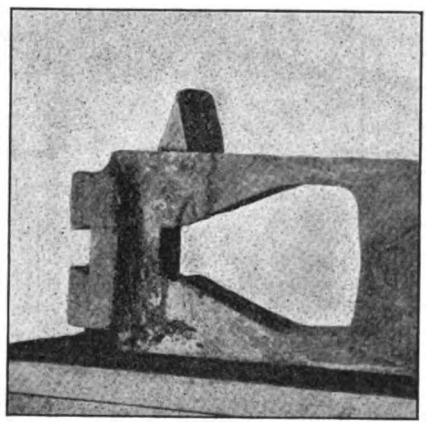
AN INEXPENSIVE TOP FOR THE DELIVERY CAR

This top can be made to fit practically any sized truck body and its cheapness will appeal to many truck owners and drivers who would not consider a more expensive equipment.

Cutting Cast Iron with the Oxy-Hydrogen Flame

ELMER H. SMITH,
President, Smith's Inventions, Incorp.

The accompanying engraving shows an interesting cast iron cutting job which I ran across over here. This casting was broken where you will easily notice it has been welded. In order to make a good weld on this piece it was necessary of course to cut away a lot of material, and the manner in which



AN INTERESTING CAST-IRON CUTTING JOB

this was done was of considerable interest.

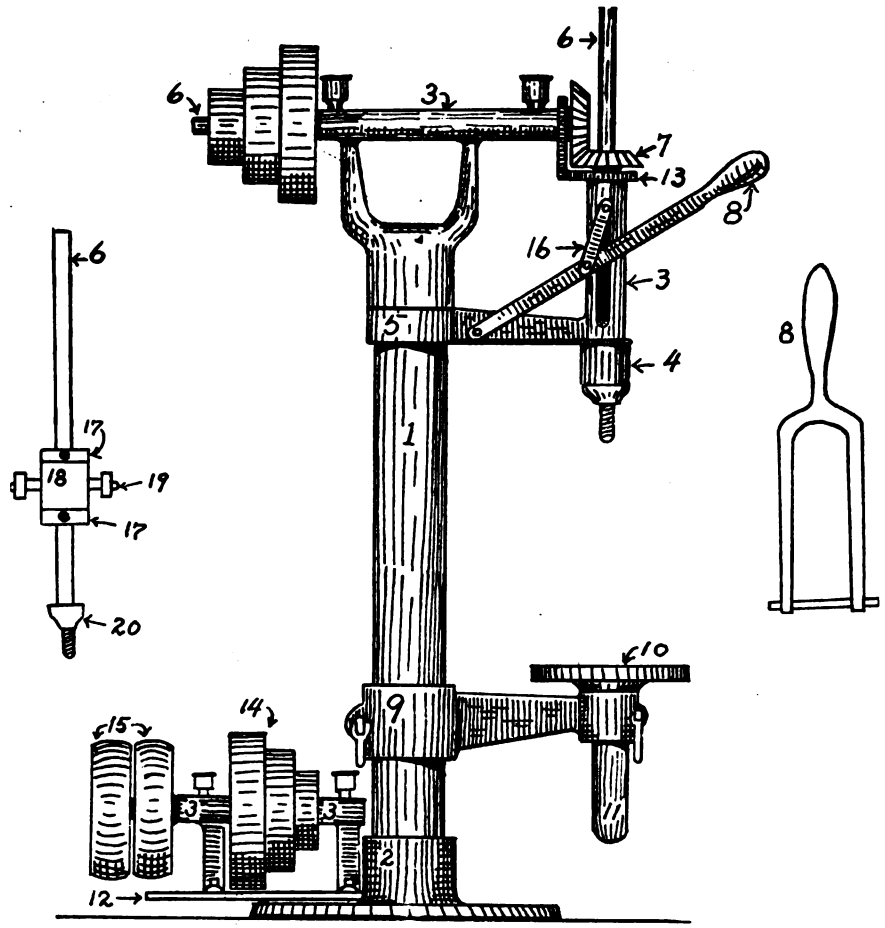
The casting was preheated with a Smith preheating torch to a cherry red, and then the cutting torch connected up with oxygen and hydrogen was brought into play. A pressure of 90 pounds was carried on the oxygen and 12 pounds on the hydrogen and the piece that you see placed on top of the casting was cut out in ten minutes, approximately five minutes for each side of the cut, and the cut compared very favorably with a similar cut, made in steel. I did not know that hydrogen could be successfully used in cutting cast iron, but it did work to perfection on this job. The fact that the casting was red hot at the time it was cut no doubt assisted greatly in the cutting. This is the neatest piece of cast iron cutting that I have ever seen.

The photograph was taken after the casting was set up in the planer and was being finished off.

A Shop-Made Sensitive Drill

O. M. PETERSON

The accompanying engraving shows a sensitive press drill that I built during this past winter. I worked on it during odd moments, and from odds and ends which I was able to pick up in and about the shop. This machine will handle drills from 1-64 up to ½ inch. Of course, it is not likely that every shop will be able to find just exactly the material with which I have built my machine, however, I have numbered each part of the machine shown in the engraving, and will enumerate exactly the material, and cast-off parts that were used for the different numbered sections.



A PRESS DRILL MADE IN THE SHOP FROM ODD CAST OFF PARTS

1—Torque tube out of a car, machined and polished.

2—Wheel or gear hub from tractor.

3—1¼ and 1½-inch pipe.

4—1½-inch pipe coupling.

5—Tractor crank machined and pressed on column.

6—7-8 inch shafting machined and key seated.

7—One pair 2½-inch miter gears about 12 pitch.

8—Forged fork lever.

9—Old pulley hub and spoke, acetylene welded.

10—Flange plate, machined and polished.

11—Either pipe or steel tubing.

12—Iron plate ½ by 4 by 12 inches.

13—Iron ½ by 2½ bent and drilled to fit pipe.

14—Either iron or wood pulleys.

15—Tight and loose pulleys.

16—Small pivot strap.

17—Steel collars pinned on shaft.

18—Bronze bushing, free on shaft.

19—Steel studs screwed into No. 18.

20—Steel collar shrunk on the spindle above the chuck.

The parts numbered 1, 3, 5 and 13, are brazed together. If No. 1 does not fit into No. 2, it can readily be set solidly and firmly in babbit metal. The end of the spindle can be machined to fit any chuck which you may have on hand or prefer to put on the machine. It it understood that cast away material will not always measure the same, so that anyone who wishes to build one of these drills, can figure and assemble his various parts to the best of his advantage.

In closing, I want to say that I have read "Our Journal" for the past five years, and have certainly found it very interesting. It has given me many good ideas, and I think that I owe the readers of "Our Journal" an idea or two of my own. I am trying to pay that debt in sending in the above.

How Some Big Oxy-acetylene Jobs Are Done in a Small Shop

JOSEPH M. HOWES

The oxy-acetylene jobs usually described in "Our Journal" seem to have been done in shops where they have every convenience for doing both large and small work. But in a shop where they have not all the modern equipment, such as gas heaters, chain blocks, and the like, it is sometimes necessary to use considerable ingenuity in order to successfully overcome some of the handicaps which arise when an exceptionally large job, or one where a very cumbersome piece of casting has to be handled. I am therefore going to tell how some of these large jobs are done in a small shop.

I have welded practically all kinds of jobs in the iron class, but have never yet handled aluminum. I weld double-cylinder blocks for large tractors, and jobs of similar character, and will tell you how we go about such a job in our shop.

After grooving out the crack to the full depth, as all such jobs should be prepared, I place the work on one of the forges. When it is firmly placed in such a position so that the crack can be easily welded, I build a wall of fire brick around the casting. I then cut pine and scrap wood, char up some coal on the other forge, and build up with this around the casting and inside the brick wall laying alternate layers of wood and burning coal. In this way the casting is gradually heated up to the desired temperature. In order to start up the slow spots in the fire. I keep on hand some kerosen oil and use it on the slow places. When the fire is well started, I cover the casting with a piece of sheet iron, and thus

the work is soon heated. It is not necessary to blow the fire very much. In fact if the fire is properly started, the natural draft of the flue is about all the fire will need.

When the casting is at the right temperature, I start welding in the usual way. After the weld is completed and the new metal has been finished off, I again cover the casting with wood and coal, and bring up again to the proper heat. I then cover with sheet iron and let it stand overnight. I have never yet had any of my jobs crack, and I have welded kettles and all large articles in this way.

One job which I did some time ago, and of which I was very proud, was the addition of new metal to a large crank shaft. A worn place on this shaft has to be built up for a distance of 9 inches long, and ⅜ inch wide and to a feather edge. The crank shaft was for a twin-cylinder tractor steam engine, and was 9 feet long and 3½ inches in diameter with double crank in the center.

To prepare this job for working I place the crank shaft on two trestles with the double crank between them. In order to allow the shaft to turn but not to roll on the trestle, I fixed blocks on each side of the shaft and fastened the trestles solidly. I then took a piece of three-inch pipe, welded a plug in one end of it, and then cut three long slotted holes with the torch in this pipe. These holes were 7 inches long and ¼ of an inch wide. I now built a rough forge with fire bricks, setting this pipe in this work to act as a tuyere, being careful to build up the brick wood solidly, and firmly, and to set the slotted pipe in it in the proper manner, so that it would remain immovable. I now set one of my electric blowers at one end of the pipe, and proceeded to build a fire in this rough forge. After the fire was well started and after about 20 minutes of steady heating, the shaft was ready for the welding operation. I welded a layer the length of the worn place, and then turned the shaft into position for another layer. When the shaft began to cool the helper turned on the blower while I rested. Then we continued alternately heating and welding until the job was finished.

The shaft was then carried by truck to a large machine shop in a neighboring city, and turned down to proper size. The owner of the machine was very well pleased and used the job all of last threshing season and the shaft is still in use. This job weighed in the neighborhood of 800 pounds and I used 5-6 Norway rods.

This Is the First Prize

The above engraving will give you some idea of the watch to be given away as the first prize in the question contest which was announced on page 37 of the March number and which again appears on page 5 of this issue.

This watch has a 7-jewel Swiss lever movement and a 10-year gold-filled case. The dial is finished in the very latest style—the background is frosted silver finish which is very beautiful, while the figures are finished in gold and are raised. This brings the figures out in sharp contrast. The hands are very neat in design and match the figures.

The second and third prizes are gold-plated shaving outfits of the famous Auto-Strop Razor — the safety razor that made self-shaving a pleasure. This is a very fine outfit both in appearance and workmanship. It will be a pleasure to shave with the razor and a comfort to use the easily applied strop.

The other main prizes are the regular Auto-Strop Razor Outfits. They are complete with razor, strop and blades .

The pictures, one of which will be given to each contestant who does not win a main prize, are reproductions in full colors of the painting "The Blacksmith" that hangs in our offices. It is an excellent picture for home or for the shop office.

This contest closes May 1st so send your question sheet today. Remember everyone gets a prize.

Benton's Receipe Book

A Good Cement is made of a good quality of shellac varnish thickened with dry white lead. Mix thoroughly by kneading with a putty knife on a glass slab, to the proper consistency.

To Test the White Lead to be used on any painting job—a question asked by F. J. E., Ohio—prepare a solution of nitric acid using one part acid to two parts of water. Dissolve a piece of the white lead in this acid solution. If the lead is pure it will entirely dissolve. If adulterated, a deposit will remain.

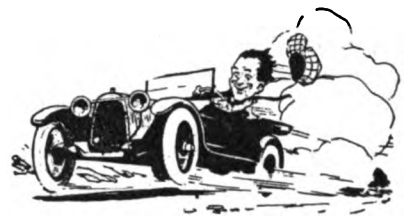
To Color Yellow Brass Castings a golden bronze clean and spray or brush with a very weak muriatic acid pickle. They are next sprayed or brushed with a solution using four ounces of sulphide of potash, two ounces of thialdine crystals, and four ounces of chloride of ammonium per gallon. By heating the castings, any shade of color, from golden yellow to dark brown, can be purchased.

To Remove Tight Nuts there seems to be about as many suggestions as for a cold in the head. Here is a simple suggestion that may or may not move the obstinate metal:—Take an open end wrench which fits the nut and heat it to a good temperature and while hot fit it to the nut. Allow it to remain for a few minutes to heat the nut and then screw nut off. If it still persists, the nut will very likely need to be split for removal.

Protecting Drill Points from the effects of hammer taps was successfully brought about as follows:—Every mechanic who has used a drill press knows how naturally every drill press operator taps the tip of the drill with the side of the hammer in order to tap the drill to a firm seat and a secure grip. This tapping naturally dulls the drill tip and some times results in actual breakage of the tip. In one shop the owner placed a wooden mallet at each drill—with instructions to the men to use the mallets to tap the drills. These were not used for long however as the men preferred the regulation hammer. The proprietor therefore hit upon the following scheme: He bored a shallow hole about an inch in diameter in the side of the hammer used at the drilling machine and poured babbitt metal into the depression. This serves effectively for tapping the drill home, does not dull the drill tip and still leaves the hammer uninjured for regulation use.

Lubricating Oil—just recently we had occasion to note the number of different uses where it made work easier. We saw a tinsmith oil the blades of his cutting shears before proceeding with a job of cutting a pattern. We saw the operator of a large metal cutting shear rub heavy oil on the cutting blades of his machine. We saw the operator of a small stamping press allow his unstamped sheets to soak in oil before stamping them out. We saw our wife pass a slightly oil moistened fingers over the blades of her shears before cutting out some dress goods. And then we tried the same stunt with our own desk shears and we find it works to perfection. Therefore this little paragraph on the use of oil where it is not generally supposed to be used.

High Spots



MASTER OF THE FORGE

H. Atlee Brumbaugh.

Written in recognition of the skill of Blacksmith Charles Gorsuch, of Martinsburg whose skilled hand forged the tiny horse shoe and thus to him it is dedicated.

Let me tell you, dear friend, of the miniature shoe,
That is forged on the anvil for me and for you;
Too small for hoof but neatly and perfectly made,
Just promises luck and is a symbol of aid.

Listen! his cling-clang-cling is the chorus in the air,
For he's master of the forge with silver thread hair;
Yes, the novelty man with the skill of his hands
Is known by his clever art in all foreign lands.

Yonder in the quaint shop you see the smoking flame,
And hear the bellows coaching up the same;
Primeval days were not as rich as modern art,
But, ah, shall the forge cease to play its part?

The master of the flaming, roaring forge has taught
That lifeless iron will imitate living thought,
And this is genius. By it men begin to glow
Until the skill of the workman the world shall know.

Instead of worrying over a loss, pitch in and turn it into a gain.

Did you ever see a self-made man who wasn't proud of the job?

Smile and keep a' smiling and when you do smile, smile as tho' you meant it and felt it.

It's not so much the money you earn as what you save out of what you earn that counts.

What's come of the ol' fashioned smith who use to argue about hot and cold fitting of shoes?

It is said that the wear and tear on a tractor plowing one acre is equal to that of an automobile run one hundred miles.

As a rule the people who look before they leap are not the ones who jump from the frying pan into the fire.

Uncle Jed Ses: "Life is like the latest Paris gown—It ain't so much how it's made, but what y' see in it."

Ever notice that the folks who are continually harping about keeping money in circulation are usually the ones who haven't any?

Suppose you treated each customer each day as tho' he were the only customer you had that day, wouldn't your business grow? Maybe that is your plan—if not—it's not a bad plan to try.

Nothing on earth will sober up a boy's or girl's flighty tendencies as responsibility. It is a good idea to give them responsibility of some kind just as early in life as possible. And then too, responsibility is fine for the helper.

A couple of good mottoes for the youngsters to adopt—(and neither one of 'em will harm any of the oldsters)—early in life are—First:—"I did it yesterday"—this in place of that old one "Do it Now". Second:—'Try to do too much—and then do it."

Don't be afraid to tell folks what you can do. If you can do many things talk about it. If you specialize, say so. But do say something. One enterprising repair man we came across the other day has a sign on his shop which reads: "We mend everything except peoples ways."

Are you showing a profit on the actual amount of business done? You should show a profit of at least 10% in real, tangible, spendable or saveable money. If you are not showing that, you had better go over your books with a sharp pencil or over your business with a calking chisel and stop up the leaks.

It's simply plain common sense. Ask any successful man. Folks don't usually slide into anything really worthwhile. 'Course there are exceptions, but it's the rule you want not the exception. And the rule is—work intelligently, persistently and practically and anything is possible. Ask any successful man.

Uncle Si Clone says: "I don't need no prophet t' tell me that some shop is goin' t' be mighty busy when I see the owner hustlin' around among the farms tellin' farmers t' bring in their plows, an' harrows, an' discs early. An what's more y' don't need no free-noligest t' tell y' that that shop owner is a wise business man, neither."

Ever think how few shops you see today with patent medicine signs, and tobacco advertisements on them. Years ago the favorite resting place for doctor bunk's punk pills for punk folks was the side or roof of the way side smithy. "Our Folks" have risen to a realization that the space is most valuable to their own business advertising signs and it is refreshing indeed to see the neat and well worded signs that some of "Our Folks" are using.

Tempering is truly a magic wand in the hands of the experienced worker of steel. By means of the tempering process the wise steel magician can cause the wonder metal known as steel to scratch the polished surface of glass. Again, by tempering, the same metal is of such flexibility as to bend and re-bend without break or crack. And all intermediate degrees from the hardness of a diamond point to the flexibility of a spring are made possible by the intelligent application of the seemingly magic process of tempering.

If you are handling accessories and parts don't try to carry everything that your customers ask for. Handle only the lines you can sell profitably. You could fill a shop as big as the State of Rhode Island with the parts, accessories and supplies that are manufactured for horse, auto, truck, tractor and implement owners and users, and yet experience the sensation of having your first customer come in and ask for something you haven't got. There is a happy medium where common sense and efficient merchandizing ability meet and at that point will be found the accessories and parts that are in demand and can consequently be sold in profitable quantities. When considering the handling of certain parts and accessories investigate and see if the items are being sold readily in your neighborhood—then if they are being advertised,—and then if the items make a fair profit possible. For after all, no matter what profit is offered in the sale of the item, if there are few or no sales, there will be little or no profit.

Friend Tardy has at last been stung by the advertising bug. Off and on for lo, these many years we have attempted to tell Tom something about the value of advertising and how much more valuable the sides and front of his shop would be to him if he used them as resting places for his own signs instead of for the signs of sundry patent medicine and tobacco manufacturers. Well, it seems that Tom has made a start at covering up the signs of the tobacco and medicine maker. As we came by the shop the other day we found Tom busily engaged in tacking up a sign which read: "Parts for Fords." We were immediately interested and Tom explained that some chap had come along that way and had sold him an assortment of the "most needed Ford repairs" for $14.28 and told him to tack up the sign. Well, Tom has made a start but as usual in the wrong direction and has again proven his natural ability as a humorist. He tacked the Ford parts sign immediately below a patent medicine sign so that the two together read as follows, "For that Tired Feeling Use Parts for Fords."

Happiness is incidental. It is a by-product. Yet most folks strive for happiness as the main goal. Happiness cannot be purchased at any price. Some folks try to corner happiness by building fine homes in which happiness is to be confined. Some people try to confine happiness in speeding automobiles, or in finely fitted yachts, or at expensive hotels. But happiness continues to be as elusive as the rain-bows end. The main function of life is service, and happiness is the by-product of service. It is incidental. To attempt to win true happiness from the world without service is like attempting to extract honey from an ant hill instead of from a bee hive. The laborer who takes pride in digging his ditches honestly and in full accordance with specifications wins happiness. The smith who forges his metal with honest blows and produces welds with honest assurance wins happiness. The Repairman who does his work honestly and charges an honest fee wins happiness. So we will change the sentence concerning the main function of life and qualify the service as honest, for without honest service there can be no true happiness.

Taking Down and Re-Assembling the Storage Battery

Part IV.

T. A. BECKLIN

Charging the Storage Battery

As explained in the first article of this series on storage batteries, electricity is not actually stored in a battery as the name would imply. The action of the storage battery is purely chemical, and the current given out by the battery is generated by chemical action.

To explain this action, it will make the charging action of the battery much simpler for the battery operator, and probably clear up some of the mystery concerning the storage battery.

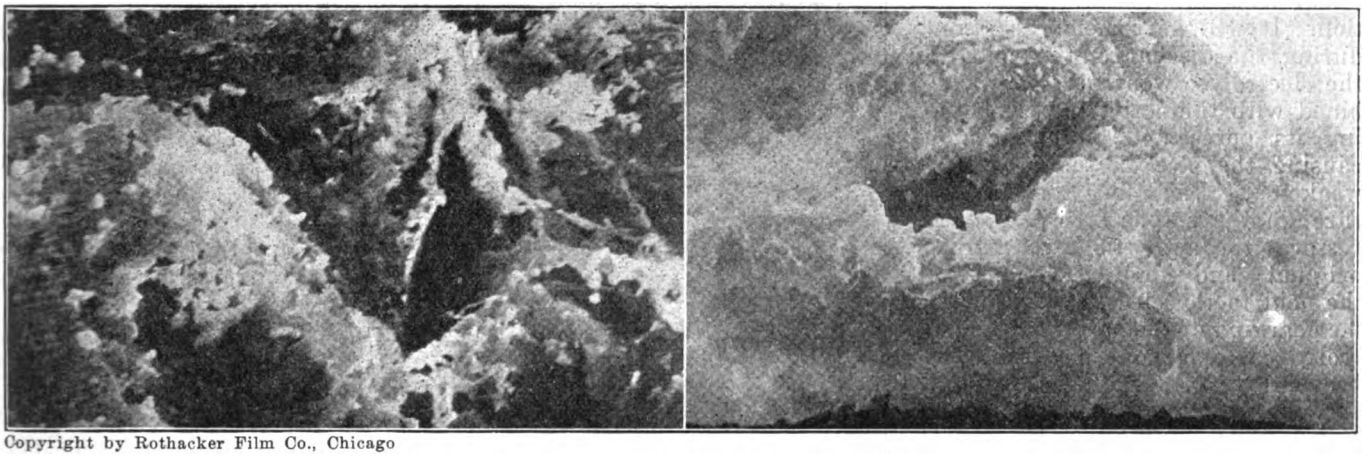
When the lights or the starter on the car are being used, the current flows from the storage battery and ordinary electric current that is used in home, factory or office. This current however, is produced chemically. The acid which is contained in the electrolyte goes into and combines with the lead or the positive plate, which is called the active material. In the positive plate this material is lead peroxide, and in the negative plate it is metallic lead in a spongy form. The paste on the grids is made of red lead and a weakened solution of sulphuric acid for the positive plate, and on the negative plate it is made of litharge and a weakened solution of sulphuric acid. When the acid in the electrolyte combines with the lead and the active material, a compound known as lead sulphate is formed.

As the current continues to be used, or as the discharge of the battery progresses the electrolyte becomes weaker, due to the fact that the acid goes into the plate. producing the electric current, and incidentally producing the compound of acid and lead called lead sulphate. This sulphate continues to increase in quantity, thereby filling the pores of the plate. As the pores of the plate become filled with this sulphate, the free circulation of acid into the plate is of course, retarded. This naturally, results in a slowing up of the normal action of the battery and the battery becomes less active. There is a drop in voltage, as shown by the volt meter, or if the discharge progresses far enough, the battery becomes entirely discharged.

Now just a word regarding the action of the hydrometer, and why it is used to determine the condition of the battery. The hydrometer is an instrument for measuring the specific gravity or density of liquid. This instrument consists of a closed glass tube in the form of a short barrel with a longer stem of smaller diameter. Inside of the stem is a graduated scale, at the lower end of which a few shot are placed. The hydrometer floats upright in the liquid, and the point on the scale at the surface of the liquid, shows the specific gravity of the liquid being tested. The little weighted and graduated scale inside of the glass tube is adjusted to a certain standard which of course has been predetermined.

It is understood that any article will sink deeper in a thinner or lighter solution than it will in a heavier and thicker solution. This natural fact, is taken into consideration in the construction of the hydrometer, and has been used to determine the specific gravity of liquid. The specific gravity of water is 1,000. If acid is mixed with water it will become heavier. A hydrometer will not sink as deep into the heavier solution, as it will in the thinner or lighter solution. When the battery is fully charged, the specific gravity of the electrolyte is between 1,285 and 1,300. The acid is then contained in the electrolyte. When the battery is discharging the plates absorb the acid, and the electrolyte solution becomes thinner and weaker, therefor the hydrometer will sink lower in the solution, and according to the degree of discharge at the time the test is made. If the battery is fully discharged, the hydrometer will show a test as low as 1,150, or almost that of water.

So much for the basic ideas in



NO, THESE ARE NOT CLOUDS NOR SNOW SCENES

Somebody wanted a movie of bubbling, boiling, melting metal. Veteran steelmen said such pictures could not be taken—that the intense heat of the molten metal would either crack the lens of the camera or set fire to the film. Well, you know how these movie camera chaps are—the more difficult the stunt the more anxious are they to do just that. And they did it in this instance. In getting the pictures the camera man's clothing took fire. After a good drenching he went back to the job and succeeded in getting the first pictures of the kind ever taken. The first picture shows the melting metal in the bubbling stage while the second shows it in the soft mushy stage. The pictures were taken in the interest of commercial development work and education in mechanical processes.

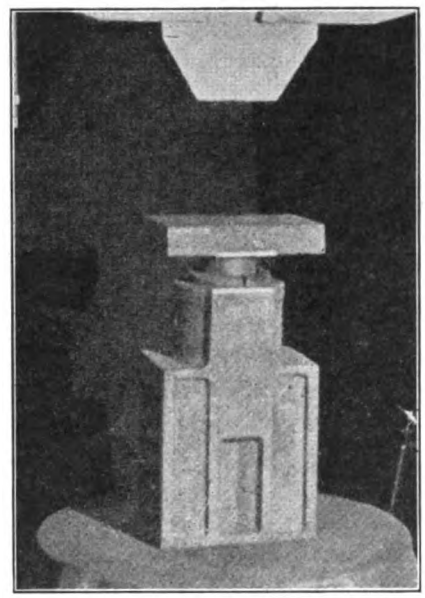
connection with the storage battery. It is not, of course, absolutely necessary for the battery repair man to understand all of these matters, but these few points explained will make the action of the battery and a great deal of battery work much clearer and simpler if the battery repair man does understand it.

Now let us consider the matter of actually charging the battery.

It is of course, generally understood that to charge a battery direct current is passed through the cells in a direction opposite to that of the discharge. This current passing through the cells in a reversed direction, reverses the chemical action which took place in the cells during the discharging operation. It will be remembered that during the discharge, the acid of the electrolyte went into and combined with the active material filling its pores with sulphate and causing the electrolyte to become weakened. Reversing the current through the sulphate in the plate restores the active material to its original condition and returns to the acid to the electrolyte. During the charging of the battery the electrolyte or acid solution gradually becomes stronger as the sulphate in the plate decreases, until no more sulphate remains and all of the the acid has been returned to the electrolyte. The battery will then be of the same strength as before the discharge and the acid will be ready to be used over again during the next discharge. As there is no loss of acid, none should ever be added to the electrolyte unless acid is actually spilled out of the battery cells. There is however a loss of water because of evaporation, and this must be replaced as may be determined by use of the hydrometer test. From this description of the charging and discharging action it will become apparent that the reason for charging a battery is to drive the acid out of the plate and restore it to the electrolyte.

Just as explained in the discharging of the battery or the using of its current, and the gradual slowing up of the discharging rate, so also can the battery absorb current at a higher rate when fully discharged then it can later on or as the charge progresses. In other words, a battery when fully discharged can absorb more quickly and as the charge progresses the plate can no longer absorb current at the same rate and the excess current goes to form gas. In a battery which is charged or nearly charged the plate can absorb current without excessive heat only at a low rate, and a high charging rate will be almost entirely used in forming gas resulting in a high temperature, and excessive wear on the plate.

Right here it might be well to mention a matter which is not generally understood correctly. There seems to be a very general idea that a high rate of discharge for the storage battery is injurious. It is not discharging at a high rate which injures a battery, but overdischarge or what may be correctly described as really under-charging or starving. In other words, if a car is so operated that the batteries get insufficient charge, or if the charging current is not sufficient to make up for the discharging current which the battery is called upon to deliver, the battery cannot be expected to do its work properly. In other words, there must be an equalization or balance between the amount of current delivered from and to the battery.



Copyright Rothacker Film Co.—Chicago

THE FASTEST MOTION PICTURE EVER MADE WITH ORDINARY MOVIE CAMERA

Some engineers wanted to know what happened when a metal was tested under a drop hammer. They had the film folks rig up a picture taking machine to snap 200 pictures a second. This is an enlargement of one of those snap shots. It shows the drop on its way to the metal being tested.

In charging the battery great care must be taken to connect the positive wire of the charging current to the positive terminal of the battery, and naturally, of course, the negative terminal of the charging current to the negative terminal of the battery. If the battery is connected up in the reverse direction very serious injury to the battery will result. Should such a reversal occur by accident put the battery on charge at the twenty-four hour rate, and leave it on for several days. Do not take it off until the voltage and gravity both have reached a maximum with the battery at the normal temperature 70 degree Farenheit.

The correct charging rate for any battery is usually given in a chart issued by the battery manufacturer. The charge is usually started at a rate equal to the normal charging rate or starting rate, as shown by the chart, and is continued until the cells gas freely. This will usually take about six hours at the normal rate or finishing rate.

To determine when the battery is fully charged after it has been on the charging current at the finished rate, observe the cells carefully. If they are gassing or bubbling freely and equally, and if the gravity as determined by the hydrometer test has shown no further rise during an hour, the battery may be judged as fully charged.

If the battery to be charged is one that has just been repaired or built up, do not start the charge until at least 12 hours after filling the cells with electro-lyte. This is done in order that the cells may have a chance to cool as they should be at a normal temperature when the charge is started. In very hot weather it may be necessary to let the newly repaired battery stand longer then the 12-hour period.

When the charge is started begin at about one-half the normal charging rate until the specific gravity and voltage show no rise over the period of about 5 hours and all of the cells are gassing freely. This will require at least 50 to 96 hours in case of new elements, while with old plates which are badly sulphated or dried out considerably more time may be necessary. It is well in charging to take occasional temperature reading and if the temperature reaches 110° Fareheit,

lower the rate of charge or interrupt or discontinue the charge for a short time.

When the charge is completed, adjust the electrolyte to the proper level, continue the charging to allow the gassing to thoroughly mix the solution and then take a hydrometer reading on the cell, and adjust the specific gravity to the proper point between 1,270 and 1,300.

After the gravity has been adjusted properly and the battery is ready to be placed in the car wipe off the top and sides of the battery with a weak solution of ammonia, and as a further precaution against corrosion, rub a little common vaseline on the exposed lead parts of the battery.

The following caution has been mentioned several times during the talks on battery work, but it will again bear repeating at this time, and that is to be extremely careful with the use of a flame of any kind near an open battery. It is well in order to avoid the possibility of an explosion of the gaseous mixture which issues from the open filling holes of the battery cells, to replace the cell plugs, and to cover the battery with a wet cloth, particularly in and around the cell when a burning operation is to be performed on or near the battery. When the torch flame is used for melting compound observe these cautions very carefully and cover all parts of the battery with a wet cloth excepting that particular portion upon which the burning operation is to be performed.

Melting Furnaces for the Amateur Founder*

WALTER J. MAY

Where metals having a fusing point above 1,000° F. have to be dealt with, a furnace of some kind is necessary. Generally speaking, it is desirable to have a furnace that will take a 50-lb. brass crucible as this enables one to melt up to steel in moderate quantities, although probably a very few amateur founders would have pluck enough to tackle this. Taken as a usual thing, a 14 in. square crucible furnace attached to a chimney 20 ft. high will melt up to high-carbon steel such as files and such kind of metal, while a 15 in. furnace attached to a 30 ft. chimney will melt mild steel and wrought iron, this being about the limit for natural draught furnaces using coke as fuel, as when 3,000° F. is reached, things begin to get soft and pasty.

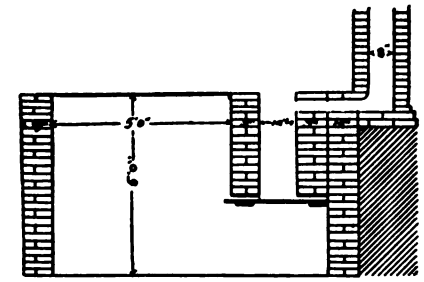


FIG. 1.—SECTION THROUGH PIT, FURNACE AND CHIMNEY

*Editor's Note:—This article appeared in the columns of "Our Journal" several years ago. It is published here at the request of a great many readers as the number in which it appeared has long since been out of print.

In all cases where crucibles are dealt with entirely by hand, the top of the furnaces should be level with the floor, except where less than about 30 lb. will be the total load, this arising from the fact that it is easier to deal with weights in this position, and that, in the event of a crucible breaking or sliping from the tongs, the molten metal does less damage than when it falls from a height. Besides, it is much safer from a personal point of view, as there is less splashing when metal falls only a short distance, which considering that molten metal makes nasty burns, is a large consideration. However, in the ordinary course of events, where reasonable care is taken, there is no reason to anticipate accidents, but, still, on the lines of prevention being better than cure, reasonable precautions should be taken.

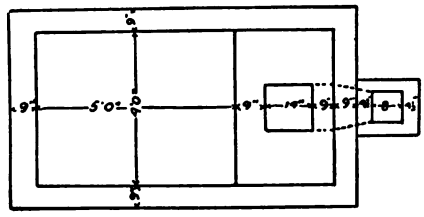


FIG. 2.—PLAN VIEW OF FURNACE ARRANGEMENT SHOWN IN FIG. 1

Probably the easiest furnace to construct would be an ordinary brick furnace, provided with a chimney about 20 ft. high could be arranged, and this would be an easy matter, as a cast-iron pipe would be suffiicent after the first 6 ft. above the outlet from the furnace. As there is no soot to be reckoned with, there would be no necessity to arrange for cleaning facilities, but as with a long run on the furnace the pipe would probably get hot, it should not be near woodwork. An 8-in. or 9-in. pipe would be needed to ensure quick draught, while there should be a damper in the brick part to regulate the draught, and a 14-in. square furnace having a chimney from 20 ft. to 25 ft. high, should melt anything up to wrought iron where good coke is used, time not being of so much importance to the amateur as to the trade worker.

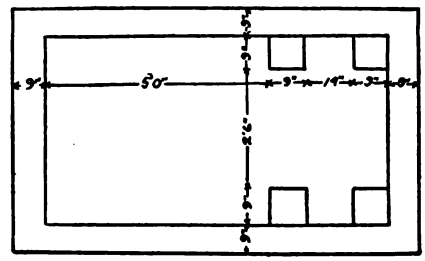


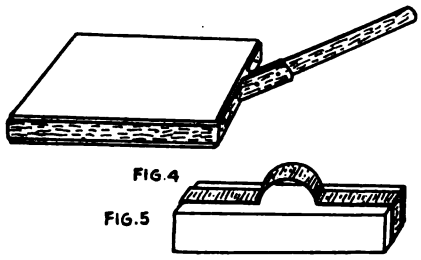
FIG. 3.—A FLOOR PLAN AND DIMENSIONS

In Fig. 1, a longitudinal section through the pit, furnace, and chimney is given showing the dimensions of each detail, while in Fig. 2, a top plan is shown. As the supports of the furnace have also to be indicated, a floor plan is given in Fig. 3, and with these before him, any ordinary intelligent craftsman should be able to do all that is required, set in fire clay with the thinnest possible joint, but the rest of the work can very well be of ordinary bricks set in mortar. Preferentially, the top of the furnace should be covered with cast-iron plates, but for the most purposes, if the top is composed of fireclay tiles, all requirements will be met.

Ordinary square bar-iron is sufficient for firebars, but a fairly strong grating over the pit is necessary for security. The cover too the furnace may be a fireclay tile banded with iron, as shown in Fig. 4, or may be formed as shown in Fig. 5, the more convenient local method usually being preferred. The brickwork above the legs or supports is carried on 3 in. by ¾ in. flat wrought bar, and the firebars by 1½ in. square bar, as heat as well as weight has to be dealt with in each case.

In some cases a more or less portable furnace is needed, and where a small blast can be provided from a fan attached to existing shafting, or where a small electric motor can be put in, a furnace of this kind can be readily put up anywhere in an outdoor shed, as

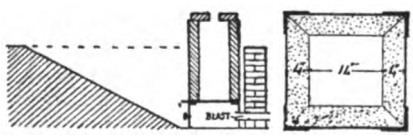
the fumes from the fuel can be passed into the open air ready enough without causing serious inconvenience. Of course, the fumes from coke are not pleasant, especially from gas coke or furnace coke



FIGS. 4 AND 5.—SHOWING FURNACE COVER CONSTRUCTION

highly charged with sulphur, but, still, as the blast applied is not great, the fumes can be dispelled by the air passing through an open shed. Where there is a chimney, of course the furnace would be arranged with a flue, and in many cases the draught would be strong enough to dispense with forced draught altogether, this being an advantage from every point of view.

The object to be secured in all crucible furnaces is not the too rapid combustion of the fuel, but rather the maintenance of a full heat for a long period. The process of melting is rather a long one and the heat has to pass through the walls of the crucible, and then be gradually absorbed by the metal within. It must always be remembered that metal absorbs heat until the fusing point is reached, and that it does not melt as soon as a flame touches it, while the heavier

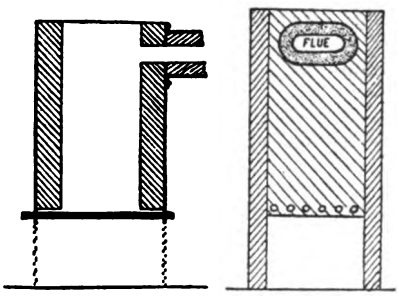


FIGS. 6 AND 7.—SECTION AND PLAN VIEWS OF FURNACE

the pieces of metal the longer the time taken to absorb the heat and reach the fushing point. Incidentally it may be mentioned that most metals, when hot, absorb oxygen rapidly, and attempting to melt without sufficient heat is likely to cause the undue reduction of the metal to oxide, which for all practical purposes is useless.

In constructing a furnace for blast, it is well to arrange that it shall stand in a shallow pit to enable one to have command of the crucible during lifting, a rough section of the whole arrangement being shown in Fig. 6. The frame of such a furnace would be preferably of 3/16 in. plate iron, held at the corners with angle iron, and lined with 4-in. fireclay tiles jointed at the corners with fireclay, the cross-section appearing as in Fig. 7. For smaller furnaces, lighter iron and tiles could be used, but their durability would be far less, and the difference in cost would hardly compensate for the shorter life of the apparatus. Cast iron plates could be used for the casing, if desired, and if the holes for the screws or bolts holding them together were made large enough to allow of play when the metal expanded or contracted with variations of temperature, there should be no serious risk of fracture.

In cases where there is an available chimney, the general shape of the furnace would be as shown in



FIGS. 8 AND 9.—SECTIONAL VIEWS OF THE SAME URNACE

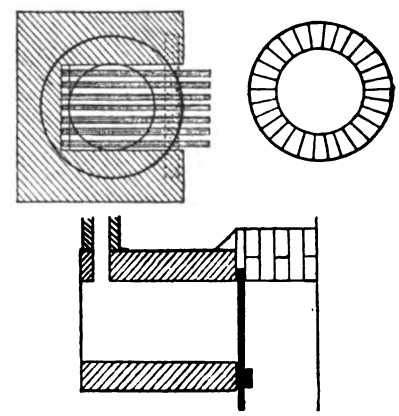
the section Fig. 8, the flue being lined with fireclay tiles, or it would rapidly burn out. For a 14 in. furnace the flue outlet should have an area of about 20 sq. in., in the position shown in Fig. 9, and this can be either rectangular or oval, as may be preferred, area rather than shape being the important point. Practically in all other respects this form of furnace is the same as that shown in Fig. 6, except that an induced and not a forced draught is used.

Outside these durable furnaces, various temporary or makeshift furnaces are possible, and one the writer came across some time ago was made from an old iron drum lined up with ganister. This was mounted on bricks, as shown in Fig. 10, and had a sheet-iron flue pipe lined with ganister, the whole making a furnace about 11 in. diameter inside, and taking a crucible holding about 15 lbs. of brass. Fig. 11, shows the way in which the furnace was placed on the bricks, and anyone with a little inventive ingenuity should be able to make a similar furnace.

In ramming up a furnace lining with ganister, the material has to be wetted down overnight, and then in the morning it is trodden and turned over, this being repeated until a stiff, tough putty-like mass is secured, this being rammed tight round a block acting as a former of the size required. The block is then withdrawn, and after the ganister has become dry the surface is washed over with a thick wash of ganister, dried and then fired until it is hard, after which it will last a long time with occasional patching.

As a general rule, square crucible furnaces are best for working, but, given sufficient space for fuel, round ones can be made to give satisfactory results. Usually these are lined with arch bricks set on end, as roughly shown in Fig. 12, fireclay being used with these. The baking can, of course, be of ordinary bricks set flat in mortar, and except for outside work, these may be the cheapest bricks obtainable, used bricks being quit good enough for the job at any time.

Possibly it may be as well to mention that in regard to metal melting, proper furnace coke, as free as possible from sulphur, should be used where it is obtainable, but at the same time hard gas-coke will melt anything up to bronze. Commercially, the furnace coke is cheapest, owing to its greatest durability, and it pays to have the best fuel as a general



FIGS. 10, 11 AND 12.—SHOWING FURNACE MOUNTING AND CONSTRUCTION

thing. All fuel must be broken to about the size of eggs, and nothing passing a 1 in. square meshed sieve should be used, or the furnace will choke with ashes and fine stuff, through which the air cannot pass with sufficient freedom. Unless

there is enough air to supply oxygen in large quantities, the carbon is reduced at too low a temperature and melting is hindered.

The fire-bars should be wide enough apart to allow of the free ingress of the air while supporting the weight of the fuel and crucible efficiently, and accumulations of ashes should not be allowed as they often check the free passage of the air.

Dry coke is always preferable to that which is damp or wet, and for this reason the coke should be kept under cover. Besides this, as coke will take up, as much as 10 per cent of water, it is necessary, from a financial point of view, that coke be purchased in a dry state. Coke costs several times more per ton than water, if we pay for water at the same rate as for coke, it is rather a losing game. At the same time, water does not seriously alter or injure coke so far as its content is concerned, as carbon may be taken to be insoluble in water, but it is a loss of energy to burn wet coke in any case.

Plumbago crucibles of some good make should be used, and these should be kept dry and in a warm place, if economy is desired. In all cases, crucibles should be kept for one class of metal, and not be used indiscriminately for anything that comes along. According to the metal, from twenty-five to fifty melts should be averaged from the crucibles, but necessarily this means that they be carefully handled and dealt with.

Standard Tire Repair Shop Methods

How to Repair Tubes and Casings, the Shop Equipment Necessary, and How To Figure Repair Costs

Part IV.

We have detailed and pictured the various operations in connection with the repairing of tires as found in the average run of tire repair shops. It now seems consistent to detail hints and suggestions regarding repair shop costs. The tire repairman may be just as expert and as thoroughly familiar with the various details in connection with the repair of tires as his inclination and experience may determine, but the fact remains that if he is not somewhat of a business man besides, he is not likely to make very much money at tire repairing or anything else for that matter; or there still remains the matter of accounting, cost keeping and the collection of the money after he has performed the work.

Very few tire repair shops keep an accurate record of the material, vulcanizing, overhead expenses, and several other details connected with the work. These matters are of very decided importance, and unless the tire repair man keeps an accurate record of them, he certainly cannot know how much money he is making or if he is making any at all.

But some reader will say, the charges for various types of repairing are fixed or established by my competitors, therefore, even should an accurate record of cost show that I am not making money or the required percentage on work of this kind, I could not very easily or readily raise my prices. And the extra time necessary in keeping records of cost will simply add to my expenses, therefore says this reader I cannot see the need or the advisability of keeping a record of material costs.

In order to meet competition successfully, it is absolutely necessary to know just what can be a minimum price to the customer and represent a fair margin of profit. Therefore, it is very important that an accurate record be kept on each and every job. By doing this it will be found that the costs are too high on some work. If due to the use of too much material, lack of skill upon the part of the workman, or too expensive repairs, these things can be carefully watched and remedied. While it is always advisable to put forth your very best efforts in repairs of all kinds, it is sometimes necessary in order to meet keen competition, to economize in the time necessary to make a repair, in the quality or amount of material used. Of course, in that event it is always well to fully advise your customers regarding the work you are giving them. In fact it is an excellent idea when you run up against competition, to endeavor to turn that customer into a quality customer rather than a price customer. In other words when you are forced to lower the quality of your work and the finished job do not let your customer get the idea that you are giving him highest quality work.

So much for the real need and necessity of repair shop costs. Incidentally, what has been said regarding the keeping of accurate records will apply not only to the tire repair shop, but to any other kind of repair shop, whether it be for the repair of automobiles, wagons, or aeroplanes. Tire repair shop costs prove helpful for inventory. They will show the efficiency of the workman, and will make it possible to know at the end of each day just what the work has cost, and the margin of profit. Considering the value of the material and the advantage of the record of materials, the saving will more than offset the time required by workmen in the way of record breaking.

When starting on a repair, the workmen should be furnished with a repair ticket or tag, upon which he should mark records of the following; 1st, Labor; 2nd, Weight of each kind of gum; 3rd, Weight of each kind of fabric; 4th, Amount of cement, and 5th, Time required vulcanizing.

2 oz. No. (?) gum @ $ (?) lb.	$(?)
4 oz. No. (?) gum @ $ (?) lb	$?)
4 oz. No. (?) Fabric @ $ (?) lb.	$(?)
3 oz. No. (?) Fabric @ $ (?) lb.	$(?)
1 pt. No. (?) Cement @ $ (?) pt.	$(?)
Total Cost Materials	$(?)
Labor and Expense 3½ hrs @ (?) hr.	$(?)
Total Cost	$(?)
Add profit (?%)	$(?)
Price to Customer	$(?)

FIG. 34.—SHOWING HOW TO FIGURE COST OF TIRE REPAIR WORK AND PRICE TO CUSTOMER

In the event that the work is done in a large shop employing several men on the same repair, the ticket should after each operation, be passed to the different workmen and thus it should follow the repair job through the several operations.

The weight of material can be secured as follows:—After the case has been cut down and trimmed ready to build up, weigh it and make a record on the repair tag. After the application of the cushion gum weigh the case again, and the difference between this weight, and the previous weight will show the amount of cushion gum used. After the application of each kind of other material used, repeat the operation of weighing. This of course is a very accurate way of determining just exactly the amount of material put into the job.

Another method, which is justified by general usage and by the weighing methods used in other trades, is to secure the weight of the material before trimming the material. In this way the material trimmed away and thrown into the scrap box is charged for and thus you receive some return for the expense of handling the trimming. This is not of the same value as when returned to the factory for credit. This practice, or methods of determining the amount of materials used is similar to that of the butcher who weighs up your meat before cutting out the bone and scrap which he throws into his scrap box. Whichever method is used or decided upon as the proper one for determining the amount of material used for each job, the main matter is to arrive at some correct basis of figuring the cost of material. Thus you determine the weight of the gum, and fabric used in the repair job, and you also determine the amount of the cement used in the work.

In order to illustrate the method of determining costs and also the price to charge for the work we will show an example. Suppose the job was a 35x3½ clincher case. The work done amounted to an outside section and four inside patches. The method of figuring is shown in example Fig. 34.

In figuring costs on such a job, the overhead expense can be figured separately or included with "labor and expense". When included with "labor and expense," it is customary to figure this item at double the rate per hour, paid for labor. Of course the percentage to add to the cost in order to arrive at the customers price is a matter that must be determined by each shop. The same is true if you do work for a dealer as the dealer will be given a special reduction in order that he may make something on the job. These figures, namely the customers price, and also the dealers price will depend a great deal upon competition in your vicinity and the prices generally charged by others for the particular work which you are doing.

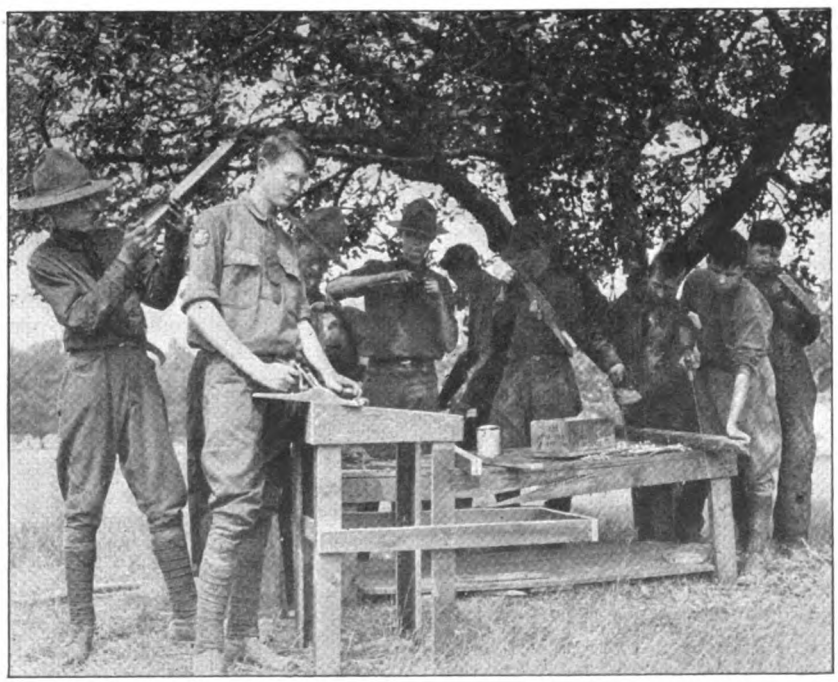
THE BOYS LIVE IN TENTS

Building Boys at Camp Roosevelt—Chicago's Boy Factory

How often we hear and read about the apparent instability, aimlessness and unreliability of the average boy of the day. How often does the thoughtless person find fault with a generation that is apparently paying more attention to the scientific raising of prize hogs and beef than in the raising of prize boys and girls. And then there is that ages old problem of what will this, that or the other trade do for want of boys coming up in the craft.

Here is described an excellent example of prize boy raising that will interest every craftsman who has ever had the welfare of a boy at heart.

Camp Roosevelt which is an auxiliary of the Chicago Board of Education, was established to take boys away from undesirable surroundings during the summer vacation months, and to keep them active, healthy and happy, under splendid conditions. To accomplish this aim, an elaborate program of military training, physical education and summer school is effective. The U. S. Government supplies officers for the necessary military instruction and an expert corps of instructors comprise the faculty of the school. The athletic directors come also direct from the gymnasiums of the Chicago schools to the big open athletic fields of the camp. Y. M. C. A. secretaries, American Red Cross representatives, and Winchester Junior Rifle Corps instructors are men of highest type, and the en-



THE BOYS ARE TAUGHT TO USE TOOLS CORRECTLY THROUGH PRACTICAL WORK AT THE CAMP

tire teaching personnel are of such superior morale that their influence necessarily reflects itself upon the boys under their charge.

A day chuck full of new experiences and clean, wholesome enjoyment is the rule. The boys learn to sleep in a tent, to wake with the bugle call, to "pile out" as the band marches past, to fall in for "setting up" exercises, to clean up for mess; to hike, tramp the woods, drill, stand guard, swim, box, learn to shoot a gun, go in for athletics of many kinds; spend half days in summer school, out in the open for surveying, botany and other studies; they absorb all of these things in a great school of the young soldier in a splendid period of recreation of six weeks' range every summer. To do all these things—what greater promise could any summer hold for the red blooded American boy!

In connection with the summer school, sixth, seventh and eighth grade subjects are taught, as well as a full high school course. Credits obtained in this school are on a par with those secured in the Chicago public summer schools; in fact, the camp summer school is recognized as a contingent of the Chicago schools.

Among the vocational subjects is a complete course in automobile construction. The responsibilty to educate the high school youth from the practical viewpoint is fully discharged in the formation of two classes. A concrete and tangible opportunity is afforded the boys in their work through the discard of an old automobile which is used at the camp, its various parts separated, studied and later remodeled into a reputable vehicle. The young mechinics spent the term on the car, studying in detail the technical phases of construction, the entire work made real and live through a live illustration.

An equally interesting course is mapped out in an elementary study of electricity essential in the auto construction class. Instructions on the dry cell, storage battery, wiring of ignition, together with the larger phases of auto ignition, battery and magneto systems, spark plug testing and storage batteries, their construction, charging and repairs, magneto ignition, general instruction for high tension magneto, its care and maintenance—all these phases are given. The proverbial automobile sickness and troubles are given the proper diagnosis and remedies provided for all cases curable. A careful survey will show that no detail essential in the construction of an automobile is omitted. Boys are here enabled to do general overhauling and repairing on other machines during class lessons.

Thus, when they start out in the business world, they have a pretty thorough groundwork on which to begin, in a business way. But that is not all. In passing through the various phases of life at Camp Roosevelt, boys are so trained and handled that they become self-reliant, they are trained in leadership, they are developed in so many ways that they return home at the end of the camping season one hundred percent improved not only physically, but mentally and morally.

The man at the head of this splendid undertaking, Major F. L. Beals, U. S. A., is known throughout the country as a "Boy Builder". His ideal was the establishment of a camp that would so mold the growing boy in the principles of better citizenship and of right living and thinking, that a finer future citizenship would result,—a valuable adjunct to the world at large. That his plan is successful is proven in the constantly increasing interest which educators and business men are taking in this great "Boy-Building" scheme.

THE STUDY OF AUTOMOBILE MECHANICS IS TAUGHT THROUGH PRACTICAL DEMONSTRATIONS

A PRIZE WINNER, AN EXCELLENT EXAMPLE OF FARM ANIMAL

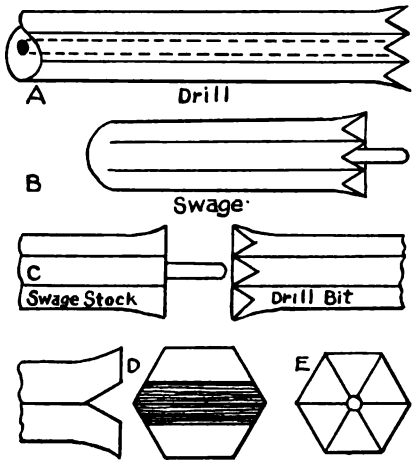
A Better Polishing Wheel

J. N. Gaza

Here is a new way of making polishing and buffing wheels which I learned about a year ago. As every practical craftsman and repair-shop man knows, the usual way of making polishing or buffing wheels is to apply glue to the cloth wheel and then to run or roll the glued wheel in powdered emery or alundum. This gluing method is a lot of trouble, and takes considerable time in order to allow the glue to dry. I therefore considered other means of holding the emery or alundum on the wheel, and in considering various materials, fin-

ally hit upon what is called liquid gloss, instead of glue.

In order to do the job correctly, take your buffing wheel and suspend it in some handy manner. With a proper sized paint brush,



MR. SWARTZ TELLS THE HOW OF ROCK DRILLS

put on a coat of liquid gloss. Apply this just the same as paint and let it stand for a short time, until the liquid gloss soaks into the the cloth. When this has soaked into the cloth, apply another coat of liquid gloss and then roll the wheel in the powdered emery, alundum, or other material that you are in the habit of using for your buffing and polishing wheels. Roll the wheel in the powder with a good pressure and as you proceed with the rolling, slap the powder with the flat of your hand to make it smooth and even. Now let the wheel set long enough so that you can apply another coat of liquid gloss without pulling the first coat off with the brush. After having applied the second coat, roll the wheel in the powder again the same as before, getting as much of the powder onto the wheel as possible, and applying it just as evenly as you can. Then set the wheel aside until it is dry.

This binder drys much faster than glue does and if you do the work properly you will save about half of your time in repairing wheels. Another good feature of the wheels made in this manner, is that they will last from three to four times longer than the ordinary glued wheels.

If you have many wheels to make at one time, it is an excellent idea to have a long shallow and narrow box to hold your emery powder or alundum. Of course if you are only coating one or two wheels, all you need do is to place a large heavy sheet of paper on the smooth top of your bench, pour your emery or alundum on this and then roll your wheel in the powder.

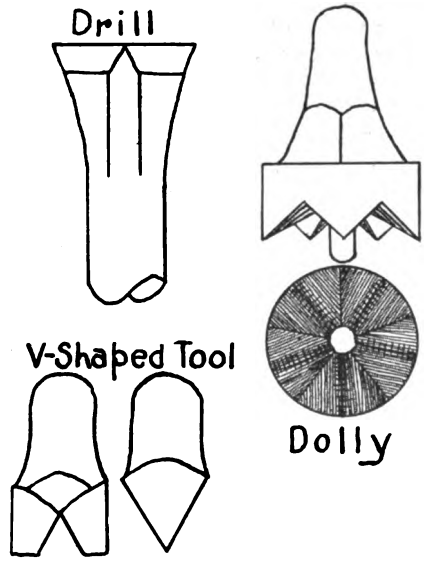
Dressing Hollow Shank Rock Drills

In the February issue Mr. J. J. McDonald of Massachusetts asked for information on the sharpening of hollow rock drills. His question on the work has prompted a number of replies which could not all be published, so we are publishing a few of the very helpful responses and incorporating as many of the ideas submitted in this composite article on the subject. We are sure that Mr. McDonald as well as other readers who are in need of information on rock drill work will welcome the very very helpful suggestions and appreciate the fine spirit that prompted so many readers to respond.

Mr. L. R. Swartz—Pennsylvania

Every reader will recall Mr. Swartz as a frequent and welcome contributor to our columns on a number of topics. In replying to Mr. McDonald's query Mr. Swartz says:—

"The best way to dress those hollow shank drills is by means of a swage as shown in the accompanying engravings. Upon observation one will find that the swage is the counterpart of the drill bit. While these swages may be had from the manufacturers of the drills and machines, it sometime causes much delay to order

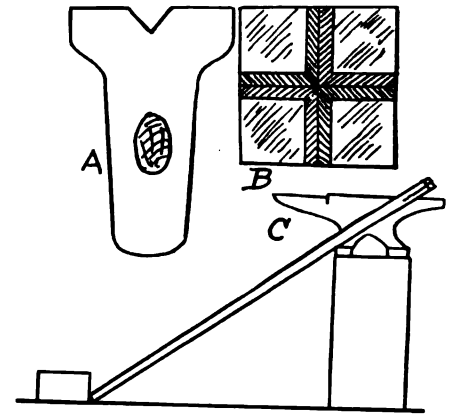


MR. JULIEN SUBMITTED WOODEN MODELS OF THESE TOOLS

and wait until a swage arrives, therefore as they are comparatively easy to make, it is advisable to forge them.

There should of course be a swage for each different diameter of drill bar. The reason for this is that the bore for the exhaust passage varies with the size of the steel bar, and the swage should keep the bars, drifted out to the proper size when dressing the bit.

"The swage may be made of a piece of the drill steel of the proper size. Upset the piece of steel on the end to a little larger size than the bit you want to use it on being careful to keep the hole open



MR. NELSON TELLS HOW HE DOES THE WORK

and in the center. Take a working heat on the swage stock, insert a small piece of rod in the hole and rough out the channels across the face of swage by driving a sharpened drill bit into the face of the swage as at C in the engraving. The small rod will keep the two pieces centered and in line. After the channels have been sunk in the swage they may be smoothed up with a file.

"Remember that it is the bottoms of the channels in the swage that form the cutting edges of the bit, they should therefore be made to a sharp angle at the bottom as at D and they should also run perpendicular to the bore of the steel so that the cutting edges will be square and even on the face when the bit leaves the swage in dressing.

"In dressing the bits, it is well to drive a punch or drift into the bore of the drill bar, and draw in the steel a little at the sides, so that it will not be much too large for the gauge after it has been swaged.

"The swage is operated by being placed squarely against the heated steel of the drill and driven home with a sledge or heavy hammer. If your swage is shaped properly very little touching up will be required and a bit may be dressed almost as quickly as a cold chisel or an old style jumper drill.

"The face of the swage may also be made by gashing the face with a track chisel at E and finishing with a file. The above plan is for six-pointed star bits. At D is shown a single channel bit. For six-pointed star three such channels should be sunk connecting all six-corners. Octagon steel may be swaged to a four-pointed star by forming two channels in the form of a cross."

Mr. O. C. Julian,—Wisconsin

Mr. Julien in replying to Mr. McDonald's question accompanies his letter with three very cleverly executed models in wood. These are pictured in the accompanying engraving. Mr. Julien's method is as follows:

"To sharpen rock drills first make a set of tools as shown in the engraving. With these on hand, take as short a heat as possible on your drill rod. Then take

the fuller and draw out the corners on the cutting edges. Then take the V-shaped tool and place it on the cutting edge of the drill and let your helper strike three or four blows with a seven-pound hammer. Repeat this on all cutting edges until sharp, then take the square set to taper down the gauge of drill to size. Now take the dollie to straighten out the drill and taper down to size again. Be sure to get the corners of the drill good and heavy or they will not stand up to the wear.

"To temper rock drills heat slowly in a good clean fire. When the drill shows a little red try it on the magnet, if the magnet is drawn to the drill, put it back in the fire and keep turning the drill to get an even heat. Then try magnet until you see that the drill has no effect on it. When the drill is to the right heat the magnet will not draw to it. Then plunge the drill in a tank of clean water and you will have a drill that will not break or wear down very easily."

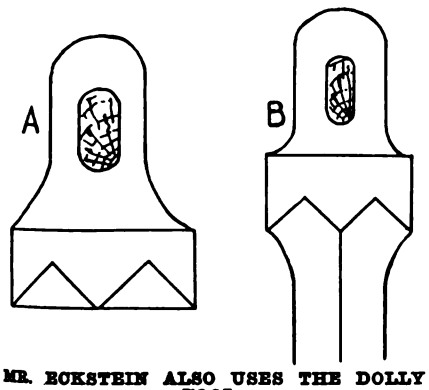
Mr. E. B. Nelson, British Columbia

Mr. Nelson also goes into detail for Mr. McDonald—"In sharpening rock drills, I used the following method:—Make a swadge as shown at A and B. Now heat the face of the drill, place the other end of it against a solid block put swadge on end of drill and let helper strike. This shoves the drill up in the center and widens the face. Now dress the corners with a small hammer while you hold drill level on anvil. The position for drills from 3½ to 6 and 7 feet long is shown at C in the engraving. Drills that are longer than 7 feet can be kept level with anvil at all times, while sharpening. Always keep the hole in the drill open while hot with punch."

Mr. E. J. Curtis—New York

Mr. Curtis also comes forward with some helpful advise on the subject.

"Perhaps I can help Mr. J. J. McDonald dress rock drills. Upset the used drill so it is about half the size of the hole he wants it to drill, then heat to a cherry red and drive a punch in the hole in the centre. Now take a good sharp hot cutter and cut on four sides. As you cannot do all the necessary cutting at one heat, remove the punch and repeat as often as



MR. ECKSTEIN ALSO USES THE DOLLY TOOL

necessary. Cut to within about ⅜ inch of the center hole. When this is done it is an easy matter to draw the cutting points out in an ordinary blacksmith vise by gripping a lip in the vise and giving a good squeeze. Then the next lip and so on with all four. Heat and repeat until you have it drawn out enough to drill the sized hole you want. I have made drills from 1¼-inch stock drill a 3½-inch hole.

Mr. John Eckstein—Wisconsin

Mr. Eckstein's suggestions to Mr. McDonald are similar with regards to the use of a dolly for shapening the drills. Mr. Eckstein's letter follows:—

"I used to sharpen a great many of these drills and very seldom had to use a file. All one needs for the work is what is know as a "dolly." This tool is shown at A in the accompaning engraving.

"To work the drill, heat the end to the proper heat, put in the vise and upset with the dolly as shown in the engraving at B.

"This dolly is made of round steel of a size depending on the size of the drill steels to be worked. The center of the face of the dolly is fitted with a short rod to fit the center hole of the drill steel. This center plug is of course inserted in the dolly last. The grooves of the dolly are cut with the hack saw to conform to the drill rod end and to a depth of ⅝ inch. The center plug is then put in. This acts as a guide in cutting the drill end and also keeps the drill rod hole open."

The character and number of these letters certainly demonstrate the very helpful spirit of co-operation that dominates the ranks of Our Readers. It is certainly most pleasing and gratifying to the editor of "Our Journal" and it surely augurs well for the future of the good craft.

Queries-Answers-Notes

THIS department is the place for discussing shop and business matters. Here you may ask for information on any topics or matters that interest you; bring to the attention of the progressive craftsmen of the day the subjects that should have their attention. You are requested to make use of this department as often as desired.

He Specializes in Blacksmithing:—In looking over my subscription account I find that my last subscription of ten years ran out with the October number. I will therefore send you another subscription order and remittance. I have read "Our Journal" for a good many years and surely want it for a few more if I remain in business.

I find "Our Journal" of great help in my line of work. Now of course, it is changing a lot, in taking up auto and tractor work, which no doubt comes in very handy for those who have taken up that kind of work beside blacksmithing.

I have not taken up auto and tractor work, as there are two auto shops here so I have let George do it. I have the only blacksmithing shop in town, and as long as they let me have the blacksmithing, and not try to do any of that work, I feel it right to let the others have the auto and tractor work.

Ole M. Johnson, Minnesota.

To Reset Auto Rims:—In looking over the October number, I see P. E. Hand of New York has asked the question on how to tighten loose auto rims. The answer is a very good way of doing it, but not very accurate. I set auto rims the same as I do buggy tires, only instead of shrinking the rim, I saw a piece out, and weld it with the welding torch.

I have been setting auto rims like this for the last two years on all the different makes of cars we get in Alberta; and that is some assortment.

Since I got my gas welding outfit, I find that the car brings me more work than it took away in horseshoeing, and the work is much easier.

L. D. Archibald, Canada.

On Plow Hardening:—I regret to inform you that "Our Journal" was unknown to me until a few months ago, but I take pleasure in telling you that I like "Our Journal" and would not want to be without it. It has already given me much valuable information and help which are worth more to me than the subscription price of years'.

I would like to have some brother craftsman tell me how to harden plow shares and how to get an even heat on them. Some advise to use tallow or linseed oil. How are graded blades sharpened, and kept straight, or made straight after the bend. Now I would like to hear from you very soon, and will greatly oblige.

Peter Bartischi, Arkansas.

To Remove Rust:—I would like to know of an acid solution or something to dissolve rust on cold steel without heating the steel. Can some brother reader give me this information.

W. W. Ballinger, Kansas.

The Advertisements Guide Him:—My shop is equipped with a Hay-Budden 160-lb. anvil, a Champion Blower and Forge, a Champion Press Drill, a set of Lightening screw plates, and numerous other tools of like merit, so you see I read the advertisements. J. E. Fary, Iowa.

Wages for Apprentice:—I have taken our paper for a number of years. I have been in the business 28 years, and have a man wanting to learn the trade. It has been a good while since I took in an apprentice, and am writing to know if anyone can tell me what would be considered a fair wage for an apprentice. I know of no one learning, since the war.

Oscar Davis, Ohio.

To Temper Auto Springs:—In reply to the reader who wants to know how to temper auto springs, after the springs are welded anneal them and after they have cooled off heat to a low read and plunge into a tank of boiling water. Be sure to have the water boiling and you will get good results. O. C. Julien, Wisconsin.

A Well-Equipped York State Shop:—My shop is located in one of the most successful and prosperous farming communities in New York State. My shop is 26 by 60 feet on a lot of 70 by 115 feet. My equipment consists of a 16-inch lathe, a 13-inch lathe, two drill presses, a tire bender, a band saw, a rip saw, a jointer, a wood working lathe, and a boring machine. All of these machines are run by power. I also have an electric blower, an oxy-acetylene welding and cutting outfit, and a punch and shear. When it comes to getting out work promptly I do not keep them waiting. I have been in the business for sixteen years. E. J. Curtis, New York.

Aprreciation from a Veteran:—I am very much pleased to get your valuable paper every month, and don't see how any one that follows the trade, could get along very well without it. Though I am no beginner, having worked at general blacksmithing for about 25 years, yet I gain much information from "Our Journal." A. G. Harris, Indina.

Our Journal in Class Work—I have discontinued general blacksmith work, and am now teaching in the high school. I find "Our Journal" a great help in my work here in the school and think it is better each year. I cannot suggest any improvement. J. W. Ivies, Utah.

Some Good Advice—I have been a constant reader of "Our Journal" for a number of years, and would not be without it for twice the price. I wish to offer this advise to all members of the Craft: Subscribe for and read this paper continually if you would keep abreast with the present age and have a successful business. S. J. Rembert, South Carolina.

Straightening Auto Axles—I began my apprenticeship at thirteen in 1873 and and have followed the trade and been with it practically ever since. I have straightened a great many auto axles and always heat and hammer them but use the tool at the heated point as little as possible so as to keep from marring or denting the axle. I have had no trouble, knowing that the same blow that bent the axle before heating would bend it afterwards. If an auto axle is made or forged cold, then straighten it cold. If forged hot, then why can't you heat it? I heat to a good red and If I finish at this heat and the heat is reduced to black heat (and I wish to) I cool it. I believe hammering on an axle will cause what is called "hammer hardening" and is liable to break where the hammer strikes.

E. N. G., Georgia.

Leveling the Horses Foot:—Fifty years ago I was in Elmira, N. Y. There I worked for a smith who had four men. He was a veterinary and understood both shoeing and diseases and anatomy. Well, he sat in his arm chair while overseeing the work, and said to me. "You do not know how to level up a shoe, young man." So, I said "Come and show me". He picked up a shoe, I had fitted and put a big square on the side that came to the foot. This square touched the heel and toe only and you could see light under it all along at the nail holes. He then turned the shoe over and put the square on the ground surface and the square touched all the way. "You drive that shoe on some horses" said he, "and when they are on the pavement it will hurt make them produce corns.

When you are leveling a shoe you look across the shoe. If I should give you a board and a smoothing plane and tell you to straighten the edge of the board you would put it in the vise and then you would step back and look through the centre or look from end to end? So when you take a shoe look from heel to toe and level them up as I do and have done ever since, and I have had good success with horses that are a little tender.

That is all this time, I don't want to give the craft too much of my medicine or some of them will say: "Get the camphor, That Old Pensy Blacksmith has fainted."

Old Pensy Smith.

He Buys From Advertisers:—What we have bought lately from your advertisers has been very satisfactory, and we are still buying some good tools. After a ten-months vacation, we decided to re-enter the blacksmith and repair business in the month of December. Our vacation was caused by disability originating several years ago from a kerosene explosion. As we had sold all tools and materials we were on the lookout for a complete set of iron and wood tools, so of course we began to look up our issues of American Blacksmith, to see if there were any new and improved tools.

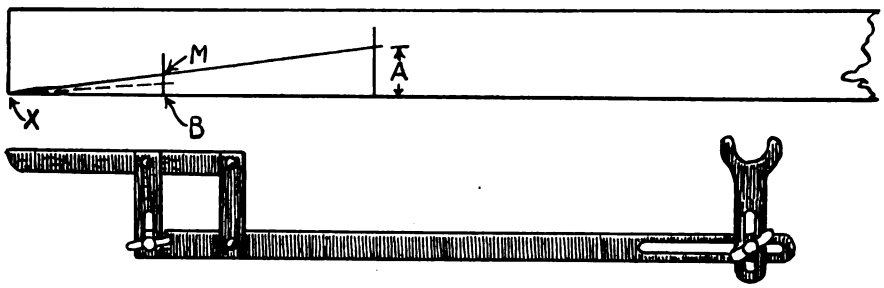
We selected a power drill, (Canedy-Otto 14.); a set taps and dies, (Greenfield); a vise; an anvil; an electric blower (Buffalo); an electric motor; 16-inch jointer head 16; shafting; pulleys; belts; hand, rip and circular saws; bolt clippers; rim wrench (O. K.); callipers; tongs; a hot shear (Simosen); a tire bender, also a shrinker. We are well pleased with all of these tools and they were bought through the advertisements of the manufacturers and from the wholesale houses of this territory. We believe that they will prove very satisfactory and were all bought at a reasonable price.

I. W. Pirtle, Michigan.

Light Motor Oil for Flushing:—I notice in the February number, an article in regard to flushing motors with kerosene oil, and all objections stated in that article are well grounded. It is a matter of common knowledge that kerosene oil has no friction reducing elements, furthermore, kerosene oil will leave enough carbon in an engine that will will do more harm than good. For instance, in flushing a Ford engine, it will be necessary to remove lower plate after flushing in order to get all of the kerosene out of the case. My advise would be in flushing out any engine to use a very light motor oil. One gallon of light motor oil would cost very little more than a gallon of kerosene and after flushing, this oil could be used for other purposes in shop or garage. In engines using a pumping system, the light oil used in flushing engine would leave the pump primed ready for the heavier oil used in running the car. And I think using the oil as recommended would leave the motor in good shape for immediate operation; at least this has been my experience.

W. L. Bayd, North Dakota.

Setting Axles for a Plumb Spoke:—To make an axle gauge for the proper setting of axles to a plumb spoke, square up a piece of board three inches wide by six feet long, and measure one-half the height of your wheel from one end. Mark this on the straight edge. Now measure the dish of the wheel at A as shown in the engraving, and also mark off the length of the spindle at B. Now rule a straight line from A to the corner of the straight edge at X and where this line B, we will call M. Measure down from this point one-half the distance on line M, and mark a dotted line to the corner of the straight edge. Now set your gauge to this line, as shown on the engraving, and you will have the pitch of a plumb spoke wheel. This is for the setting of a concord coach axle set to the bottom of the axle. T. C. Bevan, New York.



SETTING AXLES TO A PLUMB SPOKE IS EASY WITH THIS GAUGE

From An Old Reader:—I have felt sometimes as so many others like giving up the blacksmith business. There are half the shops we used to have here in Louisville, Ky., but there are more than 500 garages, which is far too many.

Blacksmith material has been entirely too high in price but has now come down, so I think I will stay in the business for a while at least. I have worked at blacksmithing and horseshoeing since 1875, and I stand the work as well now and even better than in my younger days. I do some blacksmithing for different garages, and with the few horses and wagons there is left, I can still enjoy prosperity.

I live in the suburbs where I have just completed a lovely home to which I think every blacksmith that has worked the length of time I have is entitled. I am enjoying life very much at the age of 59 years.

I have been a reader of "Our Journal" since 1901 and could write and suggest many different ideas and tell lots of funny stories about blacksmithing and woodworking and the prices, but you know there is a difference the world over in prices. My price is $3.00 for 4 new shoes, although there is much cheap work done in some of the shops here just as elsewhere.

"Our Journal" should be in every-up-to-date blacksmith shop.

An Old Subscriber, Kentucky.

A Case of Seedy Toe—What can be done for a horse's foot the walls of which have become loosened from the sole, leaving a cavity between the wall and the sole which is filled with a wattery, jelly—like substance. Oshawa.

In Reply—From your description of the

conditions, we judge that this disease is the one popularly known as "seedy-toe." The hollow wall condition is usually found in the toe of the foot to as far as the coronary band. In some cases the cavity of the toe may be just a small one, perhaps large enough to admit the end of a number ten nail. In other cases the cavity may be large enough to easily admit one or two fingers of the hand.

The treatment usually recommended for this condition is to cut away all of the loose or separated horn, paring it carefully and thoroughly until nothing but the firmly attached horn remains on the foot. The bared surface is then carefully cleaned and all dead and diseased tissue is carefully removed.

When the hoof is thus cleaned up, apply a liberal dressing of beef tallow, thoroughly and carefully bandaging the bare foot and protecting it as far as possible with a piece of tin or sheet brass, carefully cut to fit over the bandaged foot. This dressing and treatment should be repeated at frequent intervals, cutting away any diseased tissues that may appear from time to time and allowing nothing but good, healthy horn to grow over the bare portion of the foot. S. S., New York.

A Ford Verse—Finding the Correct Foot Angle—Straightening Auto Axles.—

She's a darned good car.
Will be three in the spring.
Got a Jazz movement and everything.
She's got the speed when you turn her loose,
She'll run on credit or tobacco juice.
The reason she's selling is just because,
She never was built to obey the laws.

And now a plan by which a shoer can determine the angle of a foot without using an instrument or foot leveler. A foot angle has never ben described in the many articles on shoeing that have appeared in "Our Journal", so I thought I would give the younger shoer a hint how to commence. A square or right angle has 90 degrees or a fourth part of a circle. The arc from the horizontal line to the perpendicular is 90 degrees. The half is 45. Between the degrees 45 and 90, the perpendicular, are the degrees that are used to angle the foot. Now we will imagine a perpendicular line striking the toe. The bottom of the foot represents the horizontal line. Now let us suppose a foot to be trimmed to 45 degrees or nearly that. The engraving shows a foot at about 47. To make it clearer let us take a fourth of a circle. This idea is based on imaginary lines, and if our young boys can imagine a form as I speak of this, they can talk shoeing angles right along with any shoeing expert and get by with it.

Leo A. Keller of Colorado, in February number asks the right way to straighten auto axles. I wish to state that the only way to do it correctly is to heat them red hot. Don't listen to an auto mechanic. Their knowledge of iron or steel is limited. I have straightened quite a number (not yet a carload), and I heat them to a red. Some I placed in the vice, and with a wrench twisted into line. Others I have placed on the anvil using flatter and sledge and then laid them down to cool. They turn out the same as when they were first made because when they were forged they certainly had to be heated.

Jim Baldwin, Indiana.

Appreciation and Some Questions:—It seems to me that I very seldom have anything to write, that would be of interest to the other fellow. I some times have a new idea to bite me, and think I ought to pass it along, but most generally, it has bit the other man first. I think a great deal of the question and answer department, of the magazine, and I am glad to note that you are going to devote more space to it.

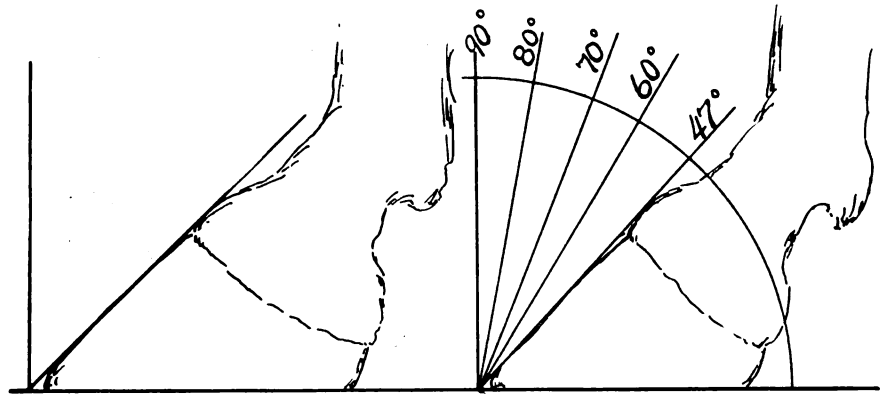
A fool can ask questions, I know this, for I am good at it myself, and I also know that I have learned a whole lot of valuable things by asking questions. I have one in mind right now that I will ask and right here let me say that when I get started asking, I never know when to stop, so don't be surprised if I make it several instead of one. I very often read about tempering different things something like this, "First harden it by plunging it in the hardening bath, then draw the temper to such and such color by doing so and so."

The thing I want to know is this, how to keep the thing, what ever it may be from cracking and thereby running it before you get the chance to draw the temper. No longer than last week I tried to re-temper an ax that had been in a fire, by some such directions and had the trouble that I have just referred to. It so happened that the cracks only extended up about a half inch from the edge so I proceded to trim them off and work the blade down to an edge again, and tempered it by the method I know best which I know as "draw temper". That is simply cool an inch or so of the edge, and watch the color as it runs down, when the color gets right cool it dead cold.

Here goes for some more information that I lack. Which is the most practical welding outfit, gas or electricity? I haven't had any experience with either, so of course know but very little of either. I have been told by some know-it-alls that the electric outfits were dangerous, hard to handle, etc. Then by some of the same class, that it was no more trouble than an open fire. Tell me something of them by comparison? Which is the most economical usually? What kind of current is used, A. C. or D. C.? What voltage is used? What is the relative cost of the two outfits? Any other information that you may see proper to give will be appreciated.

I am going to let you down easy this time, for I am not going to ask any more at this time. If you run short on questions at any time in the future, kindly advise me, and I will try to glut the market again, for what I don't know, would keep the American Blacksmith, Auto & Tractor Shop busy for quite a while telling me. E. M. Bailey, Virginia.

On Maintaining Prices:—It was certainly most pleasing to me to read that good letter of Brother H. J. Winkler of Minn. I wish every blacksmith would copy after him. When a man like Mr. Winkler is looking after his prices, he is also looking out for the welfare of his family. How often you hear a blacksmith say "If only I had realized my opportunity when it came. If only I had taken advantage of the prices, like the garageman or the plumber, or the electrician. I would be a rich man today." The world is full of such blacksmiths. They plod along year after year slaving away hopeing some-how that things will take a turn for the better. But their chances for success are gone—it lies in the sea of neglected opportunities. The blacksmith should make comparison with other workmen that are trying to keep themselves above high water. You don't hear of any blacksmith trying to better his condition except through hard work and low prices. I am no pessimist but I think it is time for all to wake up. The public can't get along without us.



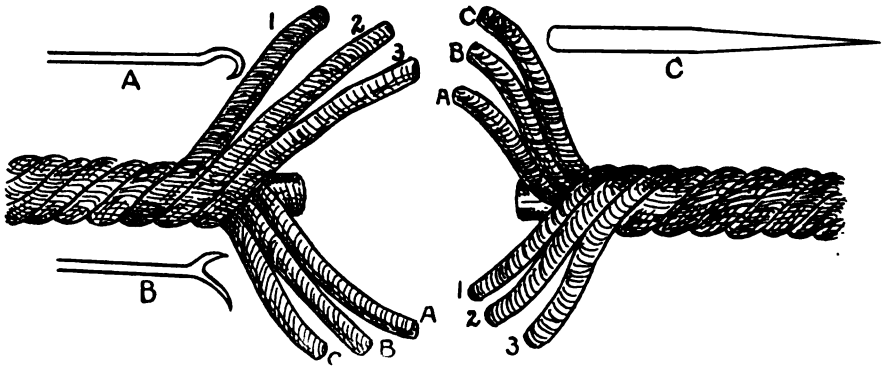
MR. BALDWIN EXPLAINS HOW TO GET THE ANGLE OF THE FOOT

Picture for example a shop-full of horses and two or three garagemen hanging around hurrying me to make them tools or do some forging, and then hear such mechanics getting a $1.00 an hour and the public growling at our prices, and calling us "blacksmith robbers." It takes a good mechanic to do all kinds of blacksmithing, and a good blacksmith knows his place. The public must employ him, and the blacksmith prides himself to know that no boy 10 or 12 years old can come along and do his work. The only thing about the trade which the blacksmith did not learn properly was the matter of prices. Talk to any blacksmith who has failed, and nine times out of ten you will find that he had no business ability.

The blacksmith should say something for their rights at the right time. All blacksmiths should write to their trade paper often. If we do not keep our Editor posted on conditions in our vicinity how can he know about them. The prices we are now getting are what we should have gotten twenty years ago. Farmer's prices are low now and many blacksmiths think they will have to lower their prices too; but, listen Brother, the farmer's prices can be raised on six hours notice, while it will take another war to raise

your prices. The farmers made money in several ways during the war, while we blacksmiths lost. Don't drop your prices too soon. Some of the blacksmiths in this part of the state are putting their prices back to starvation rates.

Friends; how would you like to go back to the times when you went to your shop and shod horses for $1,20, set tires for 50c sharpened plows shares for 15c, put in spokes for 12½c and worked 12 and 14 hours a day? When we studied "Our Journal", we got an idea from our organized brother blacksmith from 1920, until



MR. JENKINS PRESENTS MORE INFORMATION ON WIRE ROPE SPLICES

the present time. We have made many improvements in the blacksmith business today, and you will agree with me that it cost something to gain a footing and quite a bit to maintain it. As a result we are often told by the farmer we are making too much money. Suppose the average blacksmith does make $25.00 a week, and has a five-dollar hardware bill and five dollars overhead expenses, he would have $15 left for sixty hours work, which would net him 25c an hour. Now brother do you know of any tradesman in your town who works for 25c an hour? Are we getting more than is justly due us? On the 25 cents an hour basis how can we afford to send our children to church and school looking as we would like them to look, and as they should look.

A blacksmith today wins no victories alone. He overcomes injustices by himself. He contributes nothing to the tide of progress while he walks by himself. The battle of justice for progress, for democracy, for freedom, for a better life for all is the battle of all. It must be fought by all, and all must be united. Every blacksmith can put some thought or effort into the national pool of thought, and effort that is going to pull through.

I would not want to run a shop without "Our Journal". I get a good deal of information out of the letter writing. It keeps me posted on prices, and I want to know what the craft is doing. It has lifted me out of the old rut many a time, and we have an Editor who isn't afraid to help us. We should write him more often. Charles Chism, Ohio.

Splicing Wire Rope:—I am past the three-score, and have done blacksmithing all my time but I am still young and as able as ever. I am considered an expert wirerope splicer and could show a man better by making a splice than by writing about it on paper.

Recently information was asked about splicing wirerops. I will try to explain my method of splicing in hope that I will interest some of the readers: The tools I use are two crooked needles of ⅝ inch round steel shown at A and B and one straight needle shown at C. and made of 1 inch round steel. I also use a hammer and chisel. First untwist the strands for about ten feet. Then cut the core as close as you can to the rope and then lay the strands alternately and pull them up together sufficiently tight, so that the twist will be correct. Now unwind No. 1 and bring A into its place for nine feet. Then cut A one foot from the junction. Do the same on other end. Then unwind No. 2 bringing B into its place for 7 feet. Do the same with No. 3 bringing C in its place for five feet. At each junction cut the strands one foot from the crossing and then take the core out by forcing the No. 3 needle in at the junction. Take enough core out so that you can lay the strand in place by pushing No. 1 needle under two strands and No. 2 in the same way. Then place the strand that you want to put in place of the core between the two needles and it will go in easy if done correctly. This splice will be so strong as any part of the rope.

Morgan Jenkins, Iowa.

A Friendly Note From Canada:—With exchange and the Fordney bill, it almost seems as if you folks in the U. S. were getting tired of doing trade with the Canadians although the balance of trade is much in your favor. However I am not going to find fault with you, as it is no doubt just what is good for us to make us more independent and give us larger vision. I remember a good many years ago when the McKinley bill was passed some thought it was all over with us and surely for a time it did hit us hard, but today we look upon it as one of greatest blessings.

At that time we were growing barley and shipping it to the U. S., and thereby impoverishing our land. In fact, we might say we were hewers of wood and drawers of wood for the U. S. Now we feed our coarse grains and make our lands much more fertile and ourselves more prosperous and I hope the present prod will still enlarge our vision and make us still more selfreliant. I think it is a good thing for a man or a nation to get a bump occasionally but I think the whole world has certainly suffered and is still suffering very much, especially in Russia. I hope that Canada and the U. S., will do their best to aleviate it. However, I think the war will have the effect of making the English speaking people more friendly and thoughtful then even before, and may we conduct ourselves in such a manner that we will be an influence for good to the world. James Ley, Ontario.

On Credit and Prices:—Just a few lines in regard to cylinder grinders. I am making an attachment for my lathe, and would like to know what speed the grinder wheel should travel to cut right, would 5000 or 6000 rev. per minute be fast enough?

Am going to have my grinding bar attached to the lathe spindle, the excentric to adjust for different sizes of bore of cylinder, that is auto cylinders, as my lathe is not large enough for some tractors.

Would it be advisable to have a face plate to put (block) cylinder on long enough to cover a 6-cylinder block altogether or just part of it? Also what grit of wheel is the best to use for grinding?

I have been doing reboring, so I am going to start grinding as I think it does a better job. What do you think about it,

Now a few words about business. It is not like it was a few years back, but taking everything into consideration, business is good. I do all kinds of blacksmith, auto and tractor work, so I do not find any idle time.

I used to do business on credit but I lost a good deal last year. Since last September, I started to do it on cash. Now I find that I have satisfied customers and the bill is paid at the time the work is done, not 6 months or a year afterwards. I always aim to satisfy even the crankiest persons about work, and am doing work for folks 35 to 75 miles from here.

My prices are good and I am going to keep them so regardless of my competitors. I have seven competitors including the garages. My charges are by the hour or job. $1.00 to 1.50 per hour even if the rest are only charging 65 to 75c per hour.

Plow work $1.25 a lay; pulverizer shovels $2.50 a set of six or four; Forge work $1.25 an hour; discs 25 cents per blade when the customer takes them apart, and an extra charge where I must take them apart. Welding—cylinder block cast enblock $20.00 to $30.00 and up depending on size. Auto frames $15.00 and up; as a rule $20.00, and an extra charge for taking load off at $1.00 an hour. I give a written guarantee with a welded auto truck or tractor frame made of steel, if the break is a point where I can get at it so as to do the job right.

I always insist upon doing a good job and getting the price. It is not so much for the price of the thing, as it is to send a man away feeling satisfied that when he gets home, he can use the job and work it with satifaction. He is sure to bring in a new customer to me, and when a good customer comes in I always see to it that he is sent away a good customer. A dead beat is no good, and as I do cash business, I treat him as he should be treated.

A good many smiths are again cutting prices. We have just gotten them up where we can make a dollar like other human beings, and I think it is absolutely wrong to go down now we need it. I have held my prices up for years and even when another smith would do the same work for 25 to 75 less. have never reduced. I am for good work, and a good price, and a poor job.

H. E. Pass, Minnesota.

VOLUME 21 NUMBER 5

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

MAY 1922

BUFFALO, N. Y., U. S. A.

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Correspondence solicited on all subjects connected with auto, truck and tractor work, blacksmithing and general repairing. Always give name and address when writing.

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Contents May 1922

OPPORTUNITIES WITHOUT END

Never before have opportunities been greater in the shop craft than they are today. Ten or fifteen years ago the smith considered three or four lines his logical limit of business activities. He shod horses, he repaired and built wagons and repaired farm implements, generally speaking, that covered his line of activities.

The up-to-date shop owner of today who has kept abreast of the times and modern progress, does all of the above jobs as he may be called upon for such work and in addition, he sells "gas", oil and automotive accessories and supplies. He cares for auto, truck and tractor. He repairs tires, and tubes. He repairs and charges batteries. His activities run into the care and repair of vehicles of all kinds both horse and motor and the sale of all needed accessories, parts and supplies.

And all of these activities are logically within the scope of the practical rural repair shop owner. All of this work is work that rightly belongs to him. To him have come the farmers for years. First with their horses and horse drawn equipment—now with their autos, trucks and tractors and their motor driven equipment.

Opportunity is not merely knocking at the door of the repair shop owner, it is hammering and pounding with a persistency that will not diminsh until autos, trucks and tractors reach the so-called saturation point or limit of sale—which is still quite some distance ahead.

WHAT A DOLLAR WILL DO

A letter just received reminds us again of a matter that we have been most proud to call to your attention. And that is the excellent manner in which "Our Folks" generally have given us their support.

Here is the letter:—

"We wish to tell you that we value Our Journal very highly and derive great benefit from it. Even if we have been in the business for 44 years and had wide experience we find the ideas very valuable."

And that letter was received with a check for five dollars. Do you wonder that we are proud of our family of readers? Do you wonder that we are proud of the support "Our Folks" are giving us in our efforts toward craft, shop and trade betterment?

As another reader says: "I don't know how you can dish up all you do for a year for one single slip of Uncle Samuels printed matter,—But no matter, here's mine, I'm with you till Niagara Falls."

And so it goes almost every mail. Loyal, progressive smiths; efficient, experienced repairmen; up-to-date, modern forge and torch welders all hungry for practical information on their trades—all getting their fill in "Our Journal."

Of course, it's been hard work at times to not do as other publishers on every side have done—raise the subscription price. But in spite of greater paper costs, printing costs and greater postage costs, we have continued to hold to the original subscription price of one dollar a year.

By the way—if you know of anything that will give you more practical help and more real worth-while assistance for the same price, than "Our Journal" we would really like to know what it is.

SIX MONTHS SUBSRIPTION FREE

A letter just received from a brand new subscriber reminds us to remind you of this special offer. This new subscriber after receiving a copy of the March issue writes:

"Copy of your March number came this morning and it certainly is interesting. I found several things I could use right away. This afternoon I went over to see my neighbor and competitor and I showed him the book. He wanted to keep it but I couldn't spare it. Of course, I came away with his order. So here you are—two iron men—put us down for one year each."

Of course we put them down—but the sender got an extra six months for his trouble. We'll gladly do the same for you—Show your copy to a neighbor and get six months.

WHETHER THE FARMER USES ANIMAL POWER OR MOTOR POWER TO DRAW HIS FARM IMPLEMENTS HE MUST DEPEND UPON THE PRACTICAL GENERAL REPAIRMAN TO "KEEP 'EM GOING"

Removing Carbon With the Oxygen Flame

DAVID BAXTER

The repairman who has installed an oxy-acetylene welding plant and is engaged in automobile repairing may just as well include several other features closely connected with the welding business. Most of the welding apparatus may be used for other purposes as well as the fusing together of broken castings and other metal parts.

In fact there are quite a number of other things for which the torch owner may use the welding outfit besides merely as a welding tool. And besides the welding torch, other parts of the equipment may be utilized for various purposes.

Often no other equipment is required but sometimes it is necessary to purhcase a small tool or other machinism. In other words, by the addition of some minor equipment the welding apparatus is made to serve an entirely different purpose. But in most cases the new venture works in harmony with the welding repair business, so that the torch operator is ahead of the game if he has the tools to do the other kinds of work.

Take for instance the removing of carbon deposits from automobile engine cylinders; Here is one instance where the smith may make use of part of his welding outfit by the addition of one more simple tool. As he already has the oxygen on hand he may as well make use of it for other purposes besides welding. Especially if his entire time is not taken up with the welding, or if there are slack spells in his repair routine.

By the simple addition of a special torch for the purpose, the oxygen forms one of the simplest and quickest methods of removing carbon from piston heads and combustion chambers. Each cylinder may be completely and thoroughly cleaned in a few minutes, and at small expense, probably cheaper than any other method, time, labor, and everything considered.

Nor is it absolutely compulsory to purchase a carbon torch, for the ingenius mechanic can construct one himself. The main essentials are a piece of small copper tubing a gas-tight valve with facilities for fastening it to a section of rubber hose about ten feet long. If the mechanic is skillful he can make an instrument equal to the factory product, although it will likely cost as much or more than if it were bought from the manufacturer.

In making a "home-made" carbon torch the fundamental instructions are to solder or braze the tubing to the outlet of the valve and arrange the other side for attaching the hose. The hole through the tube should be smooth and should be about one-eight of an inch or less

FOR BURNING OUT CARBON A SPECIAL TORCH IS USED WITH OXYGEN ONLY

in diameter. However, the inside diameter is not so material since the tube can be squeezed together to make it the proper size for the work. A fine stream of oxygen should issue from the tube in order to better control the combustion of the carbon deposit.

In any event, however, the welder should not use the welding torch for carbon burning. Although the writer has seen torch operators who employed a special carbon burning tip made by soldering the copper tubing to the regular welding tip and manipulating it with the welding torch. This however is a risky proposition, due to the fact that the acetylene is liable to be accidentally turned on. If the welder will persist in using the welding torch for burning carbon he should at least disconnect the acetylene hose. A regulation carbon torch has only one hose, and it would be a careless man indeed who would accidentally attach it to the acetylene tank valve. The carbon torch uses nothing but oxygen.

The principles of the process are the high rates of oxidization caused by injecting a stream of pure oxygen against the carbon in connection with a small flame to start the combustion. A lighted match or a bit of oil-soaked waste ignited and dropped into the cylinder is sufficient. The oxygen pressure is turned upon this bit of fire to start the carbon burning. When the sparks and flame start to fly the oxygen tube follows the burning around the cylinder until the carbon is entirely burned out.

Some times there is quite a pyrotechnic effect accompanied by a loud roaring noise, but in neither event is there cause for alarm if the operator has taken proper steps to protect the oily parts of the car and also the gasoline supply.

Votaries of other processes of removing carbon say that the burning process is injurious to the valves and pistons; that the heat causes these parts to warp. They also say there is too much danger of setting the car afire. But to the first objection it may be said the carbon process does not generate any more heat than the natural firing of the engine when running at average speed. And as for the latter objection, it should be said there is grave danger of setting fire to the oily parts of the engine or to the gasoline tank if the operator is careless or neglectful. This danger is practically eliminated, however, if certain protective measures are maintained.

In the main the protective measures consist in being certain that the gasoline supply is cut off and the system drained. The valves must be tightly seated. Another essential is to cover the carburetor and other oily parts of the engine with asbestos paper. If these safety items are carefully attended there is little danger of damage to the engine. Where the gasoline is located in the dash of the car it is better to put an extra sheet of the asbestos paper between it and the engine.

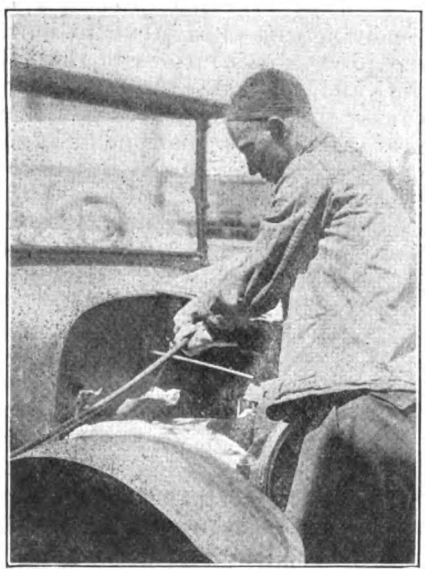
Oxygen alone will not burn but it is the greatest promotor of fire,

and when employed for carbon removal it should not be under high pressure; not over fifteen pounds.

Therefore the carbon torch hose should not be attached directly to the oxygen tank but should have a reducing regulator valve interposed between it and the tank valve. Thus the tank pressure is cut down to the desired working pressure. Not only should the tank pressure be reduced but it should be constant. A trial will show the operator the proper pressure for the job at hand.

If the pressure is too heavy it will blow the fire out and if the pressure is too low the carbon will not burn well. In either event the oxygen is not properly regulated to make the combustion continuous for as fast as the carbon burns the oxygen must be supplied. The deposit literally consumes itself, with the carbon as fuel and the stream of oxygen to maintain the oxidization.

Besides protecting the engine, the operator should take reasonable percautions to protect the car. The process should not be executed



AN ASBESTOS PAD HELD BY MEANS OF A ROD OR WIRE WILL DEFLECT THE SPARKS

in crowded quarters or near trash piles, greasy waste or other combustibles. Especially not close to gasoline or oil barrels or tanks. And it is not out of reason to have one or more good chemical fire extinguishers handily near. They may be the means of saving the building as well as the automobile.

After all the safe guards are arranged and the torch apparatus is ready, the automobile engine is started and after running a short time the gas is shut off and the engine allowed to run until it stops of its own accord. This running of the engine is for the purpose of consuming all of the gas in the carburetor and pipes. The vacuum feed should of course be drained.

Before removing the plug the regulator valve of the torch should be set by turning the thumb screw to the right until the gauge registers approximately twelve pounds. The asbestos protectors should now be in place, too.

After being certain there is no gasoline that may ignite when the carbon burning starts, the engine is ready for the carbon removal process. First, a spark plug is taken out of the end cylinder. If the carbon upon it is dry and hard it indicates that the carbon in the chambers will not be easily oxidized and that it will not start burning freely. In this case it should be moistened slightly with kerosene oil, only a very small quantity should be used however. A drop or two squirted on the walls of the chamber with a oil can are usually sufficient. Too much oil causes too much heat, accompanied by smoke, and leaves unnecessary residue. The possible result of this overheating would be to distort the casting or valves. It is also useless to increase the oxygen beyond the limit if the deposit is too dry to burn well. If the injection of kerosene will not start the combustion at first trial another drop is carefully inserted and allowed to soak in for a while.

A moist carbon deposit on the spark plug is practically an assurance that the combustion will not be interrupted. The carbon will burn out as fast as the torch can be moved around. The condition of the spark plugs is a good indicator of the interior of the cylinder.

The engine is cranked until the piston under the open plug hole comes up to the compression position. To put it differently, the engine is "turned over" until the piston is at the top of the stroke and the valve is closed. Make certain that the valve is closed as it is only the partly open valve that is likely to be damaged by the burning process.

The tube of the carbon torch is then inserted in the spark plug hole. Then a bit of blazing waste or a lighted match is dropped into the hole and the oxygen is turned on. The tube should be inserted previous to dropping the lighted match; which should be remembered as it saves time and matches. As soon as the stream of oxygen strikes the blaze the oxide sparks commence to fly. Often the action is accompanied by the roaring noise mentioned above and some-

THE OILY PARTS OF THE MOTOR ARE PROTECTED WITH SHEET ASBESTOS

times the flames are blown high out of the hole.

As the burning proceeds the torch is moved briskly around in the cavity until the sparks no longer fly. Sometimes it is necessary to drop several lighters into the hole during the removal process in order to make sure all of the carbon has been consumed. Usually all of the deposit is removed at one burning. If it will not re-light it is pretty safe to assume that the piston top, chamber and valve are free of carbon.

An air hose or a hand bellows is then employed to blow out all substances that may remain after the carbon is burned. The oxygen process will have no effect on road dust or silica or other non-combustibles which may have been drawn into the cylinders. This foreign matter must be blown out after the burning is finished.

Next the valve seat and piston are swabbed clean with kerosene, and the spark plug is replaced to prevent the introduction of more dirt during the treating of the next cylinder.

After replacing the first plug, the engine is again cranked to

bring the second piston upward to compression. The burning process is then repeated and thus each cylinder is taken in turn.

The spark plug of each cylinder is replaced before treating the next cylinder and if too much flame is produced the operator will decrease the oxygen pressure slightly. This method is very much the same on all cars so the novice will soon learn to tell when things are right. Practice teaches him to know when the pressure is too low or too high, also when the deposit is too dry. By employing it in conjunction with his regular auto repair welding he will be more able to keep his outfit busy and will at the same time work up more business both ways.

A Trio of Clever Electrical Ideas for the Automobile

PHILIP A. BAKER

Secret Ignition Lock

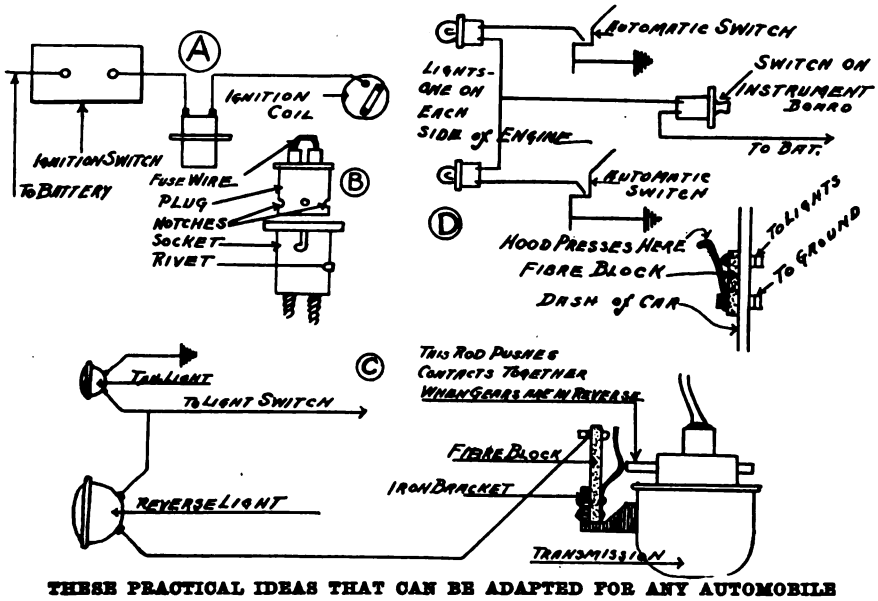
An ordinary double contact dash socket and a double contact plug are inserted in the ignition circuit as shown in the engraving at A. A piece of fuse wire is shorted across the two terminals of the plug. The socket is drilled and a small rivet placed as shown in the engraving at B. Notches are cut in the plug to correspond with rivet head. Thus an ordinary plug will not work in this socket. Removing plug locks ignition.

Automatic Reverse Light

A small spotlight or side light is fastened to the rear of the car, so it will light the road to the rear when going backwards. It is wired as per diagram at C. The automatic switch is made from a fiber block with spring brass contacts. A suitable iron bracket is made to fasten it to the transmission in such a manner that the end of the gear shift fork will close the contact points when the gears are in reverse. By connecting the lamp to the tail light wire as shown, it will only light when the other lights are on.

Automatic Engine Lights

With two lamp sockets placed on the dash, one on each side of the motor, an automatic switch is constructed that will light these lamps when the hood is raised. The switches are made from a fiber block and brass strips, and are located where the hood will press the brass spring and open the circuit when the hood is closed. One of the switches is located on each side of the dash. A third switch is located on the instrument board, so the lamps can be used only when necessary.



THESE PRACTICAL IDEAS THAT CAN BE ADAPTED FOR ANY AUTOMOBILE

Standard Tire Repair Shop Methods

How to Repair Tubes and Casings, the Shop Equipment Necessary, and How to Figure Costs

PART V.

A reader who has been following this series of articles and who evidently has become very much interested in the subject, seems rather confused with reference to some of the terms and names with which he is unfamiliar. He has asked for example—What is meant by "Breaker strip" and "Cushion stock"?

In order to make these terms and names entirely familiar to this reader and perhaps others who have not yet become experienced in tire work, it will perhaps be best to explain the construction of the regulation tire. Let us suppose then watching the building up of a tire case. The workman starts with mandril or core shaped like the inside of a tire. Upon this he builds up from 4 to 7 plies of cotton fabric. Cotton fabric is used because of its flexibility the ease with which it can be permeated with rubber, and because of its resistence to heat. The number of plies of fabric used and depends upon the size of the tire. If too many layers of fabric are used, it thickens the carcas causing it to be stiff and inflexible. Because of this stiffness and inflexibility the plies will break easily and the heat would not be easily expelled.

It is of course understood that a very considerable amount of heat is generated in the tire when it is used on the automobile or other vehicle. This can be easily demonstrated by placing your hand upon the tires of a machine that has traveled any considerable distance.

As each layer or ply of fabric is placed one over the other, rubber is applied by pressure into and between the layers or plies of fabric and this rubber impregnated into the fabric thoroughly. This is called frictioning. After the carcas of from 4 to 7 plies of fabric has been built up, a cushion of one-eighth inch pure gum rubber is placed over the fabric carcas. This cushion of gum rubber is known as the "cushion stock".

The "breaker strip" is then laid over the cushion stock. This breaker strip is made up of loose woven fabric, and is for the purpose of warding off and protecting the carcas of the tire from penetration by sharp objects. The fabric or cloth that you see when a tire wears through the rubber tread is the breaker strip.

In the building up of the tire the various layers of cotton fabric have also formed the bead. In forming this bead, hard rubber is used to form the bead of a clincher tire while small wires are employed for the straight side tire. After the breaker strip has been placed, a chafing strip consisting of a fabric about two inches wide is applied to

the edge of the bead and just above it on the side walls. This is then covered with a layer of thin tough rubber which forms the exterior surface of the side walls.

The tread made of thick tough rubber is applied last of all.

After thus being built up with alternate layers of fabric and rubber of different and various consistencies, the tire on its forming core is placed in an iron mold, which is then placed in a tank or kettle, and vulcanized by means of live steam.

Just a word or two more with reference to two general methods

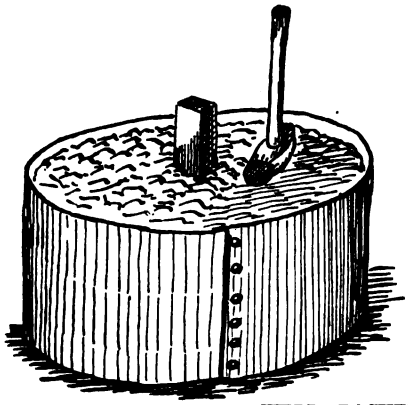


FIG. 1.—THE COAL IS WELL PACKED AROUND THE CENTER BLOCK

of finishing or vulcanizing tires. I have reference particularly to the "full molded" tire, and the "wrapped-thread" tire. The first mentioned or full molded tire is constructed as explained above. It is built up on an iron core or form and it is then placed in a mold which in turn is placed in a vulcanizer, and here it is cured in one operation.

In the "wrapped-tread" method, the fabric carcas, side wall, cushion and breaker strip are formed and built up the same as in the molded tire. The tread, however, is not added, and this tire is half-cured or semi-vulcanized, minus the tread rubber. After this semi-curing operation, the tire is removed from the mold, and the part where the tread is to go is buffed off. Several coats of high-grade vulcanizing cement are applied. A tread which has also been semi-cured is then treated with several coats of vulcanizing cement and this is allowed to dry. After drying this tread is applied to the semi-cured carcas and rolled down under heavy pressure to remove all air. The entire tire is now removed from the core or mandril, and an air bag is placed inside of the tire. The tire is now wound tightly with canvas cloth strips which are about two inches wide and thus wrapped is placed in a horizontal vulcanizer, and given a final cure with live steam, after which the tire is left standing until cool. The canvas strips are then removed, and the tire is laid away for a few weeks to "after-cure."

In the finished tire, the wrapped tread can be distinguished from the full molded type, in that the wrapped tread tire will have a slightly roughened surface, which is the impression left from the cloth wrappings during the vulcanizing process. Wrapped tread tires cost more to make than the moulded type.

Another reader has inquired regarding the difference, if any, in the construction or manufacture of gray tubes and red tubes.

The gray inner tube is of good quality, is a mixture of pure Para gum and sulphur. The sulphur is used to give it strength, and this also causes the white gray dust which gives it the distinguishing color. The red inner tubes depend upon a dye for its color, and instead of sulphur, antimony is used. This will stand a greater amount of heat, and as heat causes rubber to harden and crack, the advantage is with the red tube. Gray tubes are inclined to stick to the cases, while red tubes will not do so.

An Indiana reader inquires regarding "Tire Paint", asking whether or not it would be practicable for him to manufacture it himself.

The formula for this paint is a very simple one, and there is no reason why any tire repair man or auto service man cannot mix this up himself, either for sale to his customers, or for applying to tires when finishing them This paint adds greatly to the appearance of the finished tire, and it is an excellent idea to use it in your tire work and thus give an added touch of service to your work.

The paint is made as follows:—Mix 5 lbs. of whitening in one quart of gasoline, stirring the mixture thoroughly until no sediment remains. After the gasoline and whitening are thoroughly incorporated, and slowly one quart of cold patch cement. Continue stirring until the ingredients are thoroughly mixed. This paint is applied with a brush and leaves a white surface which will not crack because of the elacticity of the cement. The cold patch cement can be secured from any of the tire companies making up a line of supplies or from jobbers and supply houses handling tires and tire accessories.

Reclaiming Broken Hollow Drill Steels

J. C. LAMON

Around quarry and mine operations, where jack-hammers and water line drilling machines are used, large numbers of hollow drill steels become broken owing to the hard use to which they are subjected. This would prove to be a con-

FIG. 2.—THE FIRE IS KINDLED BETWEEN TWO MOUNDS OF COAL

siderable loss if the broken steels were not reclaimed. This can be successfully and economically done by a competent blacksmith by the following methods. First, assort the broken steels and classify them. This will permit retaining original length when they are "welded up." The proper arrangement of the forge fires and the use of high grade smithing coal are important essentials not to be overlooked if successful welding is accomplished. These being provided proceed as follows:—Use slaked coal having no lumps larger than will pass through ½ inch mesh screen. Before proceeding further I wish to speak of one of the most important essentials in welding any material and this is the fire. As success in welding hollow drill steel depends largely on the fire, how it is built, and maintained I want to explain the building of the fire.

First, dampen the coal well and thoroughly mix until in a plastic state. Then place a block of wood 4 by 4 by 15 inches on the twyer opening, filling up the space about the block and thoroughly pack the coal with a sledge. The block is of course placed on end as shown in Fig. 1. Then bank up coal as in Fig. 2 by packing coal on each side of block until proper height is obtained and then square them up as shown. Now withdraw the block.

Everything is then ready to start the fire. Fill the hole with live coals or if these are not available use oily waste or any dry material which will ignite readily. When fire is well started, put in coke allowing fire to get good and hot. You are then ready to proceed welding operations. The purpose of building a fire by this method is to confine fire to a small area making welding easy, also this provides a good grade of coke to be used at the forge fire.

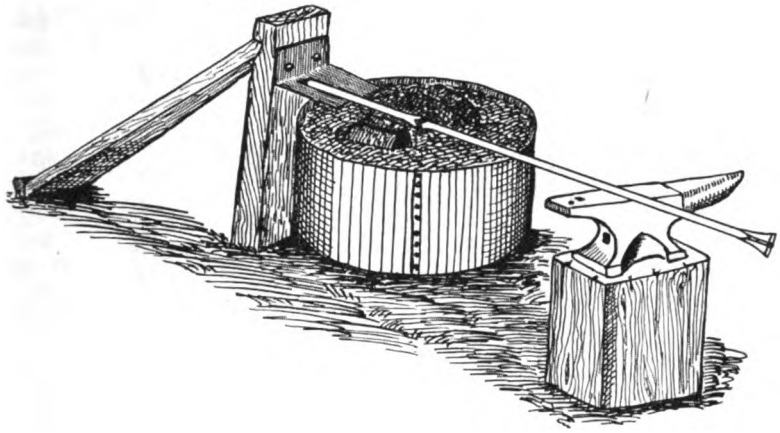


FIG. 3.—THE RODS ARE EASILY WELDED IN THE FIRE BY THIS PRACTICAL ARRANGEMENT

Fig. 3 shows arrangement for welding drill steels in the fire by means of the male and female scarf. It will be noticed that the anvil is level with the forge, also that the support on the opposite side is so arranged to take care of the different lengths of broken drill steels. This arrangement allows the drill steel to be backed up when at a welding heat with a light sledge. After being driven together in the fire the weld is withdrawn from the fire and finished on the anvil.

To be successfully welded, the steels must be properly scarfed regardless of the style or scarfing method. To proceed with this operation, heat the broken ends to a forging heat for a distance approximately three inches. Then upset the ends and drift out the hole with a long tapered drift pin. Then with a sharp hot cutter cut the steel diagonally to form the scarf. Again drift out the hole and hack the scarfs with the hot cutter. This makes the weld hang when they are lapped for welding. The engraving at Fig. 4 shows steels correctly scarfed for this method of welding.

To proceed with the weld, place the pieces in the fire scarfed sides up. Take a slow heat applying a little welding compound to the scarf. When at the proper welding heat bring out and weld on the anvil. The helper handling the short ends when the weld is completed should clear out the hole of all scales with a small wire. Then heat the weld to a forging heat and lay aside in a dry place allowing the weld to cool. This is a heat treating process that is very essential to successful welding of hollow drill steels. This tends to remove all forging strains and lessens the chances of the drill steels breaking at or near the weld.

The scarf at C, Fig. 4 is the male and female scarf and is made by upsetting the ends and trimming the long ends chissel-shape with a hot cutter. Drift the holes out, place in the fire with the short end of female scarf from the blacksmith, both ends being placed together in fire as shown in Fig. 3. Having them in line, bring up to a welding heat and then back up end with a sledge. When welded, remove from fire and finish on anvil giving the same heat treatment as already described for the other welding methods. The engraving Fig. 4 at B and C show the scarfs properly made. If these instructions are carefully carried out, success is assured to the blacksmith with ordinary skill.

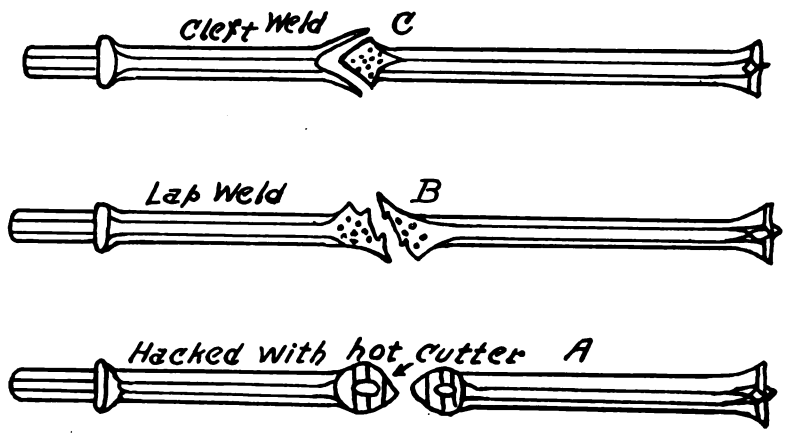


FIG. 4.—TO WELD SUCCESSFULLY THE STEELS MUST BE PROPERLY SCARFED

Belts For Tractor Work

Practical Information on Tractor Belts That Apply to Tractors Generally and to Fordson Tractors in Particular

The following have been found to be satisfactory lengths for belts to be used on various machines:

Separator	75 or 100 ft.
Silo filler	75 or 100 ft.
Husker	75 or 100 ft.
Shredder	75 or 100 ft.
Baler	75 or 100 ft.
Grinder	50 or 75 ft.
Pump	50 or 75 ft.
Saw	50 or 75 ft.

In order to obtain satisfactory results from belts as well as efficient operation of both the tractor and the belt driven machine, it is necessary that some care be exercised in applying the belt.

In starting operation with any belt driven machine, the tractor should be run up before applying the belt to the pulleys. Then bring the tractor back until the belt is at the proper tension making certain that the pulleys are in alignment. When this is being done the throttle should be set so that the pulley turns very slowly. After the proper tension and alignment have been attained, the tractor may be speeded gradually so as to allow sufficient time for the driving pulley to gain control of the belt and the belt in turn control of the driven machine. When the maximum speed has been obtained run without load until the belt and machine are running smoothly. Do not start the pulley while the driven machine is under load nor start feeding until it has reached the operating speed rec-

ommend by the manufacturer.

The driven pulley on the various machines used in order to perform its work efficiently must operate at a certain fixed number of revolutions per minute. This speed which has been determined by the manufacturer is in direct proportion to the diameter of the driving pulley of the Fordson tractor which is 9½" and which at a normal speed travels at a thousand revolutions per minute.

Below we show the particular size pulley to be used on the driven machines to obtain efficient service:

Diameter of Driven Pulley	Revolutions per Minute
5 inches	1900
5½ inches	1727
6 inches	1583
6½ inches	1462
7 inches	1357
7½ inches	1268
8 inches	1187
8½ inches	1118
9 inches	1055
9½ inches	1000
10 inches	950
10½ inches	926
11 inches	863
11½ inches	826
12 inches	782
12½ inches	760
13 inches	731
13½ inches	704
14 inches	679
14½ inches	655
15 inches	634
15½ inches	613
16 inches	594
16½ inches	575
17 inches	559
17½ inches	543
18 inches	527
18½inches	513
19 inches	500
19½ inches	487
20 inches	475

For Example: A certain machine is recommended to travel at a speed of about 1530 R. P. M. The nearest speed shown on the table is 1357 which shows that to obtain that speed a 7-inch pulley should be used.

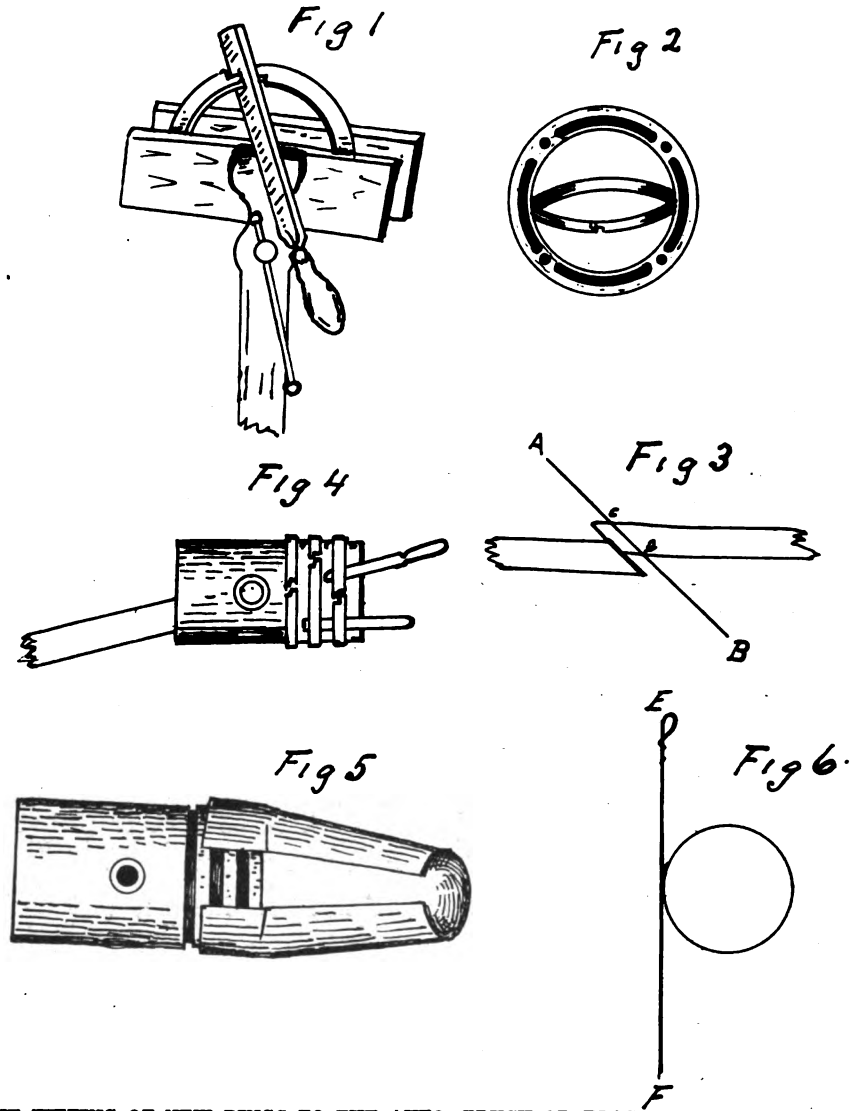
Fitting New Piston Rings

GEO. G. MCVICKER

Of all the instruction books I have ever seen accompanying tractors or any type of motors I have never read one which showed a practical method of fitting and replacing piston rings which could be followed by any one but possibly an enginering graduate. This work does not require such expert precission as usually indicated if the parts are made to fit when they leave the factory. More rings are broken in replacing them on the pistons than are broken or worn out by operation of the motor and only because instructions are not given that will prevent this breakage. First remember that piston rings are made of cast iron and will not stand very much springing and will often break if dropped on a cement floor.

New rings for replacement are always larger then will go in the cylinder. This is necessary to allow them to be fitted to the worn cylinder. Instructions specify so many thousandths of an inch clearance must be allowed to prevent the ring gripping when expanding from the heat of the motor, but how many of us know how much three or fifteen one-thousandths of an inch is in actual measurement? And if we do not know how are we to determine the clearance to be left at the ends of the rings?

Here is the method I have used for several years on a number of replacements and believe it as near correct as any measurements will make it. Place the ring between two boards clamped in a vice (Fig. 1.)



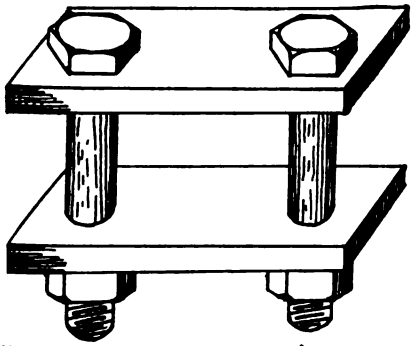
THE FITTING OF NEW RINGS TO THE AUTO, TRUCK OR TRACTOR PISTONS IS EASY WHEN YOU OBSERVE THESE HINTS

and file the ends until when the ring is placed in the cylinder as at Fig. 2 there will be a perceptible opening at the ends. Now try to turn the ring over the position in which it operates when on the piston and if it will not turn then more of the ends must be filed off until it will turn. It will be noted that in turning in the cylinder more space will be required as the diagonial corners of the ring strike the walls of the cylinder. This requires more of the ends to be cut off to allow it to turn and this amount cut off will be the cor-

rect amount necessary for the clearance.

If the ring is of the diagonial-cut-end type then the end may be marked to be cut. The ring may be placed in the cylinder in position as it operates in with one end past the other as shown in Fig. 3. A straight edge A, B, may then be placed across one end and the ring marked as shown. The ring may be turned in the cylinder as in above case and led until the proper clearance is given. In doing the turning the ends may be held together with the fingers to note whether or not one end slips past the other.

Rings may be taken off and replaced with thin pieces of metal or with old table knives as at Fig. 4, by working each ring from groove to groove until to the proper place; but a much better method is to make a cone shaped cover as at Fig. 5, to fit over the piston. This may be made by bending a piece of sheet metal around the piston and simply holding it in place with one hand while a ring is slipped over to the groove where it is wanted. The cone is then moved out to another groove and the operation repeated until all rings are on. There is little danger of breaking a ring by this method and the edges of the



AN EASILY MADE SPRING CLAMP FOR EMERGENCY USE

grooves are not damaged by prying with other tools.

If the end of the cylinder is not counterbored, (its edge bevelled) and few of them are now) some of the rings are apt to be broken in placing the piston in the cylinder. This is because the thin end of the ring will catch on the edge of the cylinder and as it is out past the groove in the piston a very small push in attempting to push the piston in the cylinder will cause this break. Often times a ring is thus broken and the fact is not known. For just as it breaks the piston is released by the ring giving way and the piece drops in or is pushed in the groove without one knowing anything about its being broken. A safe method is to use a piece of wire looped around the ring. This loop is shown at Fig. 6. One end is attached to some part of the frame of the motor or to a stud bolt in the cylinder head and the other end held in one hand. As the ring approaches the cylinder it is thus compressed and it slides it with no ends protruding to be broken. These suggestions altho simple are time savers and efficient.

A Spring Clamp and A Handy Refuse Can

W. F. RAYMOND

Here is a spring clamp which I have found very useful. The sketch shows two pieces of soft steel or iron ¼ to ⅜ inch in thickness and from 1 to 1½ inches wide. These are drilled for two 7-16 inch cap screws, the distance between the screws being about 1-16 inch greater than the width of the spring. A screw with S. A. E. threads is preferable, as it will hold better. Use check washers between nut and plate. In case this clamp slips, use a piece of emery cloth between the plate and spring putting the rough emery against the spring. If the break is close to the axle on housing, it will not be necessary to use the cloth.

I have also found a good use for empty five-gallon oil cans. Cut the top out with an ordinary can opener and with a flat piece of iron held in the vise, take a wooden mallet and flatten the rough edges down. Take a punch or large nail and punch a hole in each side, and with a piece of wire about 3-16 inch in diameter, take a pair of pliers and make a handle. I find they make very good ash and refuse cans as they stack up nicely, and do not take as much room as do buckets.

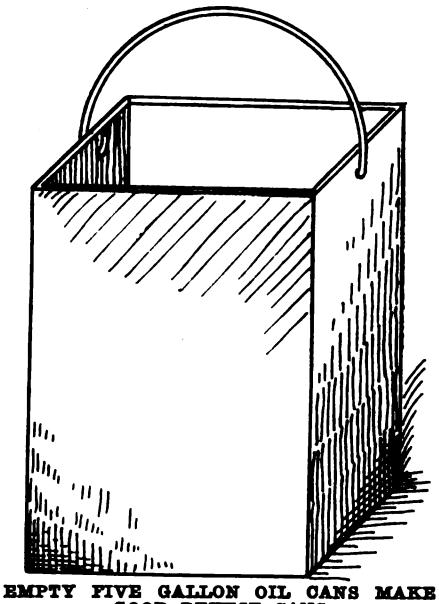
The Use and Abuse of Twist Drills

THE MELTING POT

Twist drills will stand more strain in proportion to their size than almost any other tool. The form of drill point is important, because it controls the rate of production, accuracy of the hole, frequency of necessary grinding, and the life of the drill. Speed and feed are also of great importance.

When grinding the drill points, the following rules should be observed:

Both cutting lips must be inclined at the same angle with the axis of the drill, and must be of equal length. The point angle of



EMPTY FIVE GALLON OIL CANS MAKE GOOD REFUSE CANS

59° has been universally adopted as best suited for average conditions.

The drill point must have the proper clearance or contour of surface back of the cutting edges, and this clearance must be identical on both sides. Approximately a 12° clearance angle combined with the center angle of 130°, which will give a constantly increasing clearance toward the center, has proven best for average conditions.

A gauge can be used to determine approximately the center angle. Although the included angle of the gauge is only 118°, a center angle of 130° is recommended.

Twist drills are often made with a gradual increase in the thickness of the web about the shank, with the result that as the drill becomes short and the web thinner, greater force is required to drive it. To overcome this, it is best to thin the web by grinding away the excess thickness, reducing it to the original dimensions.

In grinding high-speed drills take care not to overlook them, and when heated they should never be plunged into cold water.

If the drill is properly ground and the corners of the cutting lips begin to show rapid wear, it indicates too great a speed. If the

cutting edges roughen or break out in minute particles, it indicates that the feed is too great.

Very small drills frequently run at an abnormally low speed with the result that breakage is excessive. These are delicate tools. They must be run true and the cutting edges kept sharp. A fine grade emery stone is best suited for keeping them sharp.

Two Special Wrenches for Ford Carburetor Connections

G. A. LUERS

Because of inaccessibility of two connections on a Ford carburetor it is difficult to remove or install. To facilitate this work the wrenches shown in the accompanying sketch are of special service. The first wrench is for the inside bolt of the carburetor flange at the intake manifold.

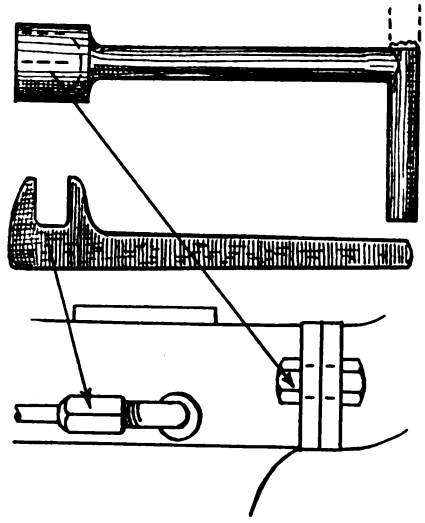
This is made from a "T" wrench by cutting off one of the handles, and the offset is enough to clear the manifold and afford sufficient leverage to make the flange tight. The second wrench is for the gasoline pipe connection at the carburetor bowl. This connector nut is placed so close to the car frame that the ordinary open end wrench will not engage the nut. On this wrench the jaws are at right angles to the handle, and by means of it, the nut is easily turned. With these two wrenches alone, the removal of a Ford carburetor can be done in about a half minute.

Prices Should Be Maintained

U. G. NEALE

I am going to make a few comments on the New Era Blacksmith, by F. J. Price, which articles is worth a year's subscription. I am afraid that unless Mr. Price is a very young man, he will not live long enough to see his ideal realized. The trouble is not with the work not being up to standard but with the price not being up where it should be, especially in the country. This is not the fault of the blacksmith individually but of all smiths. That is—One alone can't raise the prices unless he is isolated enough not to be affected by the prices in the next town, and when he has a competitor that is bound to keep the price down, I can't see any other way except to move where prices are better.

I belong to the association, and I have been getting the association price which is $3.00 for 4 new shoes 1 to 5, and $3.50 for 5 to 7, and $6.00 to $8.00 for drive calk shoes, $2.50 for re-setting common shoes and $3.00 for setting drive calk shoes. A new man has just come to town, and I understand he has cut the price one dollar all around, and as there is not enough



THE WRENCHES MAKE IT EASY TO REMOVE THE FORD CARBURETOR

to keep one man busy two days in the week, I am just curious to know how he will come out, for I will not cut my price to meet his.

I am going to stand pat and that means that the new shop will get the work, for the man that lets his horse wear the shoes from two to four months isn't particular who shoes the animal just so long as it is done cheaply.

Things will never be ideal until the blacksmith is able to convince the customer that it is the blacksmith that is confering the favor if there are any favors confered. I had a customer a while ago that was trying to get something for nothing, and he threatened to leave if I didn't let him get away with it. But I promptly told him to go as I could get along just as well without shoeing his horse as he could without getting it shod. Since then he has been one of my best customers. That may be the wrong attitude, but when the blacksmith wakes up to his own importance, he will be able to put his trade on a level with other trades, and himself on a level with other tradesmen. It is time the blacksmith learned that there is some money in his brains as well as in his brawn.

On The Treatment of Customers

E. H. MALOON

In the March number there was an article by Mr. W. S. Hathaway that fitted into my way of thinking, and if I had written the article it could not have described my feelings in the matter as well as he did.

There is nothing I do that brings me more profit than the way I treat my customers. The words cost me nothing and they bring me money and immense satisfaction. I have customers who have come to my shop for forty or more years. In all this time our relations have been pleasant and profitable to us both. As soon as a man opens my shop door I have something to say to him. In doing his work I listen to him and never give advice until I am asked. I have a good workman with me now, but he is surly to the customers and I have to watch him all the time and answer customers before he does. It is necessary to talk to him and I try to make him believe it is one of the assets of a man to be pleasant to customers, but instead of that he feels that he is doing the customers a favor when he shoes his horse for him.

Another thing I will not allow is the abuse of any horse. If the owner wants to pound his animal I have no objection, but I won't allow my man to do it. They make no headway for themselves and they make the owner cross. We have a Barcus stock for really bad horses. With this a man is safe, and the horse is safe.

A shake of the hand and a pleasant word for a customer goes a long way in my opinion.

An Idea That Will Pay Big Dividends

C. T. WRIGHT

A certain smith shop owner located on a road feeding into a popular highway was persuaded to put in a small stock of auto accessories. He had a gas pump and sold oil and a few lines but had never considered anything more than supplying his own local customers until a salesman called and told him of profits to be made

and of the possibilities in his location. Off the main highway he had always considered it impossible to get much tourist trade or to build up any great business in accessories.

But the salesman convinced him.

So the smith put in a small stock of auto accessories—all standard, well-known goods and then proceded to act upon the salesman's suggestion. Even before the goods arrived he started active operations.

The smith had a boy of twelve and a girl of ten. These youngsters he stationed in front of the shop with instructions to take down the license number of all cars and trucks passing the door. When a number appeared several times during the week it was an easy matter to secure the owners name and address from the license records and put him upon a mailing list.

In this way a list of auto and truck owners was soon made up and with no work at all for the youngsters considered it a new game and entered into it with glee.

The mailing list was circularized with a neat folder or letter at regular intervals and not only was the trade in auto accessories greatly enlarged, but this naturally brought repair jobs, calls for gas, oil and grease. In fact there is no limit to what can be done with a list of this kind especially with the many talking points that the average rural shop man has over the average city accessory store or garage.

The first letter to a new name on the list reads:

No. 411,440—Ill.

"Four times has your license number been reported passing my shop—why not stop in and get acquainted.

"I sell Socony gas, Gargoil oils and can furnish you with practically any accessory you may want.

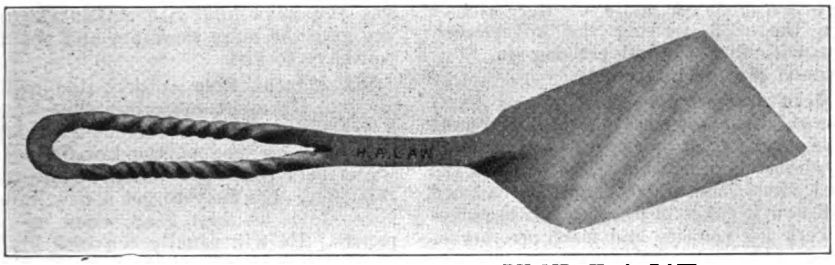
"Not having the great overhead that is carried by the city store or garage, I can usually save you money on anything you buy.

"Today I can offer you Goodyear tires and tubes at a distinct saving.

"Next time you come this way—stop at the shop if only to say you got my letter.

This smith reports that about half of the people he addresses stop at the shop in response to the first letter.

He gives all credit for the idea to the live salesman who sold him his line of accessories, but we know that this shop owner has backed up the idea with real sensible sales talks and an accessory service that while crude at first is now something that many a city garage would be proud to call its own.



THE KITCHEN HELPER AS MADE BY MR. H. A. LAW

Law Supplies Kitchen Helper

The accompanying engraving shows what Mr. H. A. Law of Missouri chooses to call a "Kitchen Helper." Mr. Law sent it to ye Editor with his compliments and for use in said editor's kitchen, and while not sent for editorial attention in the columns of "Our Journal", Mr. Law's device is so well made, so thoroughly handy and the verses accompanying the gift are so clever that we cannot refrain picturing the little kitchen tool and reproducing the verses. Needless to say the kitchen helper from Missouri occupies the place of honor in the editorial pantry.

THE SONG OF A KITCHEN HELPER

H. A. Law

My name is "Jack of all Trades"
I'm better than I look.
My home is in the kitchen
A helper to the cook.

I toss the cakes at breakfast;
At noon I hack the meat.
At turning raw fried Murphy's
I'm really hard to beat.

I'll also turn an om-'let
And even stir the mush.
And when the kiddies start to squall
Shake me and they will hush.

I slice the bread for luncheon;
I carve the cake as well.
An' if the 'Ol' Man's shirking
Grab me and hand him—well.

When meals are in the making
I lift the pots and lids.
When character's in the shaping
I spank the wayward kids.

From morn 'til night I'm busy,
As you may well believe.
I'm plain but strong and sturdy.
I'm not made to deceive.

I'm sure a sturdy helper,
For kiddies, maw and paw.
Was made in Fairport—Missouri.
In the shop of H. A. Law.

ENVOY

Any handy smith can shape me
Every handy wife will take me
Any good old spring will make me
A four-bit piece will take me.

Benton's Receipe Book

To Clean Brass that has become tarnished use oxalic acid dissolved in water. It seems hardly necessary to caution the user regarding the use of this acid solution—it is a poison and care in its use and storage should be exercised.

When Grinding on a Lathe it is a good idea to place a shallow pan of water on the cross slide and under the grinding wheel to catch the sparks and emery dust.

A Cement that will Set Under Water and is suited for water-pipe joints and for other under water conditions is composed of 4 lb. of plaster-of-paris, ground; 10 lb. litharge, ground; ½ lb. yellow ochre, fine; and ½ oz. hemp, cut short. Mix well with linseed oil to a putty.

To Remove Broken Stud Bolts seems to be the pet stunt of the receipe book fans and formula hounds. Here is another perhaps it is one of the hundreds of suggestions that have appeared before, but we are going to send it along nevertheless for there is certainly some one who hasn't seen it. Apply a thin lubricating oil to the broken stud. For this purpose a light engine oil thinned with paraffin oil is excellent. Allow the oil time to penetrate to the bottom of the hole and then with a left-hand flat drill of about half the diameter of the stud, drill into the stud. The vibration of the drill will usually loosen the stud and the drill will then turn the stud out of the hole.

Belt Fasteners in the average shop range all the way from the regulation raw hide lace to all manner of rivets, staples and stove pipe wire. The average shop owner doesn't always have access to the most efficient form of belt fastening but the following will nevertheless be of considerable value and interest. Remember that belts are more expensive than fastners, and also that cemented belts are best. The cemented belt should hold faster than all rivets, staples, or other fastenings, that could be applied. With each contact of the pulley, a blow is dealt the lap, which naturally has a tendency to cause any metal fastener to cut or tear the leather. In the use of copper rivets, the belt showed the first signs of wear at the riveted lap. When the belt is used in damp places and the cement is not waterproof, as it should be, sewing with wax-threads keeps the laps from curling if the dampness weakens the cement. Rivets and other metallic fasteners are of no service as belt lap fasteners at any time.

High Spots

SPRINGTIME!

Kiwanian C. N. Wiley, Birmingham, Ala.
in Kiwanis Magazine

Springtime's in the air,
You can feel it everywhere.

The maple trees are out in bud,
The frogs have burrowed from the mud,
The alder catkins sway in breeze
That coaxes sap up in the trees.

Springtime's in the air.
Can't you feel it everywhere?

On sun-kist slope arbutus trails,
Overhead a lazy raven sails;
A distant shout from plowman sounds
That fails to rouse the lolling hounds.
Yon brooklet gurgles as it runs,
And o'er me pleasant languor comes.

Springtime's in the air!
Can't you feel it everywhere?

When a man brags about his SPEED at doing work, watch him to see how GOOD he does it.

Has this issue stirred up your thinking mechanism? If not we have missed our target by a wide margin.

Uncle Jed says: 'Y' can't run a business on reputation ALONE without taking a chance on losing both business and reputation."

The work you do may be seriously affected by the condition of the machines upon which you do the work. Can you do perfect work on the machine you have? A few minutes each day will keep your machine equipment in shape and is well worth while.

Money is very necessary in the operation of a successful business. No one can hope to reach success in business unless he succeeds in securing the money besides. But, of what real comfort is all the money in the community, if the smith and shop-owner hasn't the respect and confidence of his community?

Throw out the junk. How much stuff and stock have you about the place that is simply gathering dust and dirt and not even paying for its keep? Sometimes the space occupied by a junk heap is worth more than the material itself. See if you haven't junk material that you would sooner have in the form of money than as junk.

There is more to collecting than the mere getting of the money. A good collector looks to the future as well as the past. He tries for the money as well as for continued patronage. If your customer pays with reasonable promptness you want him to continue as a customer. Get your money from him with a look toward future business.

Appeals to practical men of sound sense are the advertising announcements. Unlike the advertising in the popular magazines, the announcements in the trade journals are read by experienced men who know as much or more of the product than the men writing the advertising. You will find the advertising in "Our Journal" always interesting.

Doesn't seem to be much excuse for a practical, shop-owner not making good these days. The opportunities for profit are almost innumerable. The scope of the rural shop has widened and broadened until now it takes in practical all branches of work for vehicles and machines, horses and motors and a wide variety of other work thrown in for good measure.

Have you a little receipe in the shop that hasn't been published? —Send it in for 'Benton's Receipe Book. Benton is on the look out for all manner of hints, kinks and formulas—he specializes in them and nothing pleases him more than to get a brand new formula that he hasn't thought of.

Stuck on a job? Look up the Index in the December number. If it still proves a sticker ask us. We'll help you and there's no charge. The Question, and Answer Department has been swamped with requests for information but we are looking for more all the time. It's part of our service.

Some folks say "Good Morning" with about as much pep as there is in a wilted lettuce leaf. When you sound a greeting of any kind put your heart into it as though you really meant it. Greet customers as tho' you were glad to see them. A hearty, cheery greeting will always win more business than gloomy, crepe-hanging, long-faced mumbling.

In these days when everyone seems to be mad in the race for the almighty dollar how good it seems to get a real cheery greeting from some kind, thoughtful friend. A little unexpected act of kindness when we are slightly blue gives new life and courage. And it is a receipe that works both ways. Don't always be the receiver of the cherry thought and greeting,—remember what He said of the giving.

How about adding new departments to your business? Aren't any to add? How about tire vulcanizing, battery repairing, oxy-acteylene welding, carbon burning, and then that great big opportunity for profit—the sale of parts and accessories? Of course, if you have added these lines you'll be glad to read this reminder—and if you haven't added these lines you'll be glad of this reminder after you have added them. They are not side lines they are part of the main line.

How are the articles in "Our Journal" fitting into your needs? We want you to kick when we deserve it. Let us know what you think of "Our Journal" whether you have a brick-bat or a bouquet to hand us. We'll be glad to receive either. In fact our preference leans rather toward the bricks as these more nearly tell what should and should not appear to fit and suit the needs of "Our Folks." Come on now good folks, let us hear from you with some constructive criticism.

Ever notice how jolly some chaps are when you meet them out and what grouches they are at home? You meet 'em at lodge and meeting' and you'd suppose they were just fine dandy fellows. No, of course, there aren't any of 'em readers of "Our Journal." "Our Folks" are all believers in the doctrine of sunshine in the home. Funny 'bout smiles, —with most things the more you give the less you have but with smiles the more you give the more there are and the more you have to give.

Six Months Free subscription will be given any present subscriber who sends in a new one. We are reminded to repeat this offer because of the number of old subscribers that have taken advantage of this offer. It's easy to get a new subscriber. Just let him read some of your papers. He will usually convince himself. And when he knows that all it costs is one little lone dollar a year—he'll demand to be taken into our "Circle of Smiling Folks." Just say: "Give me six months for the new member." Do it NOW.

Pounding and beating is the correct way to forge iron, but not for forging the character in the youngster. A kindly word of encouragement, a word of confidence in his ability, and a friendly word of understanding will usually do more to mould the boy or girl into the right kind of a man or woman than applications of the rod. A smith may mould and shape the finest pieces from rough iron, but if he fails in shaping the characters of those who look up to him he has failed in this life.

Friend Tardy has again proven how very appropriate and fitting his name is. Last month we told you about his start to sell Parts for Fords and how very humorously he got started on the matter. Well, we happened into his shop the other day and found him in the midst of a heated argument with a would-be customer. It seems some chap came up to the shop in a Ford that was limping badly. The poor little "Henry-Lizzie" needed some sort of a thing-a-ma-bob or jigger and seeing Tom's sign the man asked if Tom had the part he needed. Well Tom very accommodatingly opened up his display of Ford parts and with the help of the stranger found the part needed. Tom then proceeded to put the part on the machine. He had to take down some part of the car and take out the old part which had broken. (Tom didn't know just what the part was called). Then he tried to put in the new part—and—found it wouldn't fit. Tom tugged and hammered and banged until the owner of the car called a halt asking Tom if he was fixing the car or trying to make a junk heap of it. Of course Tom wouldn't stand for that and that started the argument. I couldn't learn what was wrong until the man left which he did after calling up a garage and having one of the garage men tow him away. Tom then caught his breath and explained that the part wouldn't fit. When I asked him what the part was he said he didn't know. And so we have another demonstration of Tom's effort to be up-to-date. Wonder how long it will take Tom to realize that he's been stung with a lot of fake Ford parts?

OUR HONOR ROLL

Is Your Name On This List?

It is easy to place your name here and at the same time you save money. Suppose for example that your subscription account expires this month—may 1922. All you need do is to send in five dollars ($7.00 in Canada—$9.00 in Other Countries and your account will be marked paid to May 1932. And in addition you save five whole dollars, your name is put on this list and you won't have a single thought of your account for a long time. Just look over the savings you can make on other terms as well.

OUR LONG TIME SUBSCRIPTION RATES

	U. S. and Mexico			Canada			Other Countries		
2 yrs.	$1.60	save	$ .40	$2.00	save	$ .50	$2.50	save	$ .50
3 yrs.	2.00	save	1.00	2.70	save	1.05	3.50	save	1.00
4 yrs.	2.50	save	1.50	3.20	save	1.80	4.20	save	1.75
5 yrs.	3.00	save	2.00	3.75	save	2.50	5.00	save	2.50
10 yrs.	5.00	save	5.00	7.00	save	5.50	9.00	save	6.00

These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents, (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

S. G. Silar, Ala. ....June, 1950
H. Pass, Minn. ....Dec., 1941
E. Krehbiel, Colo. ....May, 1937
The Fix-It Shop, Utah ....July, 1935
P. Cocks, S. Aust. ....Sept., 1934
J. Torrey, Mass. ....Dec., 1933
D. Elledge, Nebr. ....Mar., 1933
L. White, Vt. ....Feb. 1933
J. Gamble, N. D. ....Feb. 1932
R. Tompkis, Texas ....Sept. 1932
C. Graf & Sons, Ohio ....June, 1931
A. Rice, Pa. ....May, 1931
C. Crossen, Ill. ....Feb., 1931
W. Waldorf, Ore. ....Feb., 1931
W. Watt, Kans. ....Dec., 1930
W. Waldeck, Ind. ....Nov., 1930
O. Colwell, R. I. ....Oct., 1930
A. Reeve, Fla. ....Sept., 1930
J. Huntington, Calif. ....Aug., 1930
H. Sherman, Pa. ....Aug., 1930
A. Ross, Scotland ....July, 1930
E. Stroup, Ind. ....July, 1930
C. Hawkins, Ore. ....May, 1930
G. Lawrence, Mass. ....Mar., 1930
A. Danielson, Wisc. ....Feb., 1930
J. Sefcik, Kans. ....Jan., 1930
B Olson, Minn. ....Jan., 1930
J. Erickson, Minn. ....Jan., 1930
J. Ennis, N. J. ....Jan., 1930
E. Curtiss, N. L. ....Jan., 1930
C. Fischer, Ind. ....Jan., 1930
J. Gronlund, Conn. ....Dec., 1929
R. Wilson, Md. ....Dec., 1929
C. C. Lewis Co., Mass. ....Oct, 1929
C. Winslow, Calif. ....Aug., 1929
N. Smithson, Tex. ....Aug., 1929
M. Bernardi, Calif. ....July, 1929
J. Wilder, Mo. ....May, 1929
C. Vanblad, Pa. ....Mar., 1929
J. Bulley, Vt. ....Feb., 1929
F. Price, S. C. ....Jan., 1929
New Jersey Reformatory, N. J. ....Jan., 1929
S. S. Albright, Calif. ....Dec., 1928
F. Trelegan, Calif. ....Dec., 1928
J. Wind, Ky. ....Dec., 1928
M. Malenock, Pa. ....Dec., 1928
E. Krueger, Wis. ....Dec., 1928
J. Wurst, Fla. ....Nov., 1928
H. Eisenbarger, Tex. ....Nov., 1928
A. Brookman & Co., Vict., Aust Sept., 1928
J. Valchetti, Colo. ....Aug., 1928
D. Dyson, Cuba ....Aug., 1928
P. Farrish, Wash. ....July, 1928
D. Rumsey, So. Africa ....June, 1928
J. Uts, Ill. ....June, 1928
F. Brackett, Mo. ....June, 1928
C. North, N. J. ....June, 1928
K. Reimer, Manitoba ....June, 1928
P. Schnydre, Pa. ....May, 1928
J. Miles, Ky. ....Apr., 1928
E. Harris, N. Y. ....Apr., 1928
H. Hangse, N. D. ....Apr., 1928
L. Bergonts, Pa. ....Apr., 1928
S. LeClair, Vt. ....Apr., 1928
F. Ulrich, Calif. ....Mar., 1928
J. Eyre, Nebr. ....Mar., 1928
E. Wilner, N. Y. ....Mar., 1928
H. Boger, N. C. ....Mar., 1928
A. Simpson, N. D. ....Mar., 1928
Waddington Farm, W. Va. ....Mar., 1928
P. Costa, Terra Haute ....Mar., 1928
G. Smith, New Zealand ....Mar., 1928
A. Black, Calif. ....Feb., 1928
L. Eisenhart, Idaho ....Feb., 1928
A. Wible, Md. ....Feb., 1928
W. Rogers, Md. ....Feb., 1928
L. Larsen, Nebr. ....Jan., 1928
J. Barnhart, Pa. ....Jan., 1928
J. Burns, Conn. ....Jan., 1928
S. Portelance, Quebec ....Jan., 1928
C. Forrest, Calif. ....Dec., 1927
R. Leventon, Calif. ....Dec., 1927
F. Vanneter, Calif. ....Dec., 1927
J. Kirsten, So. Afr. ....Dec., 1927
R. Keeney, Colo. ....Dec., 1927
G. Travis, Ill. ....Dec., 1927
E. Lewis, Iowa ....Dec., 1927
J. Forschel, Tenn. ....Dec., 1927
D. Meason, Scotland ....Dec., 1927
J. Templeton, Scotland ....Dec., 1927
S. Frey, Ind. ....Nov., 1927
A. Wilson, Iowa ....Nov., 1927
Morley Garage, Mo. ....Nov., 1927
B. Miller, Tenn. ....Nov., 1927
H. Facklam, Wisc. ....Nov., 1927
J. Staats, Mo. ....Nov., 1927
W. Morrison, Calif. ....Sept. 1927
W. Wilson, New Zealand ....Sept., 1927
W. Morrison, Calif. ....Sept. 1927
F. Bock, Nebr. ....Aug., 1927
E. Delay, Ill. ....July, 1927
W. Patterson, Okla. ....June, 1927
W. Egly, Pa. ....June, 1927
A. Gooding, So. Aust. ....June, 1927
W. Geer, Pa. ....June 1927
R. Wilson, England ....May, 1927
J. Brenneman, Va. ....May, 1927
C. Stebbins, Kans. ....May, 1027
J. Devero, Iowa ....Apr., 1927
F. Bruschi, Calif. ....Apr. 1927
S Forman, N. J. ....Apr., 1927
H. Dyressen, N. D. ....Apr., 1927
M. Griffin, Conn. ....Mar. 1927
E. LeClair, N. Y. ....Mar. 1927
P. Flanagan, Calif. ....Mar., 1927
J. Anderson, Calif. ....Mar., 1927
F. Evarts, Calif. ....Mar., 1927
J. Peterson, Iowa ....Mar., 1927
G. Shoemaker, Pa. ....Mar., 1927
C. Geiger, Pa. ....Mar., 1927
T. Tillman, Calif. ....Feb., 1927
J. Haught, Ill. ....Feb., 1927
W. Pontius, Iowa ....Feb., 1927
J. Howes, Md. ....Feb., 1927
M. Goller, Pa. ....Feb., 1927
F. Roschy, Pa. ....Feb., 1927
O. Knisely, Pa. ....Feb., 1927
L Stocker, Texas ....Feb., 1927
C. Adams, Conn. ....Jan., 1927
C. Radeleff, Iowa ....Jan., 1927
H. Lamons, Aenn. ....Jan., 1927
J. Schneider, Calif. ....Dec., 1926
P. Kauth, Ill. ....Dec., 1926
A. Grandadam, Ill. ....Dec., 1926
F Harding, Iowa ....Dec., 1926
H. Grimm, Utah ....Dec., 1926
J. Smith, Wash. ....Dec., 1926
C. Hall, Wash. ....Dec., 1926
H. Mokler, Ill. ....Dec., 1926
F. Bird, N. Y. ....Dec., 1926
R. Sherman, Maine ....Dec., 1926
C. Hardy, Mass. ....Dec., 1926
L. Cordes, Mo. ....Dec., 1926
R. Pogue & Son, Texas ....Dec., 1926
H. Rickley, N. J. ....Dec., 1926
A. Hallander, Calif. ....Dec., 1926
J. Griffiths, Iowa ....Dec., 1926
W. Swetnam, Ky. ....Dec., 1926
F. Hoopengarnder, Md. ....Dec., 1926
L. Turner, Kans. ....Dec., 1926
W. Matthews, England ....Dec. 1926
W. Branch, N. C. ....Oct., 1926
J. Taylor, Calif. ....Oct., 1926
W. Branch, N. C. ....Oct., 1926
F. Mataocks, Ark. ....Sept., 1926
E. Jones, Wise. ....Sept., 1926
J. Clark, Jr., Vict. Aust. ....Aug., 1926
L. Wesley, Ariz. ....July, 1926
J. Buchner, Mich. ....July, 1926
J. Dambach, N. J. ....July, 1926
H. Mitchell, N. Y. ....July, 1926
I. Boles, Ohio ....July, 1926
F. Vavasour, New Zealand ....July, 1926
S. Butler & Son, Mich. ....June, 1926
A. Schmitt, Nebr. ....June, 1926
M. Broton, N. D. ....June, 1926
J. Campbell, Oregon ....June, 1926
F. Over, Pa. ....June, 1926
A. Clark, Jr., Clct, Aust. ....June, 1926
C. Sager, N. Y. ....May, 1926
H. Pirret, Oregon ....May, 1926
P. Sowa, Oregon ....May, 1926
D. Ackland & Son, Man. ....May, 1926
J. Sinclair, W. Aust. ....May, 1926
C Sex, England ....Apr., 1926
P. Peterson, Iowa ....Apr., 1926
G. Bowers, Okla. ....Apr., 1926
E. Dignan, South Aust. ....Apr., 1926
J. Carswell, Ark. ....Mar, 1926
C. Burton, Mass ....Mar., 1926
W. Pochelu, Oregon ....Mar., 1926
A. Bowman, Va. ....Mar., 1926
W. Widger, N. Y. ....Mar. 1926
W. Glenn, Colo ....Mar. 1926
T. Moore, Vict., August. ....Mar. 1926
H. Brown, Va. ....Mar. 1926
H. Barnes, Va. ....Mar., 1926
G. Iller, N. S. W., Aust. ....Mar., 1926
E. Jones, New Zealand ....Mar., 1926
G. Torrey, Calif. ....Feb., 1926
E. Schauppner, Nebr. ....Feb., 1926
F. Trogdon, N. C. ....Feb., 1926
A. Garver, Ohio ....Feb., 1926
C. Jones, Pa. ....Feb., 1926
J. Fox, Kans. ....Feb. 1926
R. Dean, Texas ....Feb., 1926
J. Murphy, Calif. ....Jan., 1926
O. Temple, Idaho ....Jan., 1926
F. Kearns, Ill. ....Jan., 1926
J. Murphy, Nevada ....Jan., 1926
W. Post, N. Y. ....Jan., 1926
J. McIntire, Pa. ....Jan., 1926
N. Karolewicz, S. D. ....Jan., 1926
Inglis & Son, Nebr. ....Feb. 1926
L. Messersmith, Idaho ....Jan. 1926
J. Merritt, Calif. ....Jan. 1926
J. Hess, Ohio ....Jan. 1926
W. Pederson, Ill. ....Jan. 1926
Powell Bros. & Whitaker, Eng. ....Jan., 1926
H. White, N. Z. ....Jan., 1926
M. Rawlins, Calif. ....Dec., 1925
J. Hulvey, Ill. ....Dec., 1925
P. Nelson, Minn. ....Dec., 1925
J. Devine, N. J. ....Dec., 1925
S. Wright, N. Y. ....Dec., 1925
E. Lain, N. Y. ....Dec., 1925
W. Jones, Texas ....Dec., 1925
Williams & Turner, W. Va. ....Dec., 1925
A. Spence, B. C. ....Dec., 1925
N. Buchanan, Ont. ....Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ....Dec., 1925
W. Snyder, N. Y. ....Dec., 1925
J. Skiff, Pa. ....Dec., 1925
F. Crook, N. Y. ....Dec., 1925
J. Singer, N. Y. ....Dec., 1925
H. Edwards & Sons, N. Y. ....Dec., 1925
G. Strait, N. Y. ....Dec., 1925
E. Monroe, N. Y. ....Dec., 1925
L. Loch, N. Y. ....Dec., 1925
L. Rajewsky, Minn ....Dec., 1925
W. Bolle, Ill. ....Dec., 1925
F. Carlson, Ill. ....Dec., 1925
W. Seamans, Ky. ....Dec., 1925
J. Wriey, Mo. ....Dec., 1925
J. Mallay, N. J. ....Dec., 1925
S. Haslett, Ohio ....Dec., 1925
C. Seidles, Pa. ....Dec., 1925
W. Robertson, S. C. ....Dec., 1925
H. Collins, Ohio ....Dec., 1925
G. Hanshaw, Okla. ....Dec., 1925
W. Bate, Conn. ....Dec., 1925
R. Shipley, Iowa ....Dec., 1925
W. Nattress, N. M. ....Dec., 1925
J. Sammerlee, N. Y. ....Dec., 1925
D. Rhymes, Texas ....Dec., 1925
L. Heath, Calif. ....Dec., 1926
E. Wright, Ill. ....Dec., 1925
C. Frazier, Ky. ....Dec., 1925
G. Leuts, Ohio ....Dec., 1925
J. Sebesta, S. D. ....Dec., 1925
P. Oram, England ....Dec., 1925
F. Wortell, Calif. ....Dec., 1925
E. Thomas, N. Y. ....Dec., 1925
H. Miller, Wash. ....Dec., 1925
M. Bates, N. Y. ....Dec., 1925
J. Woods, Oregon ....Dec., 1925
W. Areford, Pa. ....Dec., 1925
J. Howell, Mo. ....Dec., 1925
J. Morrow, Pa. ....Dec., 1925
A. Darling, Sr., N. Y. ....Dec., 1925
J. Goebel, Kans. ....Dec., 1925
C. Rausch, Ohio ....Dec., 1925
R. Noble, Jr., Ont. ....Dec., 1925
C. Lynch, Oregon ....Dec., 1925
H. Clanson, Pa. ....Dec., 1925
Neles, Bros., Calif. ....Dec., 1925
H. Lefler, Mich ....Dec., 1925
D. Bullinger, Mo. ....Dec., 1925
A. Potter, Conn. ....Dec., 1925
R. McMains, Calif. ....Dec., 1925
W. Jordan, Maine ....Dec., 1925
R. Fisher, Pa. ....Dec., 1925
P. Kaimulos, T. H. ....Dec., 1925
H. Hesse, Kansas ....Dec., 1925
F. Hinkey, Ohio ....Dec. 1925
A. Wassmuth, Idaho ....Nov., 1925
G. Illsley, Mass. ....Nov., 1925
A. Speir, Ohio ....Nov., 1925
W. Clepper, Texas ....Nov., 1925
J. Mallett, Queensland, Aust. ....Nov., 1925
J. Dribble, South Aust. ....Nov., 1925
W. Schaid, Wis. ....Nov., 1925
D. Frazer, N. J. ....Oct. 1925
L. Krause, Ind. ....Oct. 1925
M. Pople, N. S. W., Aust. ....Sept., 1925
J. Wilkinson, Queens, Aust ....Sept., 1925
C. Williams, Victoria, Aust. ....Sept., 1925
Reynolds Bros., Pa. ....Sept., 1925
F. Krens, Calif. ....Aug., 1925
D. Allen, Mont. ....Aug., 1925
G. Fisher, & Bro., Ohio ....Aug., 1925
W. Dixon, Ohio ....Aug., 1925
F. Shupe, Pa. ....Aug., 1925
W. Wright, Va. ....Aug., 1925
H. Knoues, Ill. ....July., 1925
A. Velt, Mass. ....July, 1925
J. Stadler, Calif. ....July, 1925
Sligo Iron Co., Mo. ....July, 1925
G. Hogoboom, N. Y. ....July, 1925
H. Schriber, Pa. ....July, 1925
H. Fast, Manitoba ....June, 1925
G. Brougham, N. Y. ....June, 1925
A. Nordstrom, Iowa ....June, 1925
C. Holton, Okla. ....June, 1925
D. Conillard, Vt. ....June, 1925
Rasmussen & Baasch, Nebr. ....May, 1925
J. O'Rourke, N. Y. ....May, 1925
A. Spangberg, Oregon ....May, 1925
C. DeVore, Pa. ....May, 1925
Halvorson, Bros. ....May, 1925
A. Lemmon, Utah ....May, 1925
H. Leadbitter, N. S. W., Aust. ....Apr., 1925
J. Matthews, England ....Apr., 1925
M. Duvoisin, Ill. ....Apr., 1925
E. Ellsworth, Iowa ....Apr., 1925
G. Gullgren, Iowa ....Apr., 1925
H. Wiese, Iowa ....Apr., 1925
Heart's Delight Farm, N Y. ....Apr., 1925
S. Wilkin & Sons, N. Y. ....Apr., 1925
P. Wand, N. Y. ....Apr., 1925
M. Settle, Ohio ....Apr., 1925
D. Kille, Okla. ....Apr., 1925
J. Helms, Calif. ....Mar., 1925
E. Moon, Ind. ....Mar., 1925
A. Holmquist, Iowa ....Mar., 1925
G. Fredericks, Minn. ....Mar., 1925
O. Martinson, Minn. ....Mar., 1925
C. Lindquist, Minn. ....Mar., 1925
F. Locke, N. Y. ....Mar., 1925
G. Follmar, Nebr. ....Mar., 1925
J. Pool, Texas ....Mar. 1925
W. Thomas, Mo. ....Mar 1925
Higgins Blk. Shop, S. D. ....Mar. 1925
C. Wiesner, Calif. ....Mar. 1925
J. Guthrie, Va. ....Mar. 1925
C. Alexander, N. Y. ....Mar., 1925
P. Chemin, Ont ....Mar., 1925
F. Faistinger, Pa. ....Mar., 1925
E. Roseth, S. D. ....Mar., 1925
V. Priesmits, Wisc. ....Mar., 1925
A. Hersog, Misc. ....Mar., 1925
J. Cattanash, Colo. ....Feb. 1925
S. Stevenson, Kans. ....Feb. 1925
F. Hall, Wyo. ....Feb. 1925
J. McCallum, N. D. ....Feb. 1925
C. Ford, Oregon ....Feb. 1925
F. Chaves, N. Mexico ....Feb. 1925
J. Taugher, Ont. ....Feb., 1925
G. Lawton, South Aust. ....Feb., 1925
E. Dillabough, Tnt. ....Feb., 1925
J. Ford, Wash. ....Feb., 1925
J. Kers, Ill. ....Feb., 1925
E. Price, Ill. ....Feb., 1926
R. Nystrom, Mich. ....Feb., 1925
E. Hiteshue, Ohio ....Feb., 1925
D. Garber, Ohio ....Feb., 1925
A. E. Meier, Wisc. ....Feb., 1925
J. Beyerholm, Calif. ....Jan., 1925
C. Lake, Colo. ....Jan., 1925
H. Draper, Ind. ....Jan., 1925
J. Damm, Iowa ....Jan., 1925
E. Atteberry, Mo. ....Jan., 1925
A. Hahn, Colo. ....Jan., 1925
D. Shearer, Ohio ....Jan., 1925
H. Compton, Tenn. ....Jan., 1925
C. Jacobits, Wis. ....Jan., 1925
A. Witt, Wis. ....Jan., 1925
J. Withers, Terre Haute ....Jan., 1925
M. Bennett, Miss. ....Jan., 1925
J. Howard, Jr., Ala. ....Jan., 1925
J. Flynn, Iowa ....Jan., 1925
S. Bradford, Miss. ....Jan., 1925
E. Staley, Calif. ....Dec., 1924
J. Davis, Calif. ....Dec., 1924
G. Tatum, Fla. ....Dec., 1924
G. Laughlin, Ill. ....Dec., 1924
R. Bueker, Ill. ....Dec., 1924
F. Jarvis, Ind. ....Dec., 1924
W. Herdt, Ky. ....Dec., 1924
E. Naylor, Md. ....Dec., 1924
J. Klein, Md. ....Dec., 1924
M. Bailey, Mich. ....Dec., 1924

Taking Down and Re-Assembling the Storage Battery

PART V.

E. A. DECKLIN

Hints on Battery Work

It is of course possible for the battery repair man to make his own electrolyte. It is very necessary for him, however, to use every precaution in doing so, inasmuch as he will find sulphuric acid a very dangerous liquid to fool with.

The first requirement in the preparation of electrolyte is a glazed stone jar. Into this jar, pour the water first. It is of course understood that nothing but clean distilled water is to be used. Now fill the hydrometer syringe with chemically-pure sulphuric acid, and add the acid to the water, holding the nozzle of the syringe under the surface. Stir the solution with a glass rod, or a clean piece of wood. Now rinse the syringe and test the strength of the solution. If not enough, add more acid until the proper strength is secured. If too strong add more water. It is of course understood that pure acid

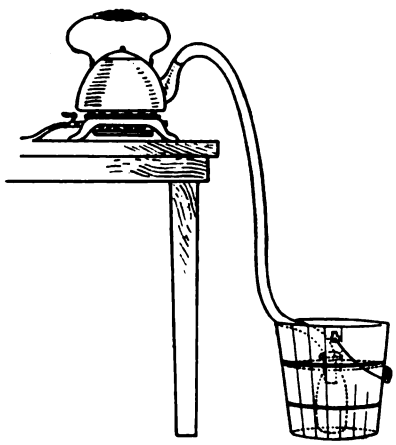


FIG. 1.—A SIMPLE MEANS OF MAKING DISTILLED WATER

should not be allowed to remain in the syringe.

In testing the electrolyte for specific gravity, it is absolutely necessary that the temperature be taken into consideration. A thermometer is therefore necessary. Hydrometer readings should be taken when the electrolyte is a 70 degress Fahrenheit.

In using the hydrometer to determine the condition of a battery, the following hydrometer readings will determine approximately the condition of the battery as follows:—A specific graviety of 1.280 indicates a fully charged battery; A reading of 1.260 indicates a battery about three-fourths charged; A reading of 1.225 indicates about half-charged; while a reading of 1.150 indicates an exhausted battery which should be removed from the car and be given a full charge.

As indicated in these articles on various occasions, it is absolutely necessary that clean distilled water only be used for battery purposes. Filtered water will not do. It is therefore necessary that the battery repair man have some means of distilling his water so as to have it on hand at all times. A simple means of making your own distilled water is shown in Fig. 1. An ordinary teakettle of aluminum or enameled ware is used. Do not use an iron kettle or any vessel made of anything that will rust. Then take a rubber hose or tube of proper size and length, which has been previously thoroughly cleaned carefully with hot water and fit this over the spout of the tea-kettle. The other end of the hose is run into a bottle or glass jar and the bottle or jar placed in a bucket of cold water. The cold water surrounding the bottle or jar is for the purpose of assisting in the condensation of the steam. As had been intimated all of the apparatus should be absolutely clean so that no impurities may be introduced into the battery by means of dirty or impure water. The tea-kettle is now filled with water and by boiling this over the fire the steam will naturally pass through the tube and condense in the bottle.

In Fig. 2 a similar apparatus is shown that is somewhat more elaborate in that the hose is coiled in a bucket filled with cold water, or ice and the end projecting through a hole bored in the bottom of the pail and inserted into a jar or bottle on the outside.

For the battery repair shop which uses any considerable quantity of distilled water it may be well to build a special water still. An apparatus of this kind can be built by practically any handy repair man from material that is on hand so long as he does not use iron for any part of the apparatus that would come in contact with the water or steam from which the distilled water is secured. Copper tubing for the coil in which the steam is allowed to collect and condense is excellent for this purpose. The retort or container for the water which is being boiled may be of aluminum or enameled ware

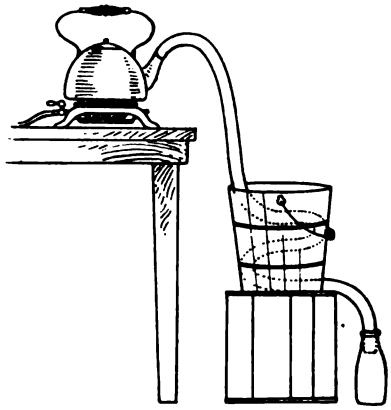


FIG. 2.—A SOMEWHAT MORE ELABORATE ARRANGMENT FOR DISTILLING WATER

if the enamel has not become chipped on any part of its surface. In Fig. 3 such a still and condenser is shown. Of course, the size of an apparatus of this kind will depend greatly upon the amount of distilled water needed from time to time. It is not at all necessary to have as many coils in the condenser as is shown in this illustration.

So that the distilled water may be kept handy and available at all times, it is an excellent idea to keep it in a wide mouthed bottle into which the nozzle of the hydrometer syringe can be easily inserted. A very handy outfit fitted up by one manufacturer consists of a hydrometer which fits very neatly into a bottle for the distilled water, and combined with this, is a cover for the bottle to exclude dust and dirt.

Every battery worker knows of course that the electrolyte in the battery must be kept above the plates. To determine the level of the electrolyte, unscrew the vent

plug from the cell which you desire to test and take a glass tube with both ends open. Push this straight down against the top of the plates, then place your thumb over the top end of the tube, and remove the tube with the top end still closed. The height of the liquid in the tube will equal the height of the electrolyte above the top of the plate. In returning the electrolyte to the cell, be sure to place it in the same one from which you removed it. If this is not done, the electrolyte in the various cells will become unbalanced.

How to Collect Shop Accounts

PART II.

It must of course be thoroughly understood throughout these articles that the customer who upon investigation proves to be notoriously unreliable, in his previous dealings with merchants is to be passed up as a credit risk. Here is a case where an ounce of investigation previous to the extention of credit will save tons of worry and shoe leather after the dead beat has 'gotten to you'' for a sum considerable more than you care to lose. However, there are no cast iron hand rules to be observed and while you may surround yourself with a most careful, system for judging your customer and for eliminating the dead beat before they get on your books, there will be times when you will need to call up very ounce of cleverness at your command in order to battle successfully with your wily debtor. At times you will be required to use the whip in order to bring your debtor into line and where you want him. At other times you will find that a few soft words will do more towards getting the money than all the force at your command. In the latter class, comes the incident related by a Western shopowner, who in attempting to get a settlement of an old account, which had baffled all his previous efforts, shows a remarkable insight into the frailities of human nature.

"Joe Wood, owed me a repair bill for several months. In fact the bill was so long overdue that he had taken his work to one of my competitors for he was ashamed to come into my shop. In meeting him on the street one day, I stopped him to inquire about his health, and that of his family, while I said nothing whatever to him regarding his overdue account, I asked him confidently if in his opinion a certain resident of town, of whom he was intimately acquainted with was worthy of credit. I added that the man had asked to open an account with me, and that I would like to have his opinion on the matter, knowing that he knew the man well. I also mentioned incidentally that I hoped he would keep it confidential, as I did not want the matter to get about town, as it may injure the man's credit if other merchants knew someone was inquiring about him. A talk along this line with several well-placed references to Joe's Wood own integrity, lead to a lengthy talk on the matter in hand. At the end of the talk, a direct reference to the long overdue account was made by Mr. Wood himself, and he also volunteered the welcome information that he would call at the shop in a few days and pay his bill. Which he did."

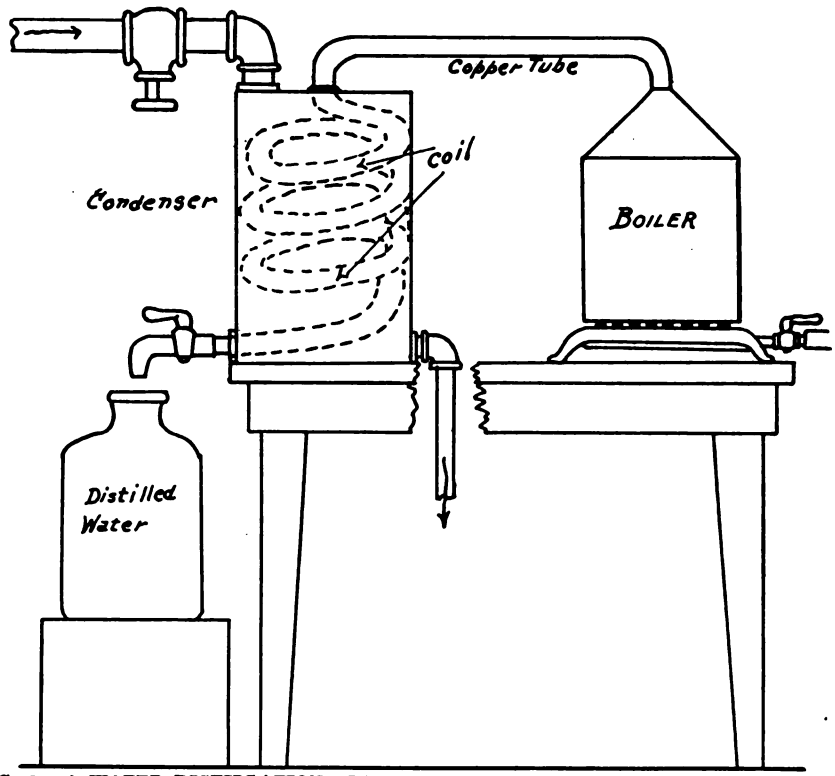


FIG. 3.—A WATER DISTILLATION PLANT FOR THE SHOP USING ANY CONSIDERABLE QUANTITY OF DISTILLED WATER

The Simple Credit System of One Shop Owner

This man after being in business at one location for over 19 years says he has lost but $35.00 in all of that time. His is a very simple system:

"I never hesitate to give a customer credit on any job unless I know he is a deliberate beat. In that case he cannot get credit under any circumstances. Usually a man does not ask for credit the first or second time he comes in, and by that time I know something about it. If I find him worthy of credit, I do not hesitate to extend it to him. When he brings in his second job, he will need to pay for the first one before he can have any more of my work on credit. In this way I keep a tight rein on credit extensions."

Using Strong Arm Methods

As previously observed, there are no set rules to be followed strictly and without exception in the collection of accounts. Witness for example how force is used in not only bringing the persistent dead beat to time, but also to create a reputation for insistence upon payment when an account is due. This illustrates how a Texas craftsman gets after his persistent delinquents.

"My shop is located in the country, and I generally have a hard time in making collections. However, when the time comes, I pick out the worst customer I have, and get after him to pay. Uusually a man of the type I pick will fail two or three times to keep his promises to pay. I then watch my chance to get after him in the right way. When I have him cornered, I ask him what he is going to do about his account, and if he shows fight,

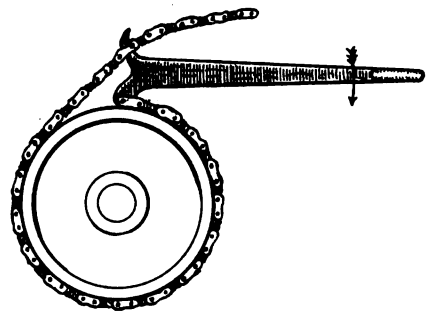
I just land on him and make him pay the fine just as I do. I then tell him that I am going to beat him every time I meet him until he pays me. This news naturally spreads rapidly, and the other chaps do not wait long to come in and settle."

This same Texas craftsman, speaking of the debtor, who is willing to pay, but does not happen to have the cash continues: "There are many poor and honest men who are willing to pay, but simply cannot come up with the cash. In dealing with such people, I take anything that they have to offer. Old scrap metal is always valuable, and I can always make good settlement on material of this kind. If the owner has a pig, or farm products of any kind, a trade can usually be made in such material. If you have any ability as a trader at all, you will be able to come out of the deal with profit.

Beating the "BEAT" At His Own Game

Another case where force was used, and the law taken right into the blacksmith's own hands, is a plan recently used by a New York State Shop owner. He relates his experience with one dead beat as follows:—"One way of beating the dead beat at his own game is to undo the work you have done for him. In other words, if a man comes into the shop to have his horse shod, and then wants you to charge it, you can insist upon cash, or if it is not forthcoming, remove the shoes from the animals feet. You might do as I did with a dead beat just recently. A man came into town with a horse and buggy. He brought the horse in to be shod. He had already purchased a quantity of groceries and other things and among the other things was a near jag. When I asked him for the money for shoeing the horse. the man refused to pay cash, so I refused to let him have the animal. "If you've got money," said I "for liquor, you've got money to pay for your horseshoeing." When I closed shop that night, I pulled the buggy inside, but took the horse to my own barn, which adjoins the house. Here I placed him in a stall and fed him. That evening the man with the sheriff and another man came after the horse, but they didn't get it. "Better give the man his horse," said the sheriff. But I firmly refused to deliver the horse until the shoeing was paid for. I kept the horse from Saturday until Monday, before I received my pay, and only delivered him to the customer after he had paid not only for the shoeing, but also for the horse's feed."

Another case along similar lines is related by an Ohio smith. A horse owner, by the name of Robinson, brought his horse to Horseshoer Scott, for shoeing. Upon completion of the job, Scott refused to let Robinson have his animal until the bill of $2.00 for shoeing had been paid. In an endeavor to get his horse, Robinson sought the aid of the Chief of Police. In the meantime, Scott placed the horse in a livery stable, and an additional



A HANDY GRIPPING DEVICE FOR USE ON FLY WHEELS

charge of $.50 was levied in addition to the bill for shoeing. The Chief of Police visited the Scott shop and when informed that Scott did nothing but a cash business he advised Robinson to pay the shoeing bill and the next time to send the money with the horse.

The Force Idea With a New Turn

A Washington State craftsman relates a similar experience he had with a member of a notorious family of "beats". After unsuccessful attempts to collect from two older brothers in a family of four, he continues: "Number three came in, and not saying that he wanted credit, he ordered shoeing as though he was prepared to pay for it. I started to put on common shoes, but he wanted Neverslips. I accordingly put on what he ordered, after he informed me that I would have to wait until he got his money from the railroad work he had done. I replied:—"That doesn't work at all. Your brother tried to get a horse shod on that kind of pay and failed, so you just leave this cayuse and go and get me $2.50, then you can have it—also it will be necessary for you to pay 25 cents for each feed that I give the horse." He then ordered me to pull the shoes off, but I said: "Not much; I could do lots of that If I wanted to." He then started out to hunt the coin, as I supposed, but he must have met his older brother, for they both came back to the shop. The older one inquired why I refused to give his brother his horse. I said:—"Simply because he hasn't paid for the shoeing." He immediately informed me that he would get that horse right now or somebody would suffer. I took up a horse rasp and said:—"Now then, there's the door, and you go." He accepted my invitation. Then the younger brother begged for the horse. He had on a good pair of "chaps" and I told him to leave the chaps as security and he could get the horse. I got my money about two weeks after that. They have tried to get work done on credit since that time, but I tell them there is "nothing doing."

Undoing The Work Done

Another case wherein similar tactics were used, was that of a wagon job. A notoriously unreliable farmer drove up to a shop and told the smith to put in a number of new spokes, patch the box bottom and renew several spring leaves in the wagon which he had left at the door. The smith knowing the man with whom he was dealing said:—"You know I'm doing work for cash only, Mr. Brown, so bring the cash with you when you come for your wagon."

The customer was inclined to hedge at this proposition, but finding the smith unwilling to do the work, except on a cash basis, the farmer finally agreed to bring the money. The smith accordingly did the work, and upon its completion "phoned his customer to call for his wagon. This the farmer did after a day or two, and when he came the wagon was in the shop pulled to one side. The customer walked in and looked over the work, while the smith was busy, and proceeded to pull the wagon out where he could hitch his team to it. The smith dropped his work, and walking toward him, asked the man if the work was all right. "Yes," said the customer, "I guess it's all right";—"I am glad to hear it" said the smith. "My charge is $9.50."

To this the customer paid no attention, but continued pulling his wagon toward the door. When nearly to the big doorway, the smith said:—"That job is $9.50, Mr. Brown; you know my terms are

cash." "I'll come in with it tomorrow when I'm coming down to the store," replied the customer, about to pull the wagon out of the door.

At this the smith gently but firmly grabbed the center pole of the wagon, and proceeded to back the vehicle into the shop. The customers was inclined to resent this but a more or less gentle grasp by the shoulder and a push to one side, showed the man that the smith meant business.

When the smith had placed the wagon to the back of the shop, he said:—"Now, Mr. Brown, if you want your wagon you pay for the work first." The man was not inclined that way, however, and insisted upon getting his "property," as he called it. "All right," said the smith, "You'll get your property, and right away too."

The smith then ordered his men to rip out all the new work that they had put into the rig and put back the old as well as they could. Upon these instructions the men were beginning to act, when the customer yelled about damaging his wagon. He also said that he'd pay immediately. "I ought to get some things in town with his money, but I suppose I got to buy you off, or you'll make my wagon worthless", said the customer offering the money.

"You are not buying me off", said the smith, refusing the money, and motioning his men to continue their work. "You agreed to pay cash and cash you will pay for the work." The customer was now well scared and said, "All right! All right! here's your money for the job. Give me my wagon and I'll go."

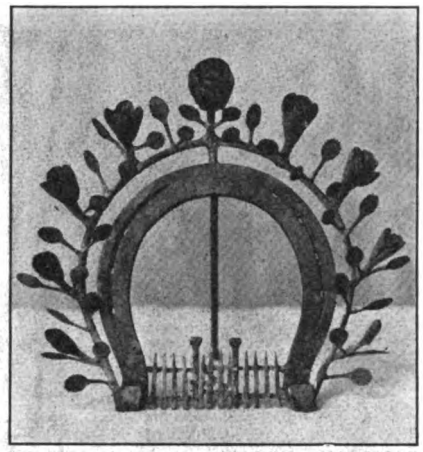
The smith now took the money and called to his men to replace what they had taken from the wagon. This did not amount to much as they had been well posted to just such tactics, and had really made more noise than the work of tearing out warranted.

While a shop owner is taking things pretty much into his own hands when making collections on the strength of a bluff of this kind, the bluff usually works. Of course a customer treated this way is not inclined to come back, nor is the smith inclined to work for a man of this kind, unless he pays spot cash for his work.

A Handy Gripping Device

Mr. W. H. Matthews, one of our very good subscribers in England, sends in an illustration and description of a very efficient gripping device that should prove of interest to other readers of "Our Journal."

A glance at the illustration will show the operation of the device for holding or gripping brake drums, and similar parts which are secured to shaft by means of a taper bearing and a nut. For handling such, there is very frequently no means provided for holding the wheel or drums while the nut is being tightened. The holding device consists of a piece of steel, shaped as shown in the engraving, with an old driving chain, attached to one end.



A CLEVERLY WROUGHT PIECE OF ORNAMENTAL WORK

In operation, the hook on the end of the steel handle is inserted in one of the links of the chain and the handle is then pulled in such a manner as to tighten the chain around the fly wheel or drum as the case may be. This tool will exert a very powerful grip and yet will not mar a polished surface if used intelligently.

An Ornamental Hand Wrought Piece

FRANK OHLER

The accompaning illustration shows an ornamented hand forged piece representing a horse shoe with a climbing rose vine and a picket fence. This work is made entirely by hand and I think it a pretty good piece of work to show what can be done with iron. This figure would be a good one for some of the smiths to practice on. It isn't difficult to make after a fellow gets started at it. If any reader wants to know anything about this I will be glad to tell them all about it if they will simply ask questions.

Are You Prepared?

P. W. RAUSCHERT

Look about your shop now to see how many things things there are that are not in first-class condition to stand their share of the burden during the next few months. Your tools you know are your helpers. They cannot perform their duties satisfactorily unless they are in condition.

Let us take a walk through the shop together to see if there are not a few things in need of attention which has been overlooked or put aside for repairs until a more opportune time.

Your anvil and your forge see more work than any other tools or machines that you use. Would a close examination of the forge find it O. K? Better go over it and if it needs over-hauling, a new tuyer or other parts—now is the time to do it.

Your anvil no doubt, is in good shape, but if it needs redressing, don't put it off. When your shop is filled with customers waiting with jobs your anvil will come in for some hard work.

Your earliest spring work will no doubt be on plows. Do you use a leveling block for this work? If not, you will find one very handy.

July, August and September are the months in which tires commence to make themselves heard and try to part company with their wheels. That is when your tire shrinker pays for itself. Perhaps you haven't used it since last summer, but now is the time to look it over and place an order for broken and worn parts. In this connection, let me give you a hint. Be sure to mention the marks found on the main castings of the machine as well as a complete description of the part required. This will enable your jobber to order from the concern who actually manufactured the machine. Parts furnished by different manufacturers will not interchange. This is true of any repair part that may be required. Examine your tire bender very carefully. It also will be needed.

Drills, shears, emery wheels, punches, motors, shafting, belting; go over them all to see if they are in shape to serve you well.

Up to now we have spoken only

of your machinery and larger tools. Now let us consider your hand tools. Check off each item after you have examined it and arranged for repairs, replacements or new items:—Sledges; Hammers; Tongs; Wrenches; Screw drivers; Punches; Drifts; Swages; Drills; Reamers; Augers; Pliers.

Does this cover everything? Perhaps not. Don't overlook a thing. The time lost on a job done by hand which could be done more quickly by a machine that is out of commission will very often more than pay for its repairs.

Now that we are sure of the equipment, let us go over your stock of materials. It is always good policy to order soon enough so that some good customer will not have reason to complain of your procrastination.

Again check off the items as you go over the stock:—Iron (all sizes and shapes); Steel all sizes and shapes; Wood stock; Horseshoes; Calks; Nails; Bolts; Screws; Rivets; Axles; Skeins; Plowpoints; Plowshares.

This, of course, does not cover your entire requirements, but gives you a good working list. With material especially, it is better to be prepared than sorry.

This is a good time to make the changes you have been thinking of; building repairs, rearrangement of machinery, etc. Preparedness is a wonderful thing when correctly applied by a business man and especially at this season by a blacksmith and repair man.

A Shop-Made Band Saw Frame

J. P. HARMON

The accompaning engraving shows a band saw frame that I made myself. The wheels are from an old mowing machine. These were cut off and dressed down to a two and one-half-inch face. The arms that hold the upper head blocks are from an old horse power threshing machine. The lower frame, as can be seen in the engraving, is a circular saw frame. The frame will take a 16½ foot band saw and the entire cost of the frame was $3.55 except for my time in building it. The mechanism for tightening and loosening the saw is clearly shown in the photograph.

Further description of the machine is hardly necessary as any reader desiring to make one can see from the photograph just how this one is put together. Of course, anyone desiring to build one may not have the same material I had to work with so that a man would need to use his own ideas depending upon the material he had on hand.

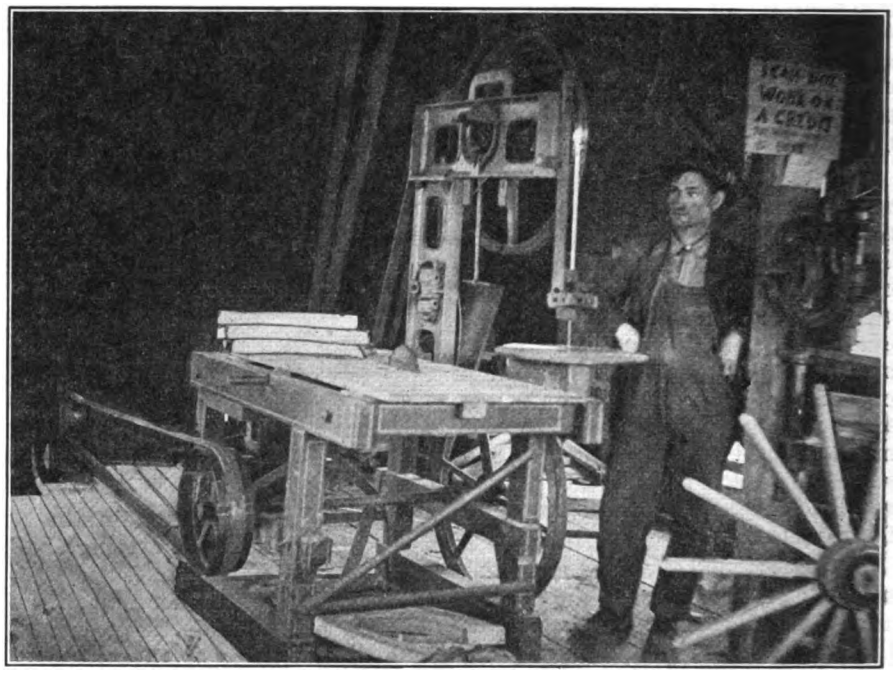
Something More on Natural Shoeing

E. H. MALOON

In the March number I see Friend "Blue Nose" gives me a rap on natural shoeing. I shall have to ask him what he did to that colt that caused him to knock his ankle. According to his story he took him in barefooted and shod him and he hit. He took the shoes off and he hit. This shows that he did something to the foot that threw him out of ballance. If he had put his shoes on and left the feet as he found them the colt would have gone clear. The colt would have gone clear when he took the shoes off and sent him out the third time just as he found him at first excepting what he did to his feet. He took the colt in when he was going sound and right only he needed a little protection against wear and the question arises why did he perhaps cut his foot down or trim it around the edge and set him to cutting so hard that he had to put a pair of freak shoes on him to stop his hitting.

I am always much pleased when a horse comes to me that is all right and I am mighty glad to shoe him and leave his feet as I find them except the extra horn that must be cut off. This is where the angle of the foot comes in that Mr. Hall speaks of. I never think of angles. My great desire is to get that hoof in shape on the bottom so that each part of the hoof will carry its part of the load. When I have done this as best I can I have a foot that describes a straight line coming down the center of pastern and strikes the floor close to the point of the frog. I should judge Mr. Hall's lines were about right. One thing is sure: with my way I keep 150 to 200 customers satisfied. We surely have not got a regular horse that is hitting himself and we certainly take old, partially foundered horses and make them go better. When a horse comes to me that is hitting I try very hard to find the cause, whether it is in the way he breaks over, carries or lands. When I satisfy myself on this I generally find a way to make him do different by weight of shoe or placing the calks in different positions.

I never use a freak shoe. What I do is to take away objections and put on objections and it is seldom I miss. In all of my articles I never lay down hard and fast rules for anyone to go by. A natural or normal horse I shoe in a natural, humane way, using iron enough to protect his foot from undue wear.



A NEATLY MADE BAND SAW FRAME FROM CAST OFF FITTINGS

A deformed horse I shoe in a way to help him do his work in a natural manner just as near as I can and that is all any man can do. I do not know it all and I rarely ever read that I do not get some point that is worth saving

Horseshoeing has changed very much since autos have come. Once we had livery and gentlemen's driving horses to shoe, but now it is farmer's work horses and heavy work horses, slow moving all of them. Here we get no interfering. In old times it was the livery horses that made the shoer sit up and think. These horses were ever-driven and over worked and it had to be a well-made horse that did not go wrong some of the time. A man who knows can do wonders with a fast horse by changing his shoe. This branch of the business I know but little. My work has always been on the gentlemen's driver and the work horse.

My hobby is frog pressure or a surpport for the internal foot. To keep this in its proper place is a job for a grown man. Most of the time the horse owner stands his horse up on calks and leaves his foot to turn nearly inside out. The result is a lame horse that suffers all of the time and but few men seem to know the trouble. I make a shoe with a steel plate welded on that covers the frog. Under this I stuff cotton and calking hard or soft as I want the pressure. It is really a perfect shoe for the horse that has to wear calks.

Proper Shoeing Based Upon Intelligent Examination of Foot and Limb

C. E. Frazer

There has been so much said about shoeing naturally that I feel like saying a few things about the foot that is naturally crooked, or deformed such as a long side and a short side; what we call run-over or one that toes in or out? If you shoe him naturally, he would never be any straighter. My rule is to look at the horse from the side, from behind, and from in front. Then I am ready to trim to as near level as I can with the front foot to an angle of 50 degrees and the hind foot 48 degrees, by my leveler — a thing every shoe'er should have. For some cases it is almost indispensible if you want a perfect job. I try to shoe to as nearly what the foot should be as I can.

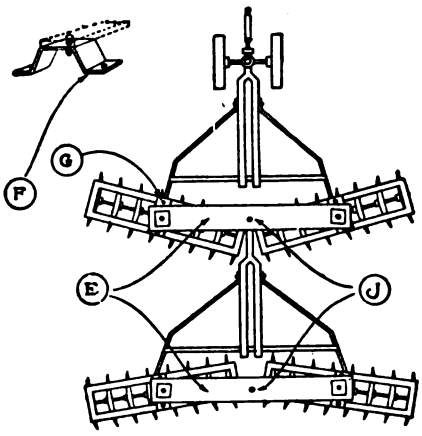
If the front foot is crooked, I try to shoe straight with the leg, and so that the leg will set in the center of the shoe with the fetlocks centered between the heels of the shoe and the center of the toe to the center of the leg in front. If shod by these rules and perfectly level there is hardly any horse that will interfere.

When a horse has a foot that is straight down on one side but flares out on the other, I take a shoe with a wide web. On the side where the foot goes straight down I punch new holes on the inside web and let the shoe extend out until the leg is in the center of shoe. For forgers I turn the front up a little at the toe and let the hind shoe project a little at the toe. This quickens the knee action and retards the hock action and he will clear in most cases. Of course, you can't get every horse to go clear the first time, nor perhaps the second especially when they are as bad as I have seen and shod them. That is where good judgment, with a knowledge of the foot and leg come in handy.

If a horse has walked a long time on a crooked foot, it is best not to overdo the thing the first time. Feel his joints, turn his foot in and out, and see if he will stand leveling without putting his joints in too much of a strain.

These are some of my rules for shoeing though it is understood, of course that they vary some for I shoe from a very small shetland and also race track horses, fancy saddle and harness horses to about 1800-pound draft horses. All rules won't work on all horses, but these mentioned are general, and will almost always work.

I have been shoeing for forty years, and am still at it, and learning more and more about it each year. I shoe now for two veterinarians, and have shod first and last for half a dozen. I learn something from them as well as a great many things from "Our Worthy journal," which every blacksmith should certainly have.



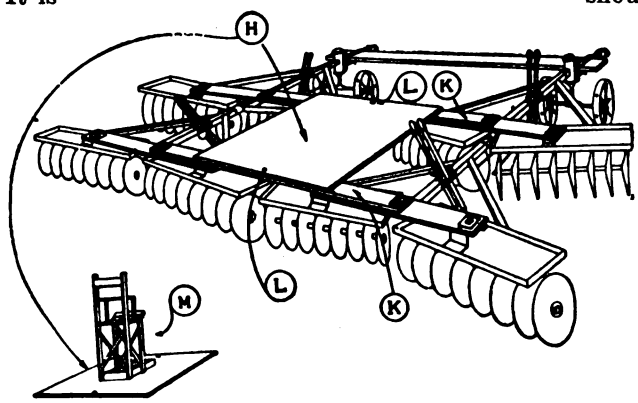
(F) Raised iron brace, home-made, bolted to discs at G to elevate plank high enough to clear discs in center.

(E) Plank 8 feet 6 inches long, extending from right front disc to left front disc, and from right rear disc to left rear disc, required in order to equally distribute the weight.

Two units, equipped thus, are placed side by side, and another equal plank extends from J on the left units to similar bearing points on the right units. This plank is shown in the lower diagram by arrow marked K. Plank floor, approximately 6 x 8 feet, is then placed upon planks marked K and attached by single king bolt L at front and rear. This permits the discs in either unit to advance or retire with utmost flexibility in turning corners. Other types of disc may require slightly different structure, but essential point is to distribute weight equally between the right and left discs, and between the right and left units in each combination.

(M) Rough structure about 6 feet high, for driver's seat. Elevation makes the handling of 7 horse team easier.

(L) King bolt.



PRACTICAL ARRANGEMENTS FOR HITCHING FOUR AND EIGHT SETS OF DISCS FOR HORSE OPERATION

Sheet Metal Work and Its Proper Reinforcement

In Work

Thos. Newton

The sheet-metal worker cannot go very far in his work without confronting the problem of how best to reinforce the metal he is handling so as to make it best serve a given purpose. The raw material of the sheet-metal worked is usually sheet metal of comparatively light gauges, and this has to be worked up into a multiplicity of shapes of various sizes. Obviously some reinforcement will be necessary if the shapes are required to be of a permanent character. Indeed, the very shapes themselves, in some instances, could scarcely be formed, and certainly they could not be

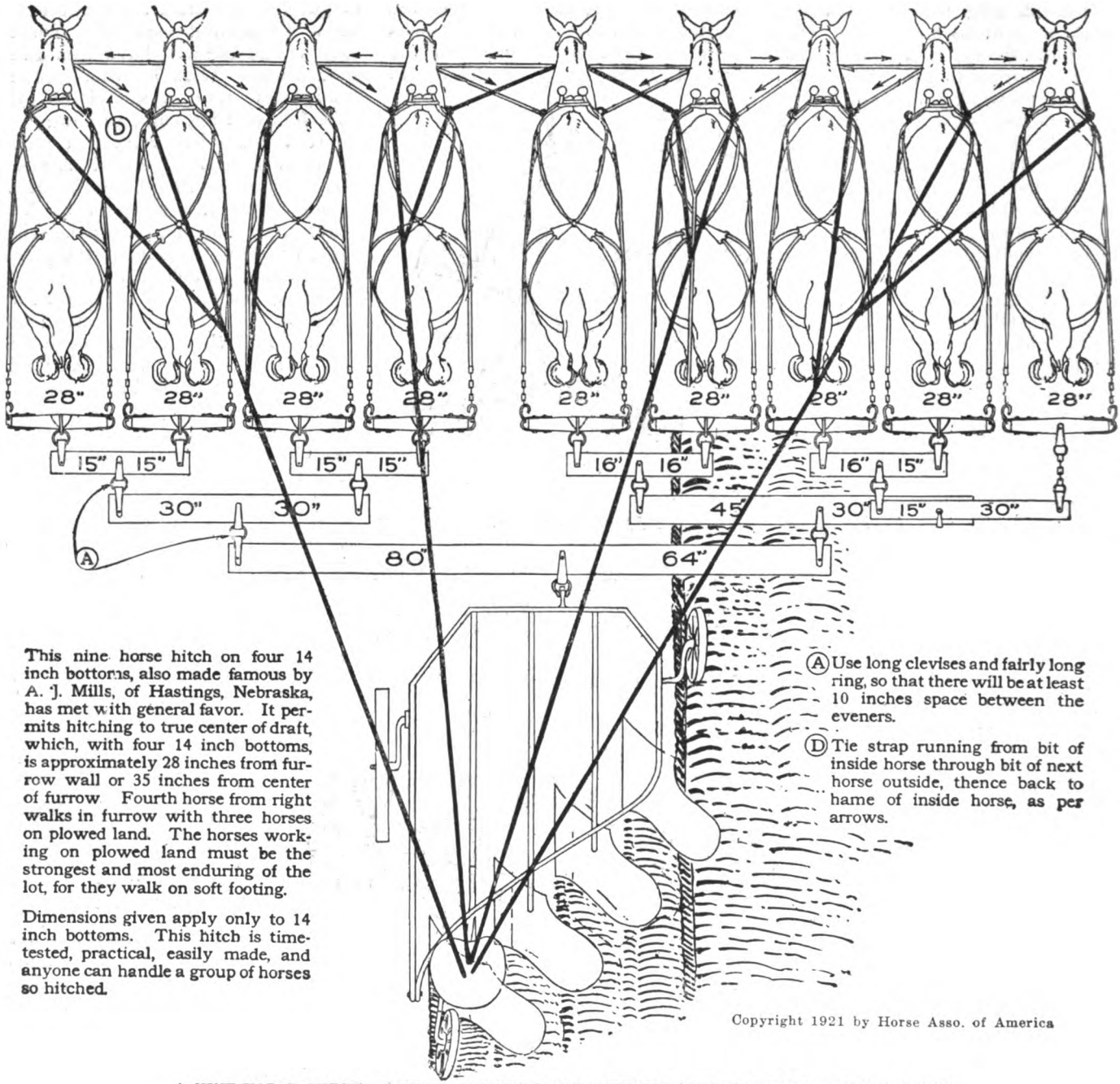
maintained without such strengthening influences as are due to methods of reinforcement.

The technical skill and experience of generations of craftsmen are sterotyped in the established customs and practices of to-day. This is true to such an extent that the expert craftsman, unconsciously almost, unfailingly does the technically correct thing. Potential weaknesses are eliminated, and by a judicious reinforcement of the metal the life of a given article is definitely prolonged. Reinforcement is always synonymous with utility, and oftentimes with finish or appearance. Here the contrast between the expert and the amateur is the most pronounced.

Wiring Sheet-metal

All sheet- metal articles are, more or less, reinforced by one method or another; but probably the most familiar and most extensively practised method is that of wiring. A bucket, saucepan or roasting-tin without the strong and finished wired top would be practically useless. In the absence of the wired edge of the bucket would not retain its shape, especially if one attempted to carry it full of water; while both the saucepan and roastingtin, in an unwired condition would become postive sources of danger. In these particular cases the change wrought by thus reinforcing the sheet metal is remarkable, for not only is strength imparted to each article where it is most needed, but the appearance of each is considerably enhanced by substituting a finished rounded edge for a dangerous raw edge.

These, briefly, are some of the reasons why the tops of domestic utensiles are wired. The gauge of the wire, however should be proportioned to the shape, size and nature of the article, so as to avoid imposing any unnecessary strain on the sheet metal. It would, for example, defeat the object in view if



A NINE-HORSE HITCH SHOWING EVENERS AND DIMENSIONS WITH FOUR 14-INCH PLOWS

an unduly heavy-gauge wire were introduced during the wiring of a small article of light sheet-metal. In such circumstances the sheet metal would be specially liable to fracture in any subsequent rounding or shaping process.

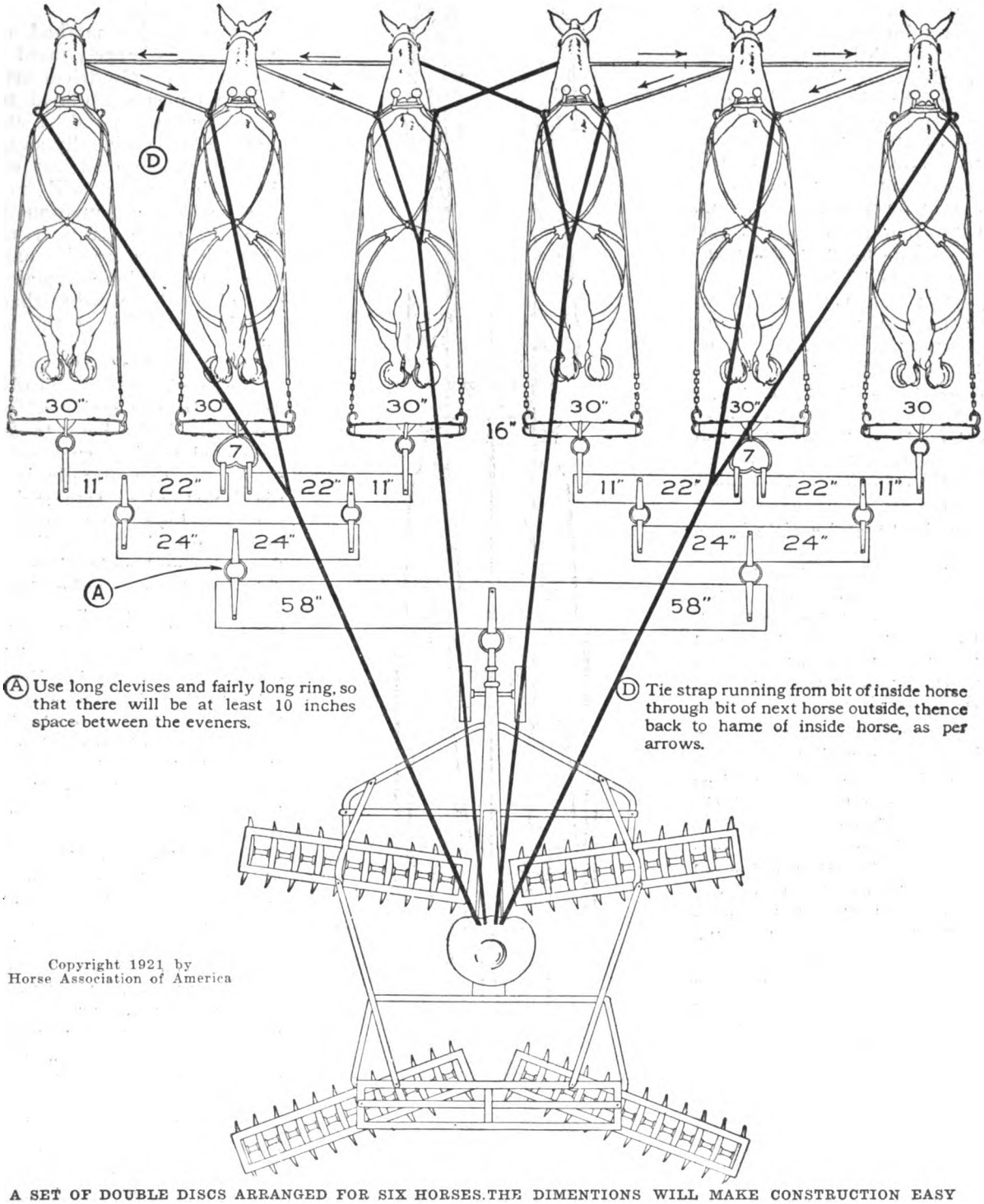
it is most essential. In such cases as these, these extra provision incidentally protects the bottom of the article which would otherwirse quickly wear out.

The insertion of wire is the generally accepted practice where an

On the other hand, such small artiles as handles, whether straight or curved, are similarly wired to accomplish the same purpose.

Angle-iron and Other Strengtheners

Water-cisterns, tanks and such like articles of large dimensions



A SET OF DOUBLE DISCS ARRANGED FOR SIX HORSES. THE DIMENTIONS WILL MAKE CONSTRUCTION EASY

It is sufficient to wire only the tops of some articles, but others are wired both at the top and bottom. coal hods and pails, for example, are each provided with a wired rim or foot; and this provision imparts additional strength precisely where

edge of sheet metal requires stiffening whether such edge be straight or curved in one or more directions. Thus the edges of the lid and box proper of deed boxes and similar sheet metal articles are all wired to enable them to retain their shapes.

require reinforcing with something obviously stronger than w i r e. Square or rectangular cisterns are best strengthened by means of angle-iron riveted round the top, and further strength is imparted by riveting four triangular plates to

the angle-iron at the corners of the cistern. This effectively ties all four sides together and prevents distortion when the cistern is in use. The bottom corners of the cistern are always weak spots unless they are reinforced; and the best method of converting a source of weakness into a corresponding source of strength is to rivet a special large-size rivet in each corner previous to the cistern being galvanized. During the galvanizing process the molten zinc flows round each rivet and eventually makes each corner solid. A similar result may be obtained in the event of the rivets being inserted after the galvanizing process by flating a body of solder over each rivet.

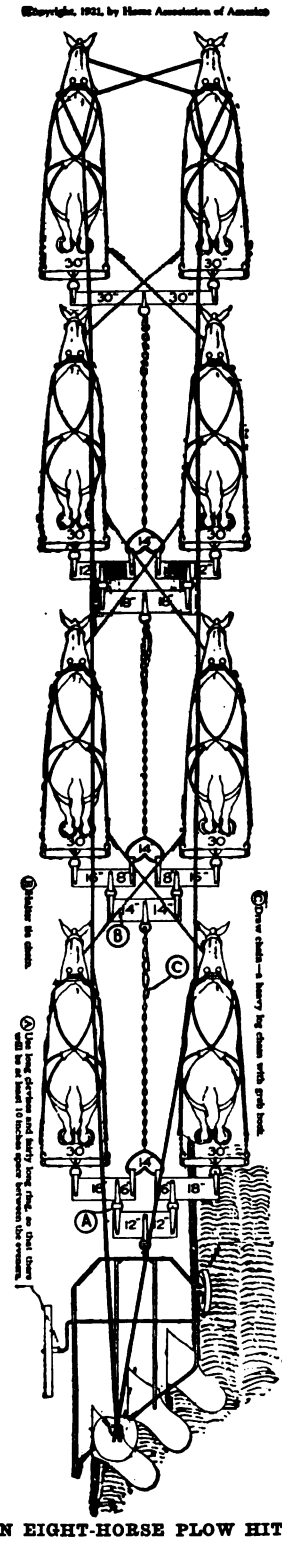
Cylindrical vessels of large dimensions have their tops strengthened by riveting a hoop of half-round iron around. This, of course is assuming that a wired edge is not sufficiently strong. Further support to the sides of both cylindrical and rectangular cisterns may be imported by riveting one or more cross-stays.

When a sheet-metal article is too small to warrant the use of wire as a reinforcing medium, the edge, or edges, as the case may be, are simply turned over and flattened. Additional strength may be imparted to such edges by passing them through the jenny in order to crease them, or in the absence of a jenny they may be creased in a crease-iron with a mallet.

Bosses and stays are also used as strengthening agents—particularly for handles, such as those usually fixed on watering-pots, etc. There can be no question that a bossed handle is much superior to an unbossed one, and the little extra time involved is well worth while.

Effect of the Seam

The nature of a seam to be used in connection with a sheet-metal article should always be considered from the standpoint of reinforcing the metal where it must need be joined. By judiciously selecting the type of seam, the latter can be made the strongest instead of the weakest part. Thus, while a lapped and soldered seam undoubtedly imparts strength wherever it occurs, still greater strength may be necessary, in which case the grooved seam would be employed. In a corresponding measure the knock-up seam is far superior to the capped edged or the lapped seam. The riveted seam, of course, is stronger still; and if even greater strength than this be required, it may be obtained by arranging the rivets in



AN EIGHT-HORSE PLOW HITCH

a double row on a correspondingly wider lap.

Swaging

Swaging is a very simple though effective method of reinforcing sheet-metal, and its employment is often resorted to when cylindrical articles are required to be made particularly strong. A certain amount of ornamentation can incidentally be effected by a judicious choice of the swage wheels and the arrangements of the swagings, but the primary object of swaging metal is to impart additional strength.

Although this method of reinforcement is largely used in connection with cylindrical articles, it is by no means confined to them, since conical and rectangular shapes are occasionally swaged. A swaged article made of comparatively light metal will frequently be superior to an unswaged article made of much stronger material. This, of course, applies particularly to the retention and maintenance of a given shape rather than to the wearing qualities of the metal itself.

Beads, etc.

The employment of beads which, essentially, are strips of metal of varying widths bent to any conventional section, such as a semicircle, vee, or rectangle, is a recognized method of reinforcing sheet metal. These are oftener used on boxes and similar bodies, having flat sides and ends, than on cylindrical articles. Trunks, deed-boxes, cash-boxes, etc., are frequently beaded, either in conjunction with or as a substitute for wiring. In many respects the beading is superior to the wiring as a strengthening agent. For example, it can be made to any given section, any desired width, and it can, moreover, be fixed in any given position. Wiring is principally used as a reinforcement along an edge which would otherwise be extremely flimsy. Beading may be used not only along an edge, but also elsewhere, as necessity demands.

A familiar method of reinforcing cylindrical articles is by means of hoops, which may be either riveted or soldered in position. When fixing a hoop a tight fit is essential, otherwise its value as a strengthening agent is partially, if not wholly, destroyed.

Angle plates fixed at the corners and bottoms of boxes are equally familiar, and as a means of imparting additional strength are equally obvious.

Hollowing

The simple expedient of hollowing sheet-metal adds enormously to its strength, and this is perhaps most noticeable in the case of hollowed bottoms and hollowed lids. In order to appreciate the value of

a hollowed bottom an attempt should be made to realize what would happen to a flat bottom of any large can in which liquid requires to be carried. Take a milk-can, for example. A flat bottom would wobble and yield with every movement of the liquid, and the series of alternate stresses and strains thus generated would undoubtedly add to the wear and tear, with the result that frequent repairs would become imperative and the life of the can would be correspondingly shortened. On the contrary, it would be far otherwise with a hollowed bottom. Besides being unyielding, a hollowed bottom imparts rigidity and strength

SOMETIMES EVEN THE TRACTOR FINDS THE GOING DIFFICULT. THIS PICTURE SHOWS THE FLEXIBILITY OF THE UNDER GEAR OF ONE MAKE OF TRACTOR WHICH PERMITS THE MACHINE TO ADJUST ITSELF TO UNEQUAL ROAD SURFACES AND TO OBSTRUCTIONS IN THE FIELD

to the body of the can, thus prolonging its life indefinitely. As with the bottom, so also with the lid. Those who have had experience know how a flat lid is liable to buckle and become distorted at the least provocation. But the hollowed lid is rigid and firm, and the deeper the purpose of gaining the reinforcement due to hollowing enters so largely in sheet-metal work.

The older craftsmen appraised hollowing at its true worth, for they hollowed at every opportunity. Not only were the bottoms and tops of articles hollowed, but they also hollowed the sides of many articles which, in these more strenuous times, are allowed to pass out of the shop unhollowed.

The mere act of hollowing a disc of metal strengthens it uniformly to a much greater extent than can be effected by any other manipulative process; and for this reason hollowing may be classed as one of the most important methods of reinforcement.

THIS department is the place for discussing shop and business matters. Here you may ask for information on any topics or matters that interest you; bring to the attention of the progressive craftsmen of the day the subjects that should have their attention. You are requested to make use of this department as often as desired.

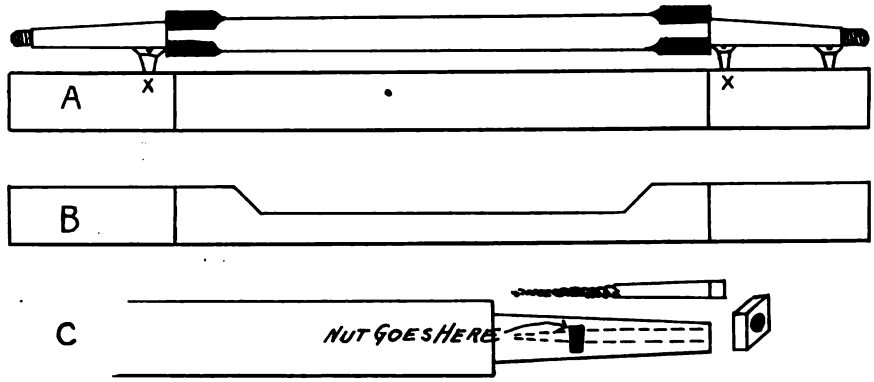
Regarding Cash or Credit:—Since W. A. B. of New Jersey would like some advice from some old timer, I will say for myself, that I am nearly on his list, as I have been at the business for 40 years. I started at my present place of business 19 years ago, and set up a shop, when I was almost a stranger. I credited every fellow for one job, but I looked out on the next credit he wanted if the first wasn't paid. Thus in the 19 years I have only lost $33.00. If any one can beat that, I will say you are a good collector. I will give you a few prices in this part; Shoeing, all round 2 pr. plain $1.00; Wagon axel $2.50; filling wheel $3.50; rim on wheel $2.50. I have not quit shoeing.

W. S. Watson, Tennessee.

Likes Articles on Battery Work:—I am especially interested in your articles on auto work, and consider the articles on Storage Battery Overhauling worth many times the price of "Our Journal"

O. M. Sasseen, Nebraska.

What Do You Suggest:—I am back for a little more advice. We are getting 45c and 65c here for shoeing, which I think would be a good price to hold right along. The shoeing business is dull on account of cars and horses are not shod regularly, sometimes once in two years. There is a village here, and there are some smiths around the country working for half



AN AXLE GUAGE AND HOW A BROKEN AXLE WAS REPAIRED

half price. To make the difference, some make their wives work the farm with the kids. And those that haven't a farm, make the wife boil moonshine.

There are five or six of these places here, so it makes some difference. I think something should be done. I was thinking we might corner them up on coal, as there are only two or three places to get it. I thank you very much for the advice I get through your paper, and personally. W. M. Robarge, Michigan.

An Axle Gauge—Repairing A Wooden Axle:—I have just received "Our Journal", and have read what H. H. Smith says about setting axles. It is a good way that I learned years ago. I have a different way now. It is easier and takes less time. I have a straight edge 5½ feet long. I use 3 screws as follows:—two screws X, X, in the engraving I put in the straight edge and have them come up to the shoulders on the bottom side of the axle. Have the screws the same length, say thre-fourths of an inch long. The place the other screw far enough along on the straight edge to be at the end of the axle. Have this screw 1/16 inch shorter than the other two. Set your axle to these screws and then try your wheels. If your wheels are dished more shorten the outer screw a trifle.

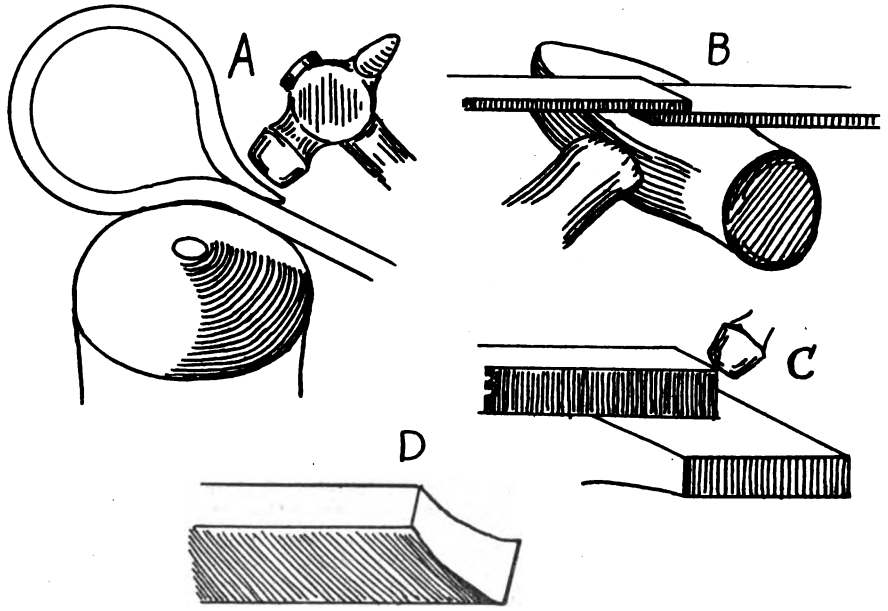
If your axle is cramped down take a board, make a straight edge on it and then cut out the center to the depth of the cranked part of the axles. See B in the engraving.

Suppose a man comes to your shop with one wheel off his lumber wagon—the coach screw or lag screw has pulled out and will not hold; how will you fix it? Here is how I do it. I bore with a ½-inch bit into the axle as far as I can and past where the lag screw reached. Then I cut the lag screw off and weld on a piece of ½-inch round iron and make a sharp point on it. I now cut a thread 1½-inches long and then I make an oblong nut, not too heavy, and cut a thread in that. I now let this down in the axle far enough to engage the sharp pointed bolt. Be careful not to cut a hole clear through the axle. An Old Pensy Smith.

A Word of Appreciation—Welding Eyes, —Welding Binder Knife—Welding Auto Springs:—The articles by Mr. Radebaugh now running in "Our Journal" will be a

great help to the younger smiths. The different steps in forging should be carefully studied by the young smith. Just reading them will not help much. They must be studied carefully and then the instructions put into practice. It is discouraging to see some of the so-called smiths of today work at the anvil. Some of them do not know how to forge the simpliest forms.

But the opportunities presented to the young smith by "Our Journal" are some young smith by "Our Journal" are some-is endeavoring to teach and instruct both young and old and the work done during



SEVERAL WELDING HINTS FOR EYES, BINDER KNIVES AND AUTOMOBILE SPRINGS

the past year has been notable. Different ideas have been discussed through these columns, all to the advantage of everyone—veteran as well as apprentice, and the ideas have been good ideas too—not theory or book ideas, but the ideas that have been put forth by men of experience and sound practice.

The subjects of auto and tractor work and welding has been thoroughly discussed, and some wonderful suggestions have been brought out. The articles on advancement, labor saving short cuts and the letter for foreign countries are very interesting. I wish that more of the craft would give their opinion or ideas on repair work. Some little kinks learned by ex-members go a long way in helping the other fellow.

Now I am going to give two kinks. When welding an eye, weld it on the horn of the anvil, and it will make it strong and heavy at the weld. In welding a binder knife, place your sledge on the forge in front of your fire; then when you are ready to weld, do the work on the sledge, and you will find it an easy job. Use welding compound.

Then there is another point I wish to talk on:—Look at your hand hammer,—Is the face flat? If it is, round it up. Make a slightly oval face, and you will find that in forging and welding, that there will be few hammer marks.

In welding auto springs, I scarf to a knife edge. In drawing down scarf drive back on upper edge as in engraving at C. Don't peen it out or put it on the edge of the anvil, or use the fuller, it won't work. Drive the upper edge back and draw to a knife edge. The thinner the edge, the more satisfactory the job. Use welding compound When the parts are placed on the anvil to weld, tap lightly at first increasing the weight of the blows as the parts go together. If your weld is not complete in first heat, take another.

James Baldwin, Indiana.

Quiet words of confidence are always more convincing than the loud mouthed utterances of the man given to shouting.

When you are attempting the sale of any item, part or accessory remember that.

An Busy Arkansas Brother:—The auto parts and repair work business is very young at this place, as there is only 14 cars here, and with the exception of two Fords, they have been here less than two years. So you see that we cannot expect very much from that line yet, but the car business is getting better all the time. Our roads are being improved, and we have the finest country in the world when you get it. Some of the greatest possibilities that the world has ever seen are before us.

I have two competitors in the blacksmith business, and they are fine men too. They are the co-operative type of competitors, so that makes things move smoothly you see. We have a territory 10 or 12 miles square here to draw trade from, and we are situated on the Kings River Valley, a fine farming district.

I am a reader of the American Blacksmith, Auto & Tractor Shop, and like the paper fine I have been thinking for sometime that I would get around to write a letter and tell Brother Craftsmen what we are doing here but have never gotten around to it yet, but may before long. I have so much work that I don't get very much time to write. By the time I do the work that I have to do and then digest the contents of "My Journal", I don't have much time to write anything for the other fellow to read.

J. W. Garton, Arkansas.

Prices From Missouri:—In looking over the Queries, Answers, Notes I read that Mr. J. M.Gaza of Kansas, asks for prices. We are located 58 miles south of Kansas City, Missouri on the M. O. P. Railroad, close to any supplies wanted. We have most of all the oak, ash and hickory that we use for wagon and buggy work. It costs us from two to three cents per ft. Here is a list of some of our prices. We run a wagon, blacksmith shop and garage The size of our buildings are: garage 44 by 64; shop 30 by 50; and storeroom 9 by 20.

Wagon Work:

Axles Front	$ 5.00
Axles Rear	5.00
Tongues	3.50
Hounds tongue pr.	2.00
Hounds rear Pr.	2.00
Bolster Front	3.00
Bolster Hind	3.00
Sand board	3.00
Reaches	1.00
Fellows each	.35
Spokes each	.25
Cutting down	14.00
Setting tires per set	3.00
Doubletrees	1.00

Buggy Work

Tongue	$ 5.00
Spokes (each)	.50
Felloes—½	1.50
Setting tires, set	3.00
Doubletrees	.75

Plow Work

Sharpening plows	.40
Plow lags 12—$2.50; 14—3.00; 16—3.50	
Sharpening discs each	25
Polishing coulters	.25
Shoeing, new, each	.75
Shoeing, Reset, each	.35

On other work 65c per hour.

Garland & Son, Missouri.

Repairing a Jaffe Radiator:—In repairing a car that was damaged in a collision and upon which I put a new radiator I have on hand the old radiator which is somewhat bent with some of the core sections broken open. Can you or any reader tell me if this radiator can be repaired and again put into good condition?

F. D W., Illinois.

In Reply:—The core of the Jaffe radiator is very easy to repair. It is presumed of course that it is desired to replace a section of the core which has been opened in the collision. If this is to be done, use a blow torch to loosen the water tubes to be removed The Jaffe is formed by what is known as "face clipping." That is, after the tubes are assembled to form the core they are dipped into an acid bath or "flux". After that the core is set in a bath of solder face down and to a depth of about a quarter of an inch. After one face is thus soldered the other is treated in a like manner so that the completed core after the soldering operation will be completely sealed up with a depth of solder of about one-quarter inch on both its front and rear face.

This soldered face or joint is the joint to be loosened with the blow torch when you prepare to insert a new section. There is no need to do any cutting.

With the section thus cut out, lay the core on a flat smooth surface. secure a new section to replace the one taken out and with the core thus assembled the new section or sections, if necessary, are resoldered into place.

New sections for the repair of Jaffe cores can be secured from the Jaffe Company, as can complete cores.

S. S. D., New York.

VOLUME 21 NUMBER 6

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Correspondence solicited on all subjects connected with auto, truck and tractor work, blacksmithing and general repairing. Always give name and address when writing.

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Contents June 1922

WHAT DO YOU WANT?

What do you want to see discussed in the pages of "Our Journal"? During the past four months we have published just fifty-six articles and items (not including the many replies to questions in the Question Department) at the request and suggestion of our readers. If you want information on a subject connected with your work, it is very likely others will be interested too. So let us know about it. Of course, it is up to the Editor to decide. But it is really surprising how often requests for the same subject will come from a number of widely separated readers. Remember this is "Our Journal" for "Our Folks."

THE MODERN MAGIC WAND

Picture the shop of twenty years ago with that of today. Compare the equipment that you found in that old establishment 'neath the spreading chestnut tree with its modern relative located beside the gasoline pump. Most prominent in that comparison of equipment is the oxy-acetylene welding and cutting torch —truly a modern wand of magic in its seemingly marvelous work.

And none the less wonderful is the effect of its work upon the purse, pocket and cash drawer of the torch owner.

Picture for example a farmer driving up in his Ford with a broken casting from some item of farm equipment and in perhaps the course of less than an hour returning with the part which has been reclaimed and made as good as originally.

And then consider what has been done by means of the repair man's magic wand.

A casting that when broken was of no more value than its weight in scrap, has ben reclaimed and made as good as new.

The time which would have been consumed in getting a new part has been saved; a saving has been made in repairing the broken piece over the cost of a new part.

And—the repairman has been able to do a job and to make a profit that would otherwise not have come to him at all without the help of the oxy-acetylene torch.

Surely the oxy-acetylene torch is a wonderful item of equipment in a wonderful age.

THE PRIZE CONTEST

We had hoped to be able to announce the results of the March and April prize contest in this issue, but the final results are not ready at this writing. The judging of the many interesting and very commendabe papers and replies received has made the work of the judges very difficult. We are sure, however, that the final results will be ready for publication in our July number and prizes will of course be distributed immediately upon the final decision of the judges.

WARNING ! ! !

Although the warning regarding agents and subscription solicitors appears regularly each month on this page, it seems necessary to mention the subject just about every so often.

During the past few weeks several cases have been reported to us of the activities of fake and unauthorized agents. When you are asked to subscribe to this (or any other publication) and you don't know the person soliciting your order—DON'T SUBSCRIBE—Or at least don't give the man any money.

Send your order and remittance direct to us here at Buffalo and then you'll know you'll get what you want.

When you hand money to a stranger you may get what you order and you may not. Better be safe than sorry.

Your home town—are you a booster for it? The chap who knocks his town knocks himself and everyone in town. If a town is all you say it is when you knock, you admit your own lack of common sense in locating there in the first place and then in remaing against your judgment, Boost and you help everyone.

A BUSY SEASON

The entire craft served by "Our Journal" seems to be enjoying one of the busiest seasons it has experienced in years. One prominent middle western reader says the present season is the busiest one he has seen in nine years. A New England reader says: "My business is booming." A Pennsylvania reader says he hasn't had so many jobs in his shop at one time for several years. And so the reports of business and busy-ness come from practically every section of our broad country.

And this increased business has brought autos, trucks and tractors—wagons and buggies—farm implements and machines to the doors of "Our Folks" for repair, overhauling and rebuilding. It means a rapid return to normal healthy business. It means a return to healthy prosperity. It means more money for shop owners. And that means the securing of the additional equipment you want — the enlargement of your service and the enlargement of your opportunities for still greater growth.

Hints and Suggestions on Tire Repair Work

The following hints and suggestions will be found of practical value to every practical tire repair man, and will be the means of saving him considerable time and money, in the actual execution of his tire work.

It is of course possible to secure molds or patterns for the various types of non-skid treads. This is an expensive proceeding however, especially if one were attempting to keep patterns for all of the non-skid treads now on the market. A very simple and very practical way to reproduce a non-skid pattern is to make your own form or mold, taking the impression from a good section of the tire you are repairing. This pattern or mold will serve every purpose in your repair work. To go about the making of such a pattern, proceed as follows:

Take a piece of canvas or fabric and apply several layers of raw gum tread stock. If you happen to have some canvas that is Para coated on one side, cut a piece large enough to cover the section of the tire upon which you desire to replace the tread pattern. After having carefully measured this, apply three layers of ordinary tread stock, to the coated side of the canvas, and then locate a good portion of tread on the tire. Dust this thoroughly and carefully with soapstone, and apply the pad which has been made of canvas and tread stock. This pad is of course applied to the tire tread with the raw rubber side next to the tread. Now place the tire in the vulcanizer, and cure for about thirty minutes. When removed from the vulcanizer, you will find an excellent pattern of the tire tread on the rubber pad, and this pattern pad can now be used to reproduce the tread pattern on that portion of the tire just repaired. It is an excellent idea to keep a pattern of this kind on hand for repeated use, and if it is marked and stored away, it will not be again necessary to make a a pattern of this particular tread.

Very naturally of course, the repair of treads are usually on tires that have worn down somewhat, and therefore a pattern of this kind taken off the tread of the tire which is being repaired, will more nearly match the rest of the tread. If on the other hand the regular tread pattern or mold is employed, it is very likely to be not an exact match.

Another little stunt in this connection will be found of practical value in the event of your having a tread pattern or pad upon which the impressions are deeper than the worn tread on the tire which you are repairing. The impressions in the pattern pads may be filled up to a certain extent by making a thick paste of soapstone and water, and filling the depressions in the tread with this before curing for the repair portion of the tire.

All vulcanizing equipment which comes in contact with raw gum stock should be kept perfectly clean. In other words it should not be allowed to accumulate rust, dirt and grease. An excellent way to clean these metal surfaces, if they have been allowed to rust, accumulate grease or oil which has hardened upon it, is to apply a small quantity of kerosene to the rusted or oil-hardened surface, and allow this to soften the accumulation. Then with emery paper, or a fine scratch brush, brush the accumulation until the metal surface is cleaned. Polish with fine emery paper, until the surfaces are bright and well-polished.

It is an excellent idea for a beginner to test out his work carefully in order that he may know whether or not he is getting proper results, and that he is doing his work correctly. For test work of this kind, it is a good idea to build up a section of an old tire as we have outlined in these articles and cure in the regular way. After the cure has been accomplished, cut a section out of the tire from the newly cured portion, of course, and separate the different parts of this section. If the different stocks are pulled slowly apart, the beginner can easily see whether he is getting proper results or not. If the fabric pulls away from the different sections of the gum stock very easily he will of course know that he is not getting a strong union of his materials. If any portion of the stock is tacky, he will know that the material has been under-cured. On the other hand if his rubber stock is breaking off short, he will know that the stock has been over-cured and will be guided in his work accordingly. Stock that has been properly cured will stretch and will return to its original form. Stock that has not been properly cured will either break off short as when overcured, or will appear sticky or tacky, as is the case when it is undercured.

It seems hardly necessary to warn the beginner against attempting to repair any tires that are wet or damp or have any moisture in them. The fabric in the tire must be thoroughly dry before you proceed with the repairing. As heat is used in the vulcanizing of tires any moisture in the tire fabric will naturally be turned to steam and expand and you can readily understand the reason for being absolutely certain that no moisture or dampness is present in the tire fabric when you attempt to repair it. An excellent means for drying a tire that is damp or moist is to put it on an inside patch vulcanizer, and apply a gentle heat to dry out the fabric of the tire thoroughly.

On inner tube repairs, it is an excellent idea to test them carefully under water, to make certain that there are not additional leaks.

When cutting rubber stock with a knife, it will cut very much easier if the knife is dipped into water occasionally. This has a tendency to let the knife slip through the rubber more readily.

The proper temperature for vulcanizing ranges from 250 to 300 degrees. The best temperature for the purpose is about 265 degrees. The time required to vulcanize Para gum 1/16-inch thick is from 15 to 20 minutes when the vulcanizing temperature is 265 degrees. An additional five minutes should be allowed for each additional 1/16 inch in thickness. In the application of heat for vulcanizing purposes, it does not matter whether the vulcanizer is heated by electricity, gas, gasoline, or steam, so long as the vulcanizing surface is kept at a steady and proper degree of heat.

It is not an easy matter to determine whether or not a tire or casing is worth vulcanizing. In the consideration of this problem, the age of the tire, the condition of the fabric, and the cost of repair must be taken into consideration, and

this of course will determine whether it is worth repairing.

The strength of the tire is in the carcass. The rubber surface and rubber tread is merely a protection. A tire case may be entirely sound on the outside and yet prove to have serious injury to the carcas upon inside examination, or the layers of fabric may be separated to such an extent as to make the repairs or vulcanizing impractical. On the other hand, outside appearances may be entirely against the tire, while the inside carcas, and fabric are in excellent condition. It is therefore necessary to carefully examine the tire both inside and outside before deciding whether or not it is worth the expense of repair operations.

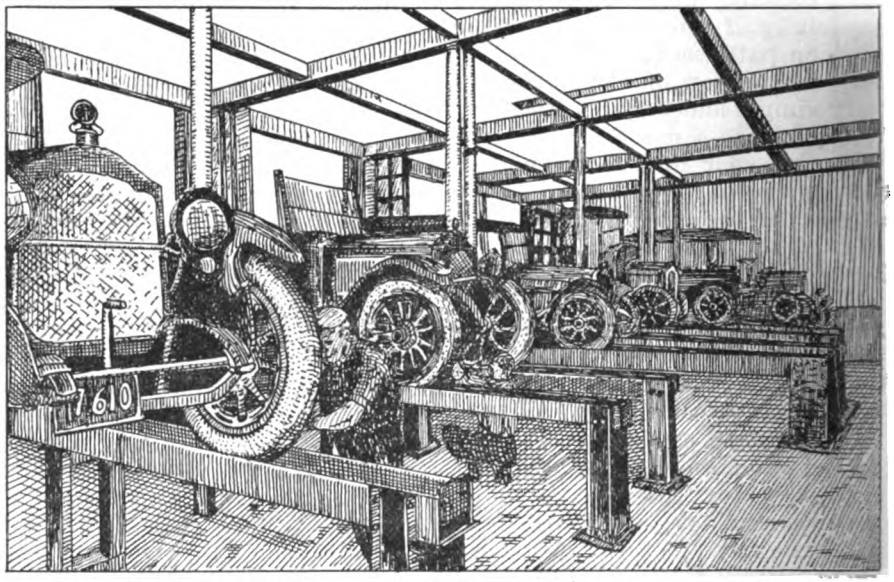
Take for example the question of re-treading. Note particularly the following condtions—(A)—Do the layers of fabric in the carcass adhere properly. If there is any considerable separation of the fabric do not attempt to repair. Sometimes the layers of the carcass are not properly formed into a thoroughly incorported union in the original manufacture and if there has been any considerable introduction of moisture into the fabric, there will be additional separation which will make repairing impractical. (B)—Note if the carcass is badly cut in several places. If this is the condition, do not attempt a repair. Any considerable cutting of the fabric of the pocket will have permitted the introduction of foreign substances, such as dirt and moisture into the cuts and has a tendency to separate the fabric of the carcass and there is no telling just how far this damage has gone. (C)—If the tire is badly rim-cut, do not do any considerable repairing on it. Rim-cuts can of course be repaired in connection with the retreading but it will require considerable work, and the extent of the rim-cutting will not warrant this.

A New England Spring Service Station

Nine years ago in a small shop in Boston, Massachusetts, George Lawrence Inc., had its start as a spring service station. During the nine years of existance the original quarters have been outgrown ten times until finally it was found necessary to purchase land and build according to the needs of the business.

Today George Lawrence Inc. (as the business is known) occupy large roomy quarters in Cambridge where a fine well-lighted shop and an up-to-date line-up of run-ways enables the company to give prompt and efficient spring service.

The engraving Fig. 2 shows the spring shop with its well-lighted interior and its battery of machines and equipment. As both passenger car and truck spring service is given at the George Lawrence station, stocks of both light and heavy springs must be carried. As will be most apparent from an examination of the shop interior, springs are manufactured and assembled here and put through all of the processes of treatment.



THE LAWRENCE SPRING SERVICE STATION CAN ACCOMMODATE SIX CARS OR TRUCKS AT THE SAME TIME

The engraving Fig. 1 shows the battery of run ways for the efficient and quick handling of both passenger cars and trucks. This engraving shows how the cars are handled. The run ways are made of channel iron firmly supported by short steel posts. The channel-runs are on a level with the street, while the floor of the pit is several feet below the street level. This enables the motorist to run his car onto the "ways" from the street. The workmen can then get at the springs easily and quickly and with very little inconvenience. For the accommodation of large trucks equipped with the heavy, wide tread tires, two of the service ways are fitted with channels of extra width.

In connection with this description of the George Lawrence Inc. spring service it is interesting to note that George Lawrence has been a reader of "Our Journal" since the beginning of 1914 and is now a member of the "Honor Roll Family" with a subscription paid up to 1930.

Selling Knowledge

ED. HENRY

"Say, can you sell me a set of spark plugs, for my tractor, that won't fold before the end of a long hard day's work?" grumpily asked a farmer coming into shop.

"No," frankly replied the shop-owner, "I cannot. Whether they will stay clean depends a great deal on the engine and other conditions, but I can sell you a set of plugs that will stay clean and working as long as any on the market," he asserted.

"Wrap 'em up then," commanded Jones the farmer.

"What seems to be your trouble?" inquired the repairman as Jones paid him.

"Well, to tell the truth, I guess my tractor needs an overhauling, but I can't spare it long enough just now to have the work done. It didn't soot up the plug like it does of late, but now I can hardly get through a day's work without changing or cleaning them. Takes a lot of valuable time and I break one every once in a while in the rush of field work which is an extra expense too."

"I think I have here just the article that will help you out—a set of intensifiers."

"And how do they work?" asked

Jones as he examined one.

"It's a little device with a spark gap about 1/16 of an inch across in it and you attach them to the outside terminal of the spark plug. It it attached in such a way that the electric current must jump both the gap in the intensifer and that between the spark plug's points, both gaps being connected in series."

"And what good does that do?"

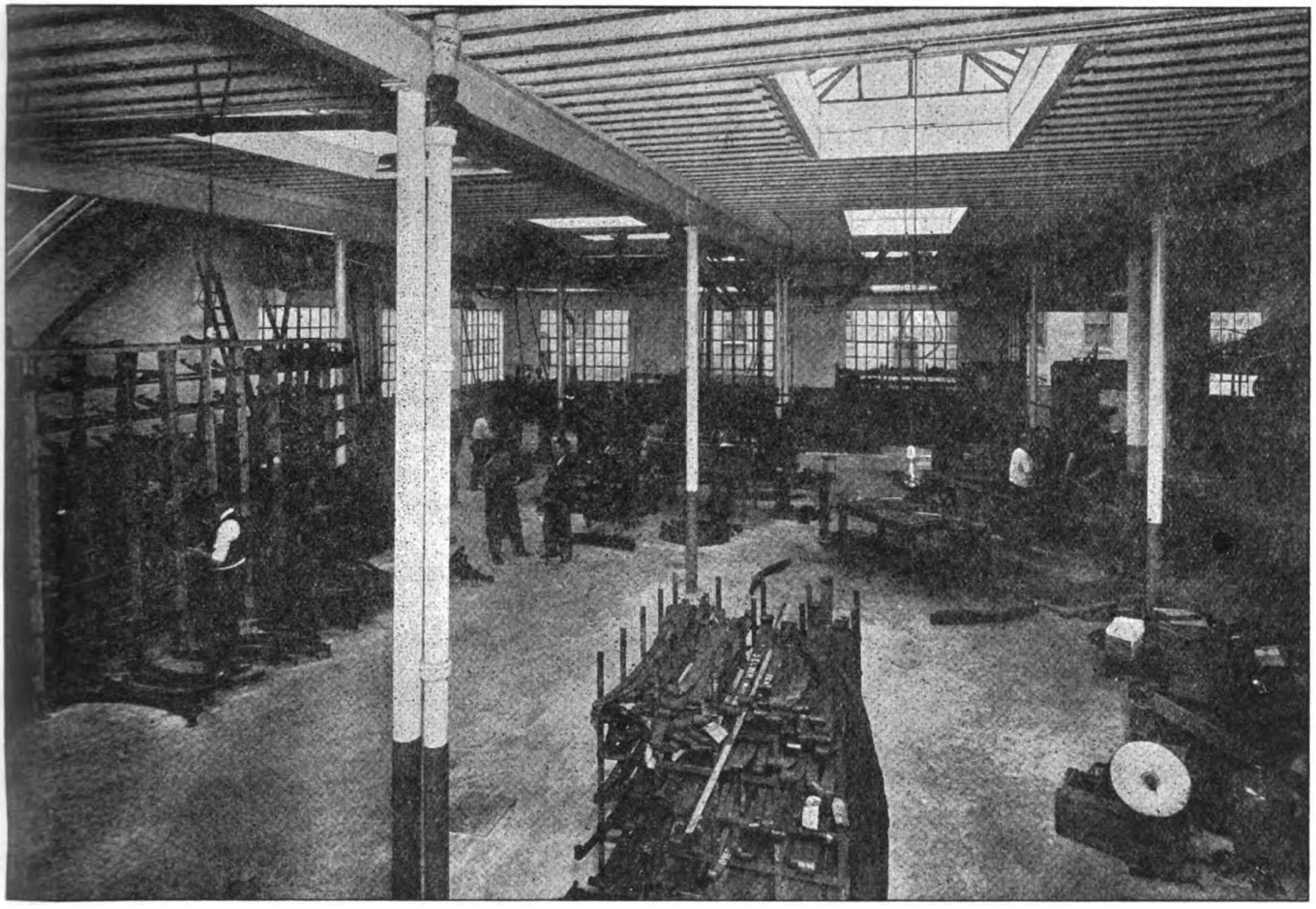
"Their chief merit," continued the shop man, "lies in their ability to assist a badly carbonized plug to fire in spite of its dirty condition. The reason for this is that in order to jump the gap between the normally spaced points of a clean plug in the engine cylinder, a voltage of approximately 5000 is required. Now with a badly carbonized dirty plug, before the necessary voltage is reached, the current begins to leak across the carbon fouling, and this so reduces the voltage that the necessary pressure may not be reached. When this happens there can be no spark at the plug gap or points and your engine misses. However, with the intensifer connected in, this is changed. The gap in the intensifier stops or checks this preliminary leakage because it breaks the connection between the magneto or coil and the carbonized plug. The current is dammed up momentarily, so to speak, or until it becomes strong enough to leap across the gap in the intensifier, and when it does, it comes with such a rush that it cannot all leak through the carbon fouling, with the result that some must jump between the spark plug points, Thus," went on the shopowner, "we get a spark from a plug that would not otherwise fire."

"Sounds reasonable," observed Jones, who had listened closely to the shop mans' rather lenghty though clear and interesting explanation. "I'll take a set," he added.

"Yes, and when your tractor engine begins missing from fouled plugs, put them on and note the improvement. You will find it quicker and more convenient than changing the plugs; but at the end of the day, remove them and clean the plugs thoroughly. Don't replace them again until the plugs show signs of fouling, as their use with clean plugs imposes a slight overload on a coil and to a lesser degree on a magneto."

Some may think this a great deal of knowledge for any show man to book on so small an accessory as an intensifer, yet it made possible the sale and when Farmer Jones' tractor's performance proves the repairman knew what he was talking about, Farmer Jones will be so impressed with the shop owner's knowledge that he will come to him again for help.

The confidence of his customers is one of the finest assets any shop owner can possess, and he should strive to obtain and retain it.



THE SHOP OF LAWRENCE INC., IS WELL-LIGHTED BY ROOF AND SIDE LIGHTS EFFICIENTLY PLACED

Cleaning Castings

For the cleaning of castings of every kind, brushing with steel wire brushes will dislodge sand and other adhesive material. With some it is an advantage to rub the surface well with a lump of hard coke to scour off dirt the brush will

not remove, while in some cases passing through a tumbling barrel more than repays the cost.

Pickling for some hours in strongly acidulated baths for the removal of the silicified surfaces left on some castings is often recommended, and often this improves the cutting of the machine tools. This practice, however, does not always give the desired results, and if by the use of a carbonaceous facing to the molds a softer skin is produced, it is desirable to use this method rather than that of pickling.

The castings in all cases should leave the fettling shop of the foundry in such a state that they can be placed on the machines immediately. The comparatively small extra cost this involves to the foundry is more than offset by the saving in the machine shops, not to say the saving in stores and avoidable waste. Roughly dressed castings are always a source of trouble outside the foundry.

Rust and Rust Prevention

H. A. WALLACE

Rust is described in Mr. Webster's big book as an "orange-yellow or red coating that is formed on the surface of iron when exposed to air and dampness. It is an oxide of iron."

Of course, we know what rust is without that definition but it is well to start an article of his kind from the beginning—therefore Mr. Webster's quotation.

Everyone is familiar with the losses, at least to some extent, that are caused by rust. One has only to view the ravages of rust on iron bridges, and the myriad other structures. And then the farm implements and vehicles used in the rural sections. Even the house wife is impressed as she notes the rusting and gradual "fading" away of the back yard wire fence and the posts for the clothes lines (if she has iron posts).

And when we consider the rust trail in the shop, we can easily make out a very damaging case for Sir Oxide. Were one inclined to play up the story of rust in true yellow journalistic style one could prove that Rust was just about the worst enemy of mankind continually striving to undo man's work and persisting in tearing down whatever man produces.

But what you Mr. Reader want, is some thing practical on rust prevention and protection. So let's go.

There have been attempts made for years to protect metal from oxidation. These have taken several forms from the cleaning and coating of the metals to prevent the formation of oxide to the invention of new alloys of metals and various mixtures calculated to prevent the formation of oxide.

The success with which these have met is left to the readers own knowledge. Suffice it to say that we still have the rust

THE TRACTOR IS DEMONSTRATING ITS VALUE IN EVERY DAY WORK

problem before us and we probably will continue to experience it for some time to come. Certainly until anti-rust metals are much cheaper and more commonly in use.

Now then, let us consider some of the rust preventatives. It is, of course understood that any coating or covering to be effective must be applied to metal that is perfectly clean. Added to this requirement the coating must adhere closely and tenatiously to the surface to be protected.

A mixture that is recommended for keeping machinery bright is made up of one ounce of camphor dissolved in one pound of melted lard. The scum is removed from this mixture and then enough fine black lead is stirred into the lard to give it an iron color. The machinery is smeared with this mixture after first being thoroughly cleaned. After twenty-four hours the grease may be removed with a soft linen cloth and the machinery will keep clean for months.

For removing rust already present and also for preventing it, grease the articles to be treated with the following mixture: Melt five parts of crude vaseline in a water bath or double boiler as it is commonly known and stir into it five parts of finely levigated powdered pumice stone until well and thoroughly mixed. Now allow to cool and when about half-way cooled add one-half part of crude oxalate of potassium (sorrel salt) in a finely powdered state and thoroughly incorporate.

An excellent rust prevention method for iron pipes is said to be as follows:—First the pieces of pipe are coated with tar and then filled with light wood sawdust, which is set on fire. This simple method is said to protect the iron from rust for an unlimited period.

To preserve tools, dies and similar articles from rust they may be well greased with ordinary vaseline. Do not use common oils for this purpose as most common oils contain acids which are very likely to act injuriously upon these metals.

A good mixture to keep on hand and which may be applied as needed to tools that are liable to rust is made up of one pound of vaseline melted up with two ounces of blue ointment (what druggists call one-third). A few drops of oil of wintergreen, cinnamon or sassafras may be added to the mixture to give it a pleasant odor. When thoroughly mixed pour the mixture into a can. A rag saturated with this mixture may be used to wipe up tools likely to rust.

To remove rust from iron place it in water in which a little sulphuric acid has been added. A piece of zinc should be firmly attached to the iron, and just so long as the zinc is firmly in contact with it the iron will not be attacked. If the articles to be treated are badly rusted it may be necessary to allow them to remain in the acid water for several days or even a week and to add a little sulphuric

acid occasionally.

This simple method of treating rusted articles has the great advantage of being applicable especially to objects with sharp corners or edges and is excellent on files and rasps. The articles will come out of this bath a dark gray or black color, and after removal should be well washed and then oiled.

To remove rust from nickel-plated articles apply oil or grease to the rust spots and allow to remain for several days. Then rub the spots with a little ammonia. If the rust persists try very dilute hydrochloric acid. When dry polish with tripoli or whiting.

The common practice of immersing rusted articles in kerosene and allowing them to remain for a considerable period is familiar to most everyone. This usually loosens the rust so it can be easily removed, but if the articles are very badly rusted the kerosene method entails considerable labor, and in addition is not likely to result in a perfectly clean surface.

Iron articles that are thickly coated with rust may be cleaned by allowing them to remain in a nearly saturated solution of chloride of tin for from 12 to 14 hours.

Rust Preventives

To prevent the formation of rust on metal articles kept in a case or drawer place a lump of freshly burnt lime in the drawer or case. This will absorb the moisture and will keep the articles bright and clean. If desired the lime may be placed in a muslin bag.

To prevent the formation of rust clean the metal surfaces thoroughly and then apply the following coating made up of sixteen parts of turpentine to which has been added one part of caoutchouc. The caoutchouc is dissolved by gentle heat and to this is then added eight parts of boiled oil. Stir thoroughly and bring to the boiling point. This is applied with a brush as varnish. When its removal is desired turpentine may be used.

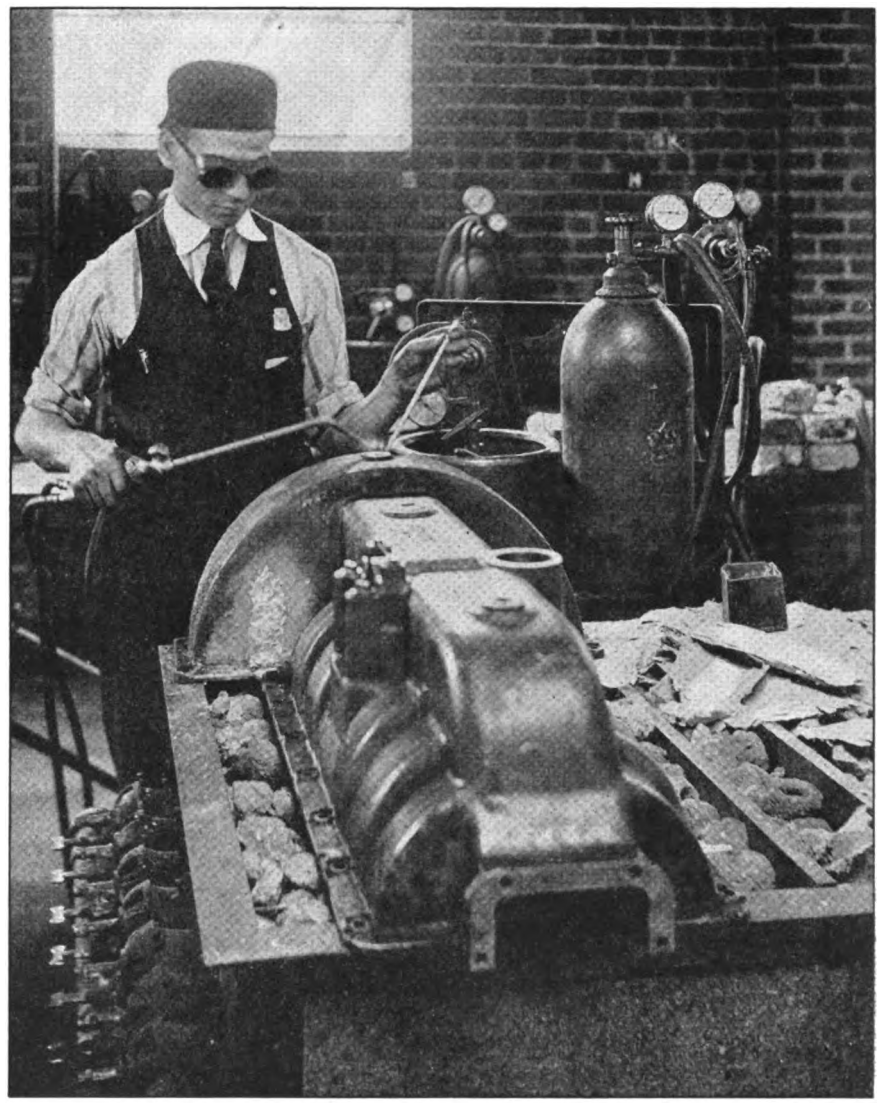
An excellent brown coating to prevent the formation of rust is made as follows:—Dissolve two parts of crystallized iron chloride, two parts of antimony chloride, and one part of tannin in four parts of water. This is applied to the metal surface with a rag and permitted to dry, additional coats are applied until the required color is obtained. After the final drying wash with water, allow to dry and polish with boiled linseed oil.

The working out of what is generaly considered a rust preventing paint is actually the application to iron surfaces of the rust we desire to prevent. To prevent oxidation of iron and steel it is necessary to exclude air and moisture from actual contact with the metallic surfaces. The best, or at least one of the best dressings for this purpose is boiled linseed oil. This forms a lasting film or covering. It is however somewhat thin and of not sufficient body to be ideal for the purpose and should be thickened by the addition of some substance to give it this desired body. The most congenial substance or pigment is oxide of iron or actual iron rust itself. This is ground to a fine powder and thus by a mixture of ground oxide of iron and boiled linseed oil we have the well known and generally used red oxide paint for iron and steel structures.

To prevent the rusting of screws used in fitting up machinery, make a mixture of oil and graphite and apply this to the screws. It is an excellent lubricant and at the same time prevents the screws from rusting into place.

To prevent the rusting of tin surfaces such as tin ware of all kinds, a simple thorough drying of them and then a warming up near the fire will usually be found sufficient.

To prevent the formation of rust on bronze, scour the article thoroughly to remove all grease and dirt. Now dry and then expose it to the fumes of a mixture made up of equal parts of hydrochloric and nitric acids at a temperature of from 550 to 650 °F. for three or four minutes. Now let cool, rub



THIS PREHEATER USES GAS, OR OIL AS THE HEATING MEDIUM

with vaseline and heat until the vaseline begins to decompose. This will protect from rust.

Nickelplated articles may be protected from rust by wiping with a mixture of vaseline and paraffin; made up of two parts of vaseline to one-half part of paraffine, to which is added one-half part of finely ground quicksand. This mixture is made by heating and thoroughly stirring. It should be applied while warm, and as additional protection the parts may be wrapped with paper which has been coated with a thin film of the same mixture. This

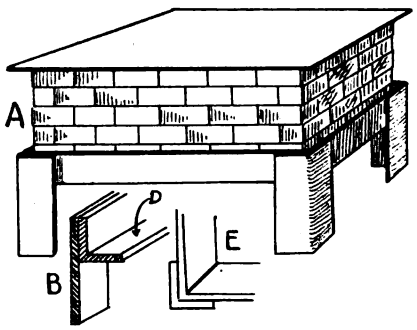


FIG. 1—A SIMPLE HEATING ARRANGEMENT OF ANGLE IRONS AND BRICK

will safely preserve bright nickel parts and keep off rust and dampness.

For firearms a lubricant that is said to clean rust from rifle barrels and also prevent corrosion by nitro powders is made up as follows: Acid free kerosene two ounces; sperm oil one ounce; oil of turpentine one ounce; acetone one ounce. These are mixed in the order given. Oil of bergannot or citronella may be added to disguise the odor.

A method of protecting iron and steel from rust by means of paraffine paper has been worked out by experiments for one of the large railroads. The surface of the metal is first thoroughly cleaned by means of a stiff wire brush. A tacky paint is then applied and the paper is then covered smoothly over the the paint and tightly pressed into place. The joints of the paper are lapped slightly until the entire surface to be protected is thus covered. The surface is then ready to receive this out side coat of paint. This is an excellent method of protecting iron and steel beams that are subjected to the action of smoke and gases that have a corroding action on exposed metal.

Preheating and Welding Tables for the Oxy-acetylene Welder

J. R. SPRAGUE

It is not within the province of this article to say anything on the subject of preheating nor is it necessary to say anything to the experienced oxy-acetylene welder regarding preheating and the reason for preheating. In this article it is taken for granted that preheating is necessary at times and for the purpose a preheating table is necessary. Practically every shop where oxy-acetylene welding is done has a device or arrangement of some kind for the purpose of preheating work. These devices range all the way from especially built preheating forges or tables to make-shift arrangements of fire brick generally built up to suit the job in hand. It is of course impossible to build a preheating table or forge that will accommodate every job that comes in for welding. However, it is possible to construct a very practical table for preheating that will take the great average run of work requiring preheating.

For the purpose of preheating work gas is undoubtedly the most convenient heat-producing medium. Charcoal and oil may also be used and are used to a large extent, while charcoal is perhaps the best for preheating work. Charcoal will heat the work slowly, evenly, and gradually, which is generally greatly desired in preheating. There are times, however, when a concentrated heat is required and gas is the best for this purpose.

The mention of the heating medium is necessary in the preparation of a preheating table, for it

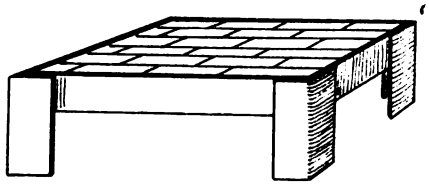


FIG. 2—HERE THE STAND IS READY FOR A WELDING JOB

is of course obvious that a table constructed for preheating by means of gas or oil would not be suited for preheating by means of charcoal. Although the charcoal preheater may take on the very simplest form, and for this reason we will consider and describe the charcoal heater first.

To preheat by means of charcoal, all that is necessary, is to lay the work that is to be preheated on a bed of live coal, cover the work to

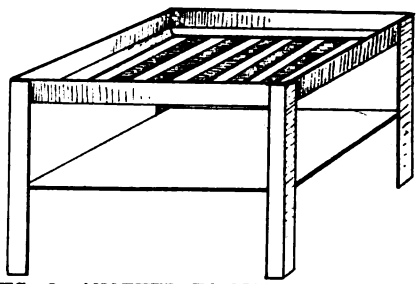


FIG. 3—ANOTHER EASILY MADE STAND FOR THE WELDER

keep the heat in, and keep your coal going freely until the work is sufficiently heated. This entire process may be very well accomplished by means of the furnace shown in Fig. 1. This stand is built entirely of angle iron for the frame with two plates of the proper size, one to fit into the stand cover, while the other (which may be a simple thin sheet) is of course to be used as a cover at C.

In building this preheating stand, four short angle irons are used for the legs. The four pieces connecting the legs for support are also angle pieces and are welded to the legs as shown in the section at B. The base plate for the stand is then simply placed inside the angle iron plate, and rest on the part at D. To fit the end of the connecting angle bar, they are cut as shown at E, which is the top view of the corner.

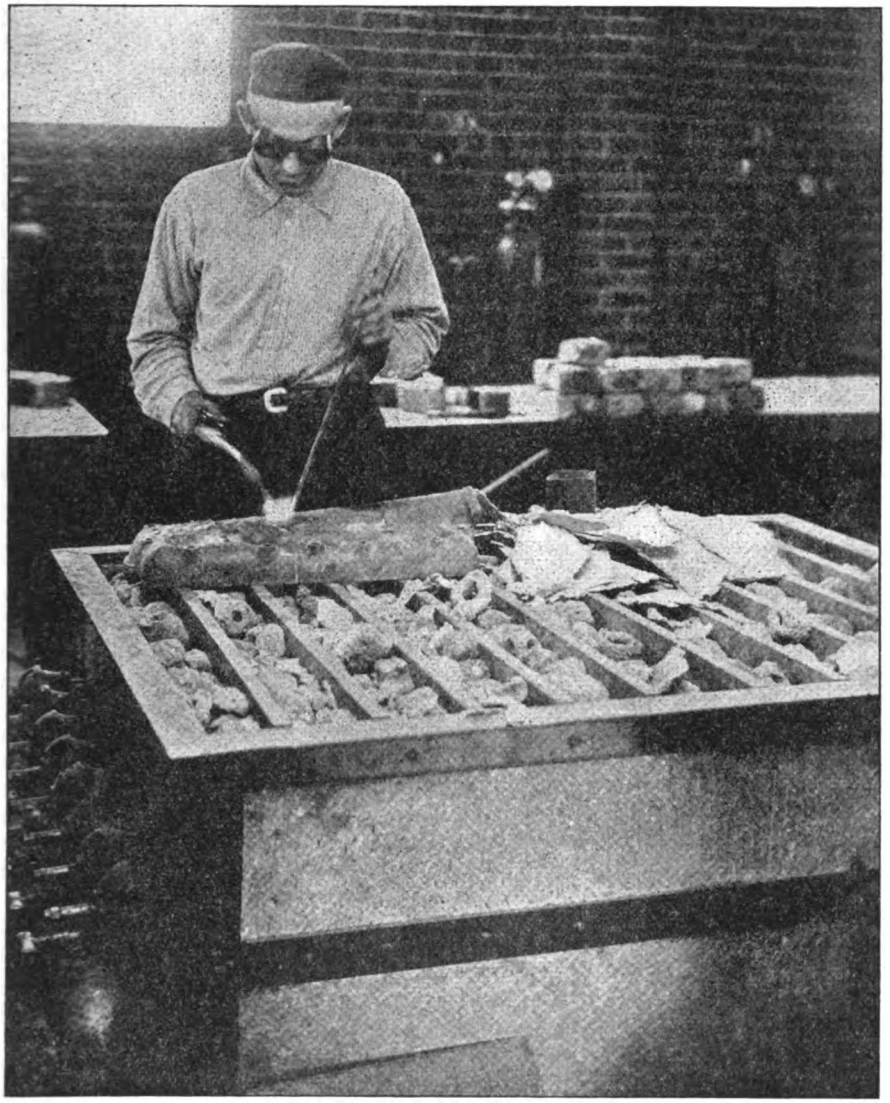
This preheating table, forge, or furnace, as you may prefer to call it, may also be used for actual welding operations. For example: After the work has been properly preheated by placing it upon the bed of charcoal and then building up the walls of brick around the work and covering the enclosure with the plate C, the work is allowed to heat up to the proper temperature and then the wall may be taken down at any point so that the weld or welds may be executed conveniently. Parts of the work may be covered with asbestos sheeting, in order to confine the heating as much as possible during welding operation.

The base of this furnace may also be used as a welding table for work which does not require preheating as in Fig. 2. Here the base is shown arranged as a welding table. It will be seen that the surface of the table is built up

with fire brick. This makes an excellent support for the average run for work requiring welding or cutting.

This frame work as described, may be easily constructed from angle iron, the various welds that are necessary being made with the welding torch. However, some torch operators might find it more convenient to build this table or stand of piping particularly if the pipe and the required fittings happen to be on hand, while the angle iron may not be of the required size or suitable length. In Fig. 3, it is shown how this frame work may be constructed from angle bars and a few flat pieces. If desired, a shelf may also be constructed beneath this table top. This will be found most convenient for holding flux, welding rod, and other supplies and accessories.

The practical mechanic will of course realize that if neither the angle iron or the pipe stock is on hand, and not easily secured, a table of this type may also be constructed by welding up flat bars to the required size. In any event, no matter what material is used for the construction of a table or frame for welding operation, it should be at least large enough to hold a good-sized casting. A size that will be found generally useful and sufficiently large to accommodate the average job that is brought into the shop should measure about 4 feet in length and about 3 feet in width. A height of 2½ feet will be found suited to the requirements of the average torchsmith.



THE BURNERS PERMIT ANY PART OF THE HEATING SURFACE TO BE USED

For a shop where a considerable quantity of oxy-acetylene welding is done, a very efficient combination preheating furnace and welding table is also shown here. It will be noted that gas or oil is the heating medium used in this furnace or preheater. By an arrangement of sixteen burners (eight on each side this device will accommodate any sized job from the very smallest piece that would require preheating to a casting covering the entire surface of the preheater. An examination of the engraving will show the surface of the preheater is made up of a number of sections or narrow channels which are filled in with what most people call "artificial coal." In this way a very uniform and even heat is obtained by means of the burners. The reader will, of course, understand that when a casting is placed upon this preheater, to be brought up to the proper temperature, it is covered with a protective hood or with sheet asbestos. In order to retard cooling and prevent cooling strains and possible cracking this preheater is fitted with a cooling oven beneath the battery of burners. Here the casting is permitted to slowly cool to normal temperature.

The frame shown in Fig. 2 also makes an excellent stand for cooling a casting after the welding operations. Remove the fire brick in the frame, and cover the recess of the frame with ashes placing the casting on these, and finally covering the casting well with another layer of ashes. The casting will cool slowly and thus effect a uniform radiation of the heat, preventing breaks and stains which would otherwise occur.

How to Collect Shop Accounts

PART III.

Getting a Note Under Difficulty

In our article on collections last month, we mentioned particularly a number of "strong-arm" methods used by the shop owners in various parts of the country. These methods will of course work in some cases, but they are not recommended where it is desired to hold the customers trade. Such tactics are not generally inclined to make the shop owner very popular with the customers upon whom he tries these methods. It is not suggested therefore, that these particular steps be tried out on any customers whom you desire to retain as regular patrons.

A suggestion which does not border so closely on "strong-arm" methods is contained in an incident

related by a Western shop owner. He said:—"I remember a case I had with a stranger last year. He ordered a rebuilding job, which consisted of taking a touring chassie, and rebuild it for truck use. He said nothing about whether he was going to pay cash, so I inquired, and was informed by one of the merchants in town that he was a bad beat, and that I would have to watch him, as he already owed several large bills, and would not pay. This merchant said the man was worth nothing, so he could not collect.

"This did not look very favorable for me. However, after finishing up the job, I notified him that it was done, and one morning he and a friend came after it. As it was outside of the shop, he and his friend started to climb right in and would have gotten away without saying a word if I had not acted quickly. I did not want to make him angry before a crowd by telling him that he could not take the truck away without paying for it, so I just said—'Just a minute, Mr. Brown, you had better let me get you some gas so that you will not get stuck on the road home! At the same time, I told one of the men to take care of the matter, and while the man was filling the tank, I called Brown into the office and said—"Do you want a receipt for the truck? He replied, You had better wait until I sell my berries to pay for it.

"I then politely told him that I must have the cash. But he said he did not have a cent. To this I replied—'I tell you what you can do, if you want the truck you can give me a note, and get Mr. M and Mr. P. to endorse it for you.' Then he said that I was afraid he was going to beat me, but I just told him that it was my way of doing business, and I began writing out the note.

"After I had it filled out, he said —You do not need to do that, I can pay you the last of this week. I then picked up a bill for a large list of supplies, which I had lying on the desk, and told him that it was due, and that I must have the money, or the note to use at the bank. He saw from this that I was firm in what I said, and he finally took the note and got one of the brokers in town to endorse it for him by agreeing to sell him his berries the coming week. You can readily see from this, that if I had not acted quickly, I would have lost the value of my work on that truck."

When to Ask for Money

Another phase of the collecting problem that is of interest and value, particularly to the rural shop owner, is decribed as follows by one member of the craft. "It is a very good point to ask a man for money when you know that he has just been paid a large sum. I go at this proposition somewhat as follows:—For example, I learn that Farmer Brown has sold his crop of tomatoes, and that he has received his pay for them. Accordingly, I say to him—Mr. Brown I understand that you have settled up for your tomatoes, and I therefore thought it was a good time to fix up this little bill of mine. I am collecting my bills, and most everybody is paying for what they owe. A talk along this line, presenting the subject to him as though you knew he was going to pay, is more likely to bring the cash than if you ask him if it is convenient?"

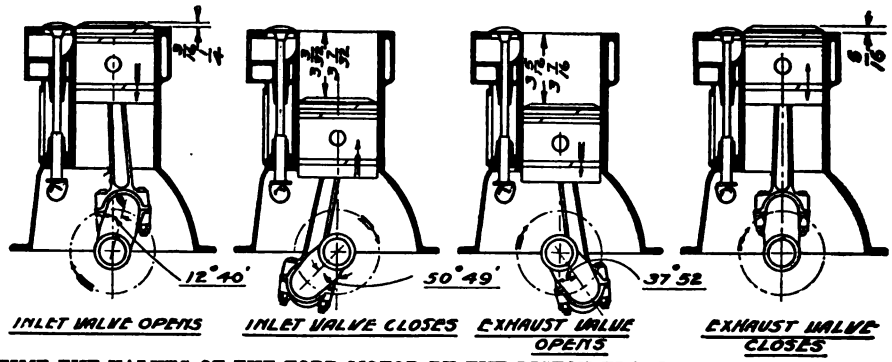
A wide awake smith with ears and eyes open and with mouth closed will miss very few opportunities to present his bills at just the proper moment. A bit of gossip here and a bit there will oftimes lead to a quick and easy settlement of an account. Otherwise, it would not be settled for quite some time.

Another shop owner located in a district which is particularly well-known for its over-abundance of slow payers describes his collection system as follows:—"There are several different kinds of people to deal with. You must study the case of each one. One method will not suit all customers. Take for example, the man who can pay and will pay, but still wants to run an account. This is the method I use:—Mr. A. I want your trade, and assure you full satisfaction. Send your work in, I will keep account of it, and it will be all right. You can pay me every 30 or 60 days, as that is how I have to pay my bills.

"On the first of each month, show this man the amount due. All carefully itemized, and should you need money, or desire him to settle his account, write a few words below the statement, something along this line:—I can use this money very handily at the present time. Can you not let me have check for same this week?

"The next case is that of Mr. Black, who is worth a little money, but who is somewhat slow pay. Go at him something like this if he asks for credit:—Mr. Black, I am glad to have your work, but as you know I must pay my bills promptly, and ask that you either pay cash, or that you settle promptly every thirty days. Have an understanding with a man of this calibre. Tell him that you expect and require payment every thirty days, and see that your bills and statements go to him at regular intervals. When it it is necessary to send this man his second bill, call his attention to the fact that the amount is due, and that you expect payment promptly.

"The next case is that of Mr. Green, who is not worth very much money, but still has the reputation of being honest and good-pay. When he asks for credit, speak to him something like this:—Mr. Green, you are well aware that my prices are very low, also that I have to pay my men promptly every week and that I must pay my bills promptly at the supply house, and it takes a considerable amount of money to take care of all of this. I am always glad to accommodate when possible, but I must have the cash. If he says that he cannot pay you in cash, ask him how long he wishes accommodation. He will probably say a few weeks. Then tell him, that about the first of the



TIME THE VALVES OF THE FORD MOTOR BY THE PISTON TRAVEL. HERE ARE SHOWN THE POSITIONS OF THE PISTON AND CRANK AT THE TIME OF THE OPENING AND CLOSING OF THE VALVES

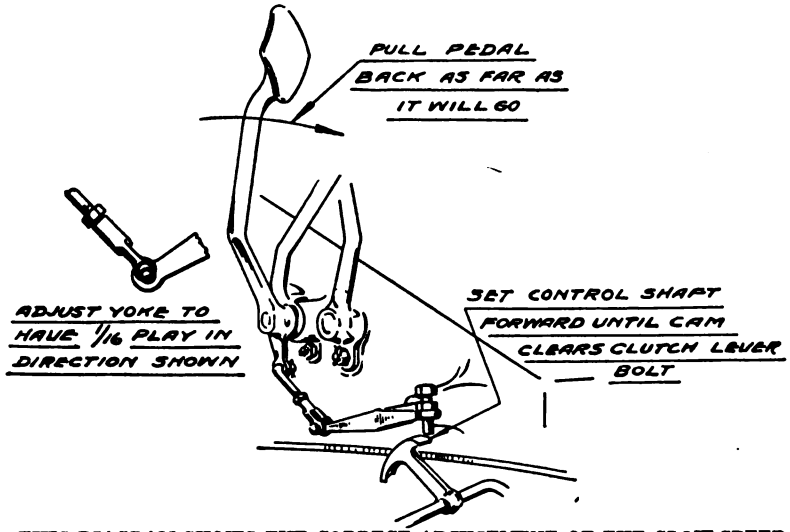
month will be all right, but that you will need it without fail at that time. By getting him to specify a certain date, he will be more likely to meet payment at the proper time.

"If this man should want a new vehicle, a rebuilding job, or some similar items that is likely to run into considerable money, then speak to him along this line:—Mr. Green, I know of course it will be all right, but as I need the money, I suppose you will be glad to give me your note for the amount. The bank requires two names on a note, so just get some of the merchants here in town to put their names on it with you. By so doing you will have the time which you are asking for and I will have the use of the money as I can discount your note at my bank. After you put his note in the bank, keep the date in mind, and when it is due, send him a notice as follows:—Your note is due at the bank on the 10th of this month and as I have several other notes there, try to make your payment if you can possibly do so. If you cannot pay it when due, kindly let me know immediately.

"Now comes Mr. Jones, he is the 'hard nut' of the group. He is a general beat and won't pay any one, but he is still bold enough to ask for credit. If he wants only a small job, tell him that you must have the cash; but if he wants a large amount of work done look his case and if you cannot get the cash out of him and question him as to where he is going to sell his crops. He will probably inform you that he has contracted to sell to someone in town or to a commission man or broker. After you have secured the desired information tell Jones that while you think it would be O. K. it is necessary for you to do business in a business like way, and therefore it will be necessary for him to get the endorsement on the order of the men to whom he is to sell his crops. A good form for an order of this kind, may read about as follows:—

"A. Blacksmith, kindly let Mr. Jones have what he wants up the amount of $....., and I will be responsible to you for same on or before..... ....., if not paid before that date.
Signed ....."

"Of course, Jones may refuse to do business with you on this basis, but you must remember that unless you get him tied up properly with a definite understanding as to just how you are going to get your money you are quite certain to have nothing but the sad experience to repay you for your trouble after the job is done. On the other hand, if Jones gets the order signed by the man to whom he is to sell his crops, charge Jones' account against this man, and bill him regularly for the work you do for Jones, so that he will not overlook the matter when settling time comes, and you will be sure of your money."



THIS DIAGRAM SHOWS THE CORRECT ADJUSTMENT OF THE SLOW-SPEED CONNECTION AND CLEVIS FOR MR. FORD'S FAMOUS VEHICLE

A Spring Questionaire For the Modern Shop

Right now, when the trade is on the threshold of what promises to be the busiest season for years, is an excellent time to analyze conditions in your shop and territory. While the following questions will not all apply to each and every reader's shop, they will assist the shop owner by calling attention to several matters that deserve attention at this time.

These questions are not necessarily for reply to the editor—simply study them carefully and observe the hints and suggestions they carry.

1—Is all of your equipment; machines, tools and supplies, in shape to do efficient work at a moment's notice?

2—Have you the proper equipment to do all of the work you plan doing this year?

3—Are you planning to take care of all of the work that should logically be done in your shop and at a profit?

4—Is your strong point "Quality" or "Price"?

5—Are you letting the nearness of a dime on a cheap job blind you to the dollar in the distance for quality?

6—Are you anticipating the busy season by suggesting that your customers bring in certain needed work immediately?

7—Have you a fair stock of parts, supplies and accessories?

8—Have you gone out after business when work was some what slack?

9—And when you went out after business, did you call at **every place** where business was to be had?

10—Can you afford to overlook one single opportunity for added profit?

Benton's Receipe Book

To Cement Leather to Iron, first clean the iron and then apply a mixture of white-lead and lampblack mixed in oil and allow to dry. The cement is made by soaking the best glue in water until soft, draining off the water and adding enough brown vinegar to dissolve the glue. The melted glue is then mixed thoroughly with one-third its bulk of the best turpentine, and then thinned with vinegar until easily workable with a brush. Either the iron or the cement (or both) should be warmed, the leather cemented on and very quickly pressed into place. It must then be tightly clamped until thoroughly dry.

A Hot-Metal Paint is the request of A. J. M. of Pennsylvania. He asks: "Isn't there some kind of hot-metal paint I can apply to exhaust piping to make it appear neat when finishing up a car. I am a stickler for making a job look just as neat as possible when turning it over to the owner—I find it pays," Good for you A. J. M.—We're with you on both feet and here is your "Hot-Metal Paint"—Though I call it heat-proof paint in my Receipe Book. Take nine parts of Fuller's Earth, three parts of graphite and two parts of black oxide of manganese and mix these thoroughly. Now take ten quarts of sodium silicate, one part of glucose and four parts of water and mix. Then add the last mixed compound to the first mixture until the resulting combination is about the consistency of paint and can be applied with a brush.

When the Worms are Scarce

APOLOGIES TO DAVE DARRAH

Said the little red rooster; "Gosh all hemlock! Things are tough,
"Seems that worms are getting scarcer, and I cannot find enough,
"What's become of all those fat ones is a mystery to me;
"There were thousands thru that rainy spell—but now where can they be!?"

The old black hen who heard him didn't grumble or complain.
She had gone through lots of dry spells, she had lived through lots of rain.
She flew upon the grindstone and she gave her claws a whet,
As she said: "I've never seen the time there weren't worms to get."

She picked a new and undug spot; the earth was hard and firm.
The little red rooster jeered: "New ground! That's no place for a worm."
The old black hen just spread her feet, she dug both fast and free.
"I must go to the worms," she said: "The worms won't come to me."

The rooster vainly spent his day, through habit by the ways,
Where fat round worms had passed in squads back in the rainy days.
When night fall found him supperless, he growled in accents rough:
"I'm hungry as a fowl can be. Conditions sure are tough."

He turned then to the old black hen, and said "It's worse with you.
"For your not only hungry, but you must be tired too.
"I rested while I watched for worms so I feel fairly perk.
"But how are you? Without worms too, and after all that work?"

The old black hen hopped to her perch and drooped her eyes to sleep,
And murmured in a drowsy tone: "Young man here this and weep.
"I'm full of worms and happy, for I've dined both long and well,
"The worms are there as always—but I had to dig like Hell."

And so there are "red roosters" still a' owning shops galore,
They say: "No sense t' scout fer work, conditions are so pore.
'We'll hev' t' wait 'till things get right—an' then we'll work like sin."
Meanwhile the "ol black hens" are out a' gathering in the "tin."

High Spots

No purse can fatten up on lean collections.

Some shop owners think that the overhead is something to be overlooked.

Are the figures you give on work profit figures or don't you know?

The biggest bank account is not always owned by the customers with the "biggest mouth."

Some chaps know they cannot win but they make the man ahead break records and thats' winning something.

There is always something wrong with a man (just as there is with a motor) that knocks continually.

Ol' Sid Deemers ses:—"Tell me what a man does when he ain't got nothin' t' do an' I'll tell y' what he is."

Don't hammer on the anvil all of the time no matter how much work you may have ahead—hammer on collections occasionally also.

An old baseball slogan—"Today's game can't be won on yesterday's hits"—applies as well to business and is right to the point.

There's just as much sense displayed in knowing when to stop talking as there is in knowing when to talk and what to say.

"The Service Shop" is a pretty good name for any shop. Is that what folks call your establishment? Make yours a real shop of service and see if it doesn't pay in more ways than one.

Jim Nasium says: "Trying to run an up-to-date shop without 'Our Journal' is like climbing the stairs of a twenty-story building when the elevator is running. You will probably get to the top if you keep plugging and climbing but it's darn hard going."

Flowers won't buy shoes for the baby —"say it with work."

Be a booster
Like a rooster
Always crowing loud and long.
Keep a yelling
What you're selling
Put some pep into your song.

Ideas are like smiles—the more you give the more you get. The owl may be a wise bird but no one ever heard him say anything but a hoot. The chap who keeps everything to himself usually has nothing but his own ideas to keep. Smile at others and their smiles come to you. Give your ideas to others and get theirs in return. The columns of "Our Journal" are an Idea Exchange—use them.

The Repair Business is primarily a service business. Its very existence depends upon its service to the community. To be successful depends upon the quality and extent of that service. The broader the service the greater the opportunity for profit. The better the quality of service the greater chance for the growth of the business. From the mere serving of horse owners with horse and horse vehicle service, the modern rural shop has grown and enlarged its service until today it includes efficient service on both horse and motor vehicles and implements of all kinds, the sale of the parts and accessories and a long line of incidentals dependent upon locality and local conditions. Surely the "Village Smithy" of years ago has grown tremendously—and it is still growing.

Are you taking advantage of the opportunities presented by town meetings and gatherings of every kind to put neatly printed cards, or circulars into the vehicles on the "square" or "parking space"? These gatherings are excellent chances to let folks know what you can do for them. And make your circular or card timely. Don't offer to take care of sleighs in July nor urge the sharpening of discs in December. Take your ideas to your local printer—he can usually help to fix up something neat, attractive and timely that will help to bring in some new business. And don't have more of the cards printed than is necessary. Better get up new circulars more frequently and have 'em up-to-date than use a lot of old ones year after year because you ordered too many.

"Why the great hilarity?" we asked as we found Tom dancing about in great glee as we chanced into his shop the other afternoon. "Just sold a fine bill of them Ford parts," replied Friend Tardy. "An' I made a profit of over two iron men on a bill totaling less than seven dollars. I guess that's got the old business of tinkering with wash boilers beaten." And Tom did another whirl, sang another snatch of a popular song and expressed the thought that he guess'd he'd go to a movie. Just then a man came into the shop rather briskly carrying what appeared to be a rather heavy parcel. "Hey! you" was his greeting to Tom. "Here's that junk you just sold me. Them parts are made o' putty. Give me my money back, you highway robber." And the man emphasized his determination by slamming the parcel down on the shop bench. Tom stood wide eyed, too surpirsed to speak. "Don't stand there like a wooden indian—give me my money and be glad I don't ask y' to pay for the time I put on the car tryin' to put them soft putty parts into it." By this time Tom had recovered his speech. "What's the matter—those parts are made by one the biggest makers of parts for Fords—they're guaranteed" said Tom. "Guaranteed putty, I guess" said the man. "Look at 'em yourself—you can almost pull 'em apart with your hand." To make a long argument short, Tom finally but most reluctantly gave the man his money and rather sheepishly replaced, the returned parts that were not broken, back into his collection of Parts for Fords. We couldn't resist remarking about the advisability of buying automobile parts from responsible makers, but we had to dodge a broom and a shoe keg for our pains. You'll remember Tom bought the collection of parts from some travelling fakir with a very smooth tongue.

OUR HONOR ROLL

Is Your Name On This List?

It is easy to place your name here and at the same time you save money. Suppose for example that your subscription account expires this month—June 1922. All you need do is to send in five dollars ($7.00 in Canada—$9.00 in Other Countries and your account will be marked paid to June 1932. And in addition you save five whole dollars, your name is put on this list and you won't have a single thought of your account for a long time. Just look over the savings you can make on other terms as well.

OUR LONG TIME SUBSCRIPTION RATES

	U. S. and Mexico			Canada			Other Countries		
2 yrs.	$1.60	save	$ .40	$2.00	save	$ .50	$2.50	save	$ .50
3 yrs.	2.00	save	1.00	2.70	save	1.05	3.50	save	1.00
4 yrs.	2.50	save	1.50	3.30	save	1.80	4.20	save	1.75
5 yrs.	3.00	save	2.00	3.75	save	2.50	5.00	save	2.50
10 yrs.	5.00	save	5.00	7.00	save	5.50	9.00	save	6.00

These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents. (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

S. G. Silar, Ala. ....June, 1950
H. Pass, Minn. ....Dec., 1941
E. Krehbiel, Colo. ....May, 1937
The Fix-It Shop, Utah....July, 1935
P. Cocks, S. Aust....Sept., 1934
J. Torrey, Mass. ....Dec., 1933
D. Elledge, Nebr. ....Mar., 1933
L. White, Vt. ....Feb. 1933
J. Gamble, N. D. ....Feb. 1932
R. Tompkis, Texas ....Sept. 1932
C. Graf & Sons, Ohio....June, 1931
A. Rics, Pa. ....May, 1931
C. Crossen, Ill. ....Feb., 1931
W. Waldorf, Ore. ....Feb., 1931
W. Watt, Kans. ....Dec., 1930
W. Waldeck, Ind. ....Nov., 1930
O. Colwell, R. I. ....Oct., 1930
A. Reeve, Fla. ....Sept., 1930
J. Huntington, Calif. ....Aug., 1930
H. Sherman, Pa. ....Aug., 1930
A. Ross, Scotland ....July, 1930
E. Stroup, Ind. ....July, 1930
C. Hawkins, Ore. ....May, 1930
G. Lawrence, Mass. ....Mar., 1930
A. Danielson, Wisc. ....Feb., 1930
J. Sefcik, Kans. ....Jan., 1930
B Olson, Minn. ....Jan., 1930
J. Erickson, Minn. ....Jan., 1930
J. Ennis, N. J. ....Jan., 1930
R. Curtiss, N. L. ....Jan., 1930
C. Fischer, Ind. ....Jan., 1930
J. Gronlund, Conn. ....Dec., 1929
R. Wilson, Md. ....Dec., 1929
C. C. Lewis Co., Mass....Oct, 1929
C. Winslow, Calif. ....Aug., 1929
N. Smithson, Tex. ....Aug., 1929
M. Bernardi, Calif. ....July, 1929
J. Wilder, Mo. ....May, 1929
C. Vanbiad, Pa. ....Mar., 1929
J. Bulley, Vt. ....Feb., 1929
P. Price, S. C. ....Jan., 1929
New Jersey Reformatory, N. J....Jan., 1929
S. S. Albright, Calif. ....Dec., 1928
F. Trelegan, Calif. ....Dec., 1928
J. Wind, Ky. ....Dec., 1928
M. Malenock, Pa. ....Dec., 1928
R. Krueger, Wis. ....Dec., 1928
J. Wurst, Fla. ....Nov., 1928
H. Eilenbarger, Tex. ....Nov., 1928
A. Brookman & Co., Vict., Aust Sept., 1928
J. Vaicbetti, Colo. ....Aug., 1928
D. Dyson, Cuba ....Aug., 1928
T. Farrish, Wash. ....July, 1928
D. Rumsey, So. Africa....June, 1928
J. Utz, Ill. ....June, 1928
F. Brackett, Mo. ....June, 1928
C. North, N. J. ....June, 1928
K. Reimer, Manitoba ....June, 1928
P. Schnydre, Pa. ....May, 1928
J. Miles, Ky. ....Apr., 1928
E. Harris, N. Y. ....Apr., 1928
H. Hangse, N. D. ....Apr., 1928
L. Bergonts, Pa. ....Apr., 1928
S. LeClair, Vt. ....Apr., 1928
P. Ulrich, Calif. ....Mar., 1928
J. Eyre, Nebr. ....Mar., 1928
E. Wilner, N. Y. ....Mar., 1928
H. Roger, N. C. ....Mar., 1928
A. Simpson, N. D. ....Mar., 1928
Waddington Farm, W. Va....Mar., 1928
P. Costa, Terra Haute....Mar., 1928
G. Smith, New Zealand....Mar., 1928
A. Black, Calif. ....Feb., 1928
L. Eisenhart, Idaho....Feb., 1928
A. Wible, Md. ....Feb., 1928
W. Rogers, Md. ....Feb., 1928
L. Larsen, Nebr. ....Jan., 1928
J. Barnhart, Pa. ....Jan., 1928
J. Burns, Conn. ....Jan., 1928
S. Portelance, Quebec....Jan., 1928
C. Forrest, Calif. ....Dec., 1927
R. Leventon, Calif. ....Dec., 1927
F. Vanneter, Calif. ....Dec., 1927
J. Kirsten, So. Afr. ....Dec., 1927
R. Keeney, Colo. ....Dec., 1927
G. Travis, Ill. ....Dec., 1927
E. Lewis, Iowa ....Dec., 1927
J. Forschel, Tenn. ....Dec., 1927
D. Meason, Scotland ....Dec., 1927
J. Templeton, Scotland....Dec., 1927
S. Frey, Ind. ....Nov., 1927
A. Wilson, Iowa ....Nov., 1927
Morley Garage, Mo. ....Nov., 1927
B. Miller, Ark. ....Nov., 1927
O. Roberts, Calif. ....Nov., 1927
H. Facklam, Wisc. ....Nov., 1927
J. Staats, Mo. ....Nov., 1927
W. Morrison, Calif. ....Sept. 1927
W. Wilson, New Zealand....Sept., 1927
W. Morrison, Calif. ....Sept. 1927
F. Bock, Nebr. ....Aug., 1927
D. Lyon, So. Africa....Aug., 1927
E. Delay, Ill. ....July, 1927
W. Patterson, Okla. ....June, 1927
W. Egly, Pa. ....June, 1927
A. Gooding, So. Aust....June, 1927
W. Geer, Pa. ....June 1927
A. Mellum, N. D. ....June, 1927
R. Wilson, England....May, 1927
J. Brenneman, Va. ....May, 1927
C. Stebbins, Kans. ....May, 1027
J. Devero, Iowa....Apr., 1927
F. Bruschi, Calif. ....Apr. 1927
S Forman, N. J. ....Apr., 1927
H. Dyressen, N. D. ....Apr., 1927
M. Griffin, Conn. ....Mar. 1927
E. LeClair, N. Y. ....Mar. 1927
P. Flanagan, Calif. ....Mar., 1927
J. Anderson, Calif. ....Mar., 1927
F. Evarts, Calif. ....Mar., 1927
J. Peterson, Iowa ....Mar., 1927
G. Shoemaker, Pa. ....Mar., 1927
C. Geiger, Pa. ....Mar., 1927
G. Norton, D. C. ....Mar., 1927
T. Tillman, Calif. ....Feb., 1927
J. Haught, Ill. ....Feb., 1927
W. Pontius, Iowa ....Feb., 1927
J. Howes, Md. ....Feb., 1927
M. Goller, Pa. ....Feb., 1927
F. Roschy, Pa. ....Feb., 1927
O. Knisely, Pa. ....Feb., 1927
L Stocker, Texas ....Feb., 1927
C. Adams, Conn. ....Jan., 1927
C. Radeleff, Iowa ....Jan., 1927
H. Lamons, Aenn. ....Jan., 1927
J. Schneider, Calif. ....Dec., 1926
P. Kauth, Ill. ....Dec., 1926
A. Grandadam, Ill. ....Dec., 1926
F Harding, Iowa ....Dec., 1926
H. Grimm, Utah ....Dec., 1926
J. Smith, Wash. ....Dec., 1926
C. Hall, Wash. ....Dec., 1926
H. Mokler, Ill. ....Dec., 1926
F. Bird, N. Y. ....Dec., 1926
R. Sherman, Maine ....Dec., 1926
C. Hardy, Mass. ....Dec., 1926
L. Cordes, Mo. ....Dec., 1926
R. Pogue & Son, Texas ....Dec., 1926
H. Rickley, N. J. ....Dec., 1926
A. Hallander, Calif. ....Dec., 1926
J. Griffiths, Iowa ....Dec., 1926
W. Swetnam, Ky. ....Dec., 1926
F. Hoopengarnder, Md. ....Dec., 1926
L. Turner, Kans. ....Dec., 1926
W. Matthews, England ....Dec. 1926
W. Branch, N. C. ....Oct., 1926
Hanson & Marvin, Cal. ....Oct., 1926
W. Branch, N. C. ....Oct., 1926
F. Matsocks, Ark. ....Sept., 1926
E. Jones, Wise....Sept., 1926
J. Clark, Jr., Vict. Aust....Aug., 1926
L. Wesley, Ariz. ....July, 1926
J. Buchner, Mich. ....July, 1926
J. Dambach, N. J. ....July, 1926
H. Mitchell, N. Y. ....July, 1926
I. Boles, Ohio ....July, 1926
F. Vavasour, New Zealand....July, 1926
S. Butler & Son, Mich. ....June, 1926
A. Schmitt, Nebr. ....June, 1926
M. Broton, N. D. ....June, 1926
J. Campbell, Oregon ....June, 1926
F. Over, Pa. ....June, 1926
A. Clark, Jr., Cict, Aust....June, 1926
C. Sager, N. Y. ....May, 1926
H. Pirret, Oregon ....May, 1926
P. Sowa, Oregon....May, 1926
D. Ackland & Son, Man. ....May, 1926
J. Sinclair, W. Aust. ....May, 1926
C Sex, England ....Apr., 1926
P. Peterson, Iowa ....Apr., 1926
G. Bowers, Okla. ....Apr., 1926
E. Dignan, South Aust. ....Apr., 1926
J. Carswell, Ark. ....Mar, 1926
C. Burton, Mass ....Mar., 1926
W. Pochelu, Oregon....Mar., 1926
A. Bowman, Va. ....Mar., 1926
W. Widger, N. Y. ....Mar. 1926
W. Glenn, Colo ....Mar. 1926
T. Moore, Vict., August....Mar. 1926
H. Brown, Va. ....Mar. 1926
H. Barnes, Va. ....Mar., 1926
G. Iller, N. S. W., Aust....Mar., 1926
E. Jones, New Zealand....Mar., 1926
G. Torrey, Calif. ....Feb., 1926
E. Schauppner, Nebr....Feb., 1926
F. Trogdon, N. C. ....Feb., 1926
A. Garver, Ohio ....Feb., 1926
C. Jones, Pa. ....Feb., 1926
J. Fox, Kans. ....Feb. 1926
R. Dean, Texas ....Feb., 1926
Inglis & Son, Nebr. ....Feb. 1926
J. Murphy, Calif. ....Jan., 1926
O. Temple, Idaho ....Jan., 1926
F. Kearns, Ill. ....Jan., 1926
J. Murphy, Nevada ....Jan., 1926
W. Post, N. Y. ....Jan., 1926
J. McIntire, Pa. ....Jan., 1926
N. Karolewicz, S. D. ....Jan., 1926
L. Messersmith, Idaho ....Jan. 1926
J. Merritt, Calif....Jan. 1926
J. Hess, Ohio ....Jan. 1926
W. Pederson, Ill. ....Jan. 1926
Powell Bros. & Whitaker, Eng. Jan., 1926
H. White, N. Z. ....Jan., 1926
M. Rawlins, Calif. ....Dec., 1925
J. Hulvey, Ill. ....Dec., 1925
P. Nelson, Minn. ....Dec., 1925
J. Devine, N. J. ....Dec., 1925
S. Wright, N. Y. ....Dec., 1925
E. Lain, N. Y. ....Dec., 1925
W. Jones, Texas ....Dec., 1925
Williams & Turner, W. Va. ...Dec., 1925
A. Spence, B. C. ....Dec., 1925
N. Buchanan, Ont. ....Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ....Dec., 1925
W. Snyder, N. Y. ....Dec., 1925
J. Skiff, Pa. ....Dec., 1925
F. Cronk, N. Y. ....Dec., 1925
J. Singer, N. Y. ....Dec., 1925
H. Edwards & Sons, N. Y. ..Dec., 1925
G. Strait, N. Y. ....Dec., 1925
E. Monroe, N. Y. ....Dec., 1925
L. Luch, N. Y. ....Dec., 1925
L. Rajewsky, Minn ....Dec., 1925
W. Bolle, Ill. ....Dec., 1925
F. Carlson, Ill. ....Dec., 1925
W. Seamans, Ky. ....Dec., 1925
J. Wrley, Mo. ....Dec., 1925
J. Mallay, N. J. ....Dec., 1925
S. Hazlett, Ohio ....Dec., 1925
C. Seidles, Pa. ....Dec., 1925
W. Robertson, S. C. ....Dec., 1925
H. Collins, Ohio ....Dec., 1925
G. Hanshaw, Okla. ....Dec., 1925
W. Bate, Conn. ....Dec., 1925
R. Shipley, Iowa ....Dec., 1925
W. Nattress, N. M. ....Dec., 1925
J. Sammerlee, N. Y. ....Dec., 1925
D. Rhymes, Texas ....Dec., 1925
L. Heath, Calif. ....Dec., 1926
E. Wright, Ill. ....Dec., 1925
C. Frazier, Ky. ....Dec., 1925
G. Leutz, Ohio ....Dec., 1925
J. Sebesta, S. D. ....Dec., 1925
P. Oram, England ....Dec., 1925
F. Wortell, Calif. ....Dec., 1925
E. Thomas, N. Y. ....Dec., 1925
H. Miller, Wash. ....Dec., 1925
M. Bates, N. Y. ....Dec., 1925
J. Woods, Oregon ....Dec., 1925
W. Areford, Pa. ....Dec., 1925
J. Howell, Mo. ....Dec., 1925
J. Morrow, Pa. ....Dec., 1925
A. Darling, Sr., N. Y. ....Dec., 1925
J. Goebel, Kans. ....Dec., 1925
C. Rausch, Ohio ....Dec., 1925
R. Noble, Jr., Ont. ....Dec., 1925
C. Lynch, Oregon ....Dec., 1925
H. Clauson, Pa. ....Dec., 1925
Neles, Bros., Calif. ....Dec., 1925
H. Lefler, Mich ....Dec., 1925
D. Bullinger, Mo. ....Dec., 1925
A. Potter, Conn. ....Dec., 1925
R. McMains, Calif. ....Dec., 1925
W. Jordan, Maine ....Dec., 1925
R. Fisher, Pa. ....Dec., 1925
P. Kaimulos, T. H. ....Dec., 1925
H. Hesse, Kansas ....Dec., 1925
F. Hinkey, Ohio ....Dec. 1925
N. La Duke, N. Y. ....Dec., 1925
A. Wassmuth, Idaho ....Nov., 1925
G. Ilisley, Mass. ....Nov., 1925
A. Speir, Ohio ....Nov., 1925
W. Clepper, Texas ....Nov., 1925
J. Mallett, Queensland, Aust...Nov., 1925
J. Dribble, South Aust....Nov., 1925
W. Schaid, Wis. ....Nov., 1925
D. Fraser, N. J. ....Oct. 1925
L. Krause, Ind. ....Oct. 1925
Nugent-Covey Wagon Co., Calif. Sept., 1925
M. Pople, N. S. W., Aust. ..Sept., 1925
J. Wilkinson, Queens, Aust ..Sept., 1925
C. Williams, Victoria, Aust. ..Sept., 1925
Reynolds Bros., Pa. ....Sept., 1925
F. Krens, Calif. ....Aug., 1925
D. Allen, Mont. ....Aug., 1925
G. Fisher, & Bro., Ohio ....Aug., 1925
W. Dixon, Ohio ....Aug., 1925
F. Shupe, Pa. ....Aug., 1925
W. Wright, Va. ....Aug., 1925
H. Knoues, Ill. ....July., 1925
A. Veit, Mass. ....July, 1925
J. Stadler, Calif. ....July, 1925
Sligo Iron Co., Mo. ....July, 1925
G. Hogoboom, N. Y. ....July, 1925
H. Schriber, Pa. ....July, 1925
H. Fast, Manitoba ....June, 1925
G. Broughan, N. Y. ....June, 1925
A. Nordstrom, Iowa ....June, 1925
C. Holton, Okla. ....June, 1925
D. Conillard, Vt. ....June, 1925
Rasmussen & Baasch, Nebr. ...May, 1925
J. O'Rourke, N. Y. ....May, 1925
A. Spangberg, Oregon ....May, 1925
C. DeVore, Pa. ....May, 1925
Halvorson, Bros. ....May, 1925
A. Lemmon, Utah ....May, 1925
H. Leadbitter, N. S. W., Aust..Apr., 1925
J. Matthews, England ....Apr., 1925
M. Duvoisin, Ill. ....Apr., 1925
E. Ellsworth, Iowa ....Apr., 1925
G. Gullgren, Iowa ....Apr., 1925
H. Wiese, Iowa ....Apr., 1925
Heart's Delight Farm, N Y. ..Apr., 1925
S. Wilkin & Sons, N. Y. ....Apr., 1925
P. Wand, N. Y. ....Apr., 1925
M. Settle, Ohio ....Apr., 1925
D. Kille, Okla. ....Apr., 1925
J. Helms, Calif. ....Mar., 1925
E. Moon, Ind. ....Mar., 1925
A. Holmquist, Iowa ....Mar., 1925
G. Fredericks, Minn. ....Mar., 1925
O. Martinson, N. D. ....Mar., 1925
C. Lindquist, Minn. ....Mar., 1925
F. Locke, N. Y. ....Mar., 1925
G. Follmar, Nebr. ....Mar., 1925
J. Pool, Texas ....Mar. 1925
W. Thomas, Mo. ....Mar. 1925
Higgins Blk. Shop, S. D....Mar. 1925
C. Wiesner, Calif. ....Mar. 1925
J. Guthrie, Va. ....Mar. 1925
C. Alexander, N. Y. ....Mar., 1925
P. Chemin, Ohi ....Mar., 1925
F. Faistinger, Pa. ....Mar., 1925
E. Roseth, S. D. ....Mar., 1925
V. Priesnits, Wisc. ....Mar., 1925
A. Herzog, Misc. ....Mar., 1925
W. Snider, Ind. ....Mar., 1925
B. Christianson, Wis. ....Mar., 1925
J. Cattanash, Colo. ....Feb. 1925
S. Stevenson, Kans. ....Feb. 1925
F. Hall, Wyo. ....Feb. 1925
J. McCallum, N. D. ....Feb. 1925
C. Ford, Oregon ....Feb. 1925
F. Chaves, N. Mexico ....Feb. 1925
J. Taugher, Ont. ....Feb., 1925
G. Lawton, South Aust. ....Feb., 1925
E. Dillabough, Tnt. ....Feb., 1925
J. Ford, Wash. ....Feb., 1925
J. Kerz, Ill. ....Feb., 1925
E. Price, Ill. ....Feb., 1925
B. Nystrom, Mich. ....Feb., 1925
E. Hiteshue, Ohio ....Feb., 1925
D. Garber, Ohio ....Feb., 1925
A. E. Meier, Wisc. ....Feb., 1925
J. Beyerholm, Calif. ....Jan., 1925
C. Lake, Colo. ....Jan., 1925
H. Draper, Ind. ....Jan., 1925
J. Damm, Iowa ....Jan., 1925
E. Atteberry, Mo. ....Jan., 1925
A. Hahn, Colo. ....Jan., 1925
D. Shearer, Ohio ....Jan., 1925
H. Compton, Tenn. ....Jan., 1925
C. Jacobitz, Wis. ....Jan., 1925
A. Witt, Wis. ....Jan., 1925
J. Withers, Terre Haute ....Jan., 1925
M. Bennett, Miss. ....Jan., 1925
J. Howard, Jr., Ala. ....Jan., 1925
J. Flynn, Iowa ....Jan., 1925
S. Bradford, Miss. ....Jan., 1925
T. Elam, England ....Jan., 1925
E. Staley, Calif. ....Dec., 1924
J. Davis, Calif. ....Dec., 1924
G. Tatum, Fla. ....Dec., 1924
G. Laughlin, Ill. ....Dec., 1924
B. Bueker, Ill. ....Dec., 1924
F. Jarvis, Ind. ....Dec., 1924
W. Herdt, Ky. ....Dec., 1924
E. Naylor, Md. ....Dec., 1924
J. Klein, Md. ....Dec., 1924
M. Bailey, Mich. ....Dec., 1924

Joe Joins the Hot Flame Gang

A. J. MILLER

"So y' want I should give y' my o' pinyun o' them here oxa-setylean plants eh?" questioned Joe, in response to my request for his experience with the oxy-acetylene plant. Joe it may be explained, is the owner of a well-equipped shop and in more than one way is from Missouri. But then Joe's own language will tell more about him and his ideas and, incidentally, his very characteristic humor than anything I can say.

THE PRACTICAL TRACTOR REPAIR MAN SHOULD ALSO KNOW SOMETHING OF TRACTOR FIELD WORK

Joe has had an oxy-acetylene plant for lo, these several years, and—well I'm going to let Joe do the talking.

"Well, I'll tell y'. Ef y' want a lot o' trouble an' work an' ef y' want t' keep 'bout as busy as a one armed man with the itch, you get yourself one o' them here oxa-setylean outfits. Its jes' about the durndest contrivance on earth t' keep a man busy.

"But, let me begin from the start off. Back here a couple or four years ago some smart talkin' chap cum along here in one o' these new flivver-cars and after sum pretty smart talk on the marvels o' the age and a lot of other warmed-up air that I didn't get because he talked too fast for my receiving set, he finally went out to that flivver of his and fetched in a couple of tanks with a couple of lengths of little garden hose attached and a bright shiny nossel. I told him I didn't have any grass or plants that needed sprinkling, but he brought the contraption into the shop and asked if I had anything that needed welding or brazing.

"Well, it happened that I had a couple of simple brazing jobs in and I also had a broken casting off the band saw which I had fixed up with a lot of hay baling wire and which that eagle eyed yap quickly discovered.

"Well, I ain't never over anxious to have any strangers snoopin' around the shop an' 'specially 'round my machines. But this chap had the dangest way o' pushin' his way in and before I hardly knew what he was about, he was chipping away with hammer and chisel on that broken part for the band saw frame.

"Well, I cum darn near throwin' him out, tanks, hose and all, but he had such a sort o' get-up-an'-git way that I simply couldn't bring myself t' do it—an' then too he wasn't my size an' I do hate to' pick on anybody bigger'n I am.

"Well—I watched him pretty close an' the way he went at that job had me backed off the map. He sure knew his business. And in almost less time than it takes to tell about it, the durned cuss had the crack chipped out and welded too by crackee.

"Well, t' make a long story longer I bought the durned thing then an' thare. An' as I had a shop full o' all kinds of work I sent fer Jim Carter—he's my helper, but was on a little vacation. Well, I turned the shop over t' Jim and I kep' that smart alec right thare showin' me just how t' use that durn'd set o' hoses and nozzel.

"He also left a book with me an' I got so gol-durn'd interested in the way that stream o' fire would fix up a break or cut through somethin' that my wife come pretty near gettin' a divorce. She said that the darn contraption has de-lean-eated my affections or something o' that kind.

"Well, that wus purty bad—but, as the story writers say; the worst was yet to cum.

"As I sed—I bought the contraption, an' ever since I've had it in the place I haven't had a chance t' sit down long enough at one time to warm up the chair seat. The gosh darned thing has kep' me so tarnally busy I ain't had much time for anything. I've even been dropped from the 'Easy Chair Club' 'cause I couldn't attend the Wednesday afternoon meetings.

"It's been so I couldn't get out to the circus now for the last three years. An' before that I hadn't missed a circus in purty near forty year. I'll tell y' its gettin' t'a pretty pass when business interferes to that extent.

"Well, last fall the missues an' girls had their mind set on goin' down t' the missus folks for Thanksgiving. 'Course I sed al' right—I ain't partial t' goin' away fer any holiday, but y' know how it is. The girls an' their ma wanted t' go an' so me an' the boy—yes, I got one boy, as fine an upstandin' chap as y' ever saw. Well, as I sed—me an' the boy decided t' go

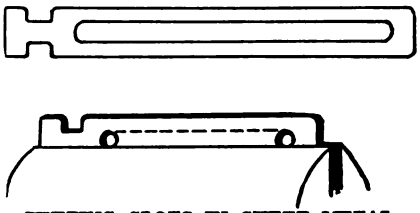
"It was planned t' go down t' ma's folks the day before Thanksgiving. I had the tickets bought an' everything ready an' by gosh thar came that sudden cold spell that busted so many water jackets that I not only couldn't go with them but I had to work all day Thanksgiving day pokin' that there oxa-sety-lean nozzle into cylinder cracks.

"Well, that was bad enough, but then the folks planned on comin' up t' our place for Christmas an' New Years. Y' see we'd gotten into our new place that I'd built in

the summer an' ma's folks hadn't seen it. An' I guess ma an' the girls had kind a fixed it up t' have the folks up so they could see how comfortable we wus. O' course it was all right as far as I was concerned. The folks sed that as I couldn't cum down, why they guessed they'd cum up fer a spell. Well, I tho't from Christmas t' New Year's was spell enough but I didn't say nothing', but kinda' planned on seein' that they had a good time.

"I sed t' the boy that he'd better get his Ford right away—I'd planned on givin' him one fer Christmas—so's he'd hav'er in good runnin' order by the time the folks cum. An' I'd get the Buick tuned up a bit so's we wouldn't have no trouble when the folks was here. Y' see with ma an' the two girls an' me an' the boy, we couldn't take all the folks in that seven-passenger Buick. But with the new flivver t' take the youngsters we could all git out together in two cars comfortable an' easy.

"Well, it was all planned fine. Ma had stocked up with some good feed and I planned on closing down shop an' givin' the boys a vacation for a week. Well, gosh darn the luck if I didn't hav' t' work



CUTTING SLOTS IN SHEET METAL

Christmas morning t' get sum jobs out with that darn hose an' nozzle contraption. An' I had t' keep the shop open an' hire an extra man.

"An' t' add insult t' injury, as the feller in the story says—I had t' let the girls run the Buick—'couldn't even take the folks out in the car.

"An' that's jus' about the way its been ever since I got that darn hose an' tank welding contraption. These here oxa-sety-lean plants is all right fer a feller that wants t' be busy all the time—that ain't fond o' circusses an' movies an' family entertainment; But fer the chap that's inclined t' be kind o' lazy or afflicted with armchairitis it ain't the thing t' purscribe.

"Y' know since I got that first outfit—we got two of 'em now—'t seems as tho' everybody in the hull county hes got sum sort o' work that can be done on it. First off' I uster go out on the kid's bike an' look for work fer that darn thing an' now I can't stop 'em from bringin' stuff in t' be welded.

"I got the boy in the business now tho' an' I'm plannin' to get a much needed rest—jus' sort o' take things easy, tho' ma an' the girls say we're goin' t' Atlantic City this summer. Well, I ain't hankerin' fer t' see the ocean but then I spose thar's lots worse places than Atlantic City.'"

Cutting Slots in Sheet Metal

G. A. LUERS

In the repair of a broken section in the linkage for an accelerator pedal the repairman made two attemps at chiseling out a slot through a section of metal to replace the broken part of the car. In each of these pieces the slender edge of the metal broke while chisling. When the third part was cut out in readiness for making the slot, the extreme ends for the slot were first drilled with holes the same diameter as the width for the slot. Using these places for the entrance of the corner of the cold chisel and with the metal clamped securely in the vise, a clean cut was made through the length of the slot, the chisel cutting the edge flush across the edge of the vise jaw. Seemingly the whole success of slotting out a narrow section of metal with the chisel rests with the starting place which the drilled hole provides.

Suggestions to Belt Users

Keep belts flexible and as clean as possible. Use no belt dressing containing mineral oils or resins.

Where possible, use a belt speed of 3,000 feet per minute, but not more than 3,600 feet per minute.

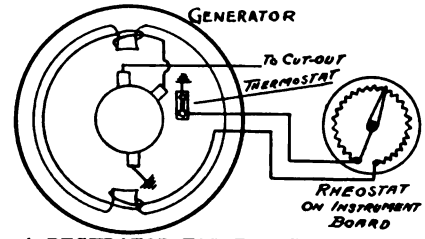
To obtain a given amount of power, better use a narrow belt running at high speed than a wide belt at a low speed.

When using a vertical belt, have no more center distance than absolutely necessary—the weight of the belt reduces the efficiency of the drive.

If possible, use a horizontal belt with large center distances and the pulling side at the bottom. In a horizontal drive, the slack side of the belt at the top of the drive increases the belt contact.

Avoid crossed belts on short center distances. Avoid crossing wide belts anywhere. If crossing is necessary, see that the rubbing of the belt surfaces does not have a tendency to open up the laps.

Use a wide enough pulley so a small amount of belt irregularity does not make it run off. Allow at least ½ inch on machine pulleys, and 1 inch or more on counter-



A REGULATOR FOR THE GENERATOR

shaft and lineshaft pulleys. Use crowned pulleys where possible.

A Regulator for Generator Output

PHILIP A. BAKER

By connecting a rheostate in series with the field circuit as shown, in the engraving the current output of the generator can be regulated to suit all conditions. If a third brush generator is used, it should be regulated to give its maximum output then it can be regulated with the rheostate. When making a long run on a hot day, the output can be cut down to as low as two amperes, and when short runs are made the output can be increased as desired. The rheostat should have a capacity of about six ampheres, and about 12 ohms resistence. I used an ordinary rheostate simular to that used on wireless instruments. This is a great aid in protecting the battery from overcharge.

Taking Down and Re-Assembling the Storage Battery

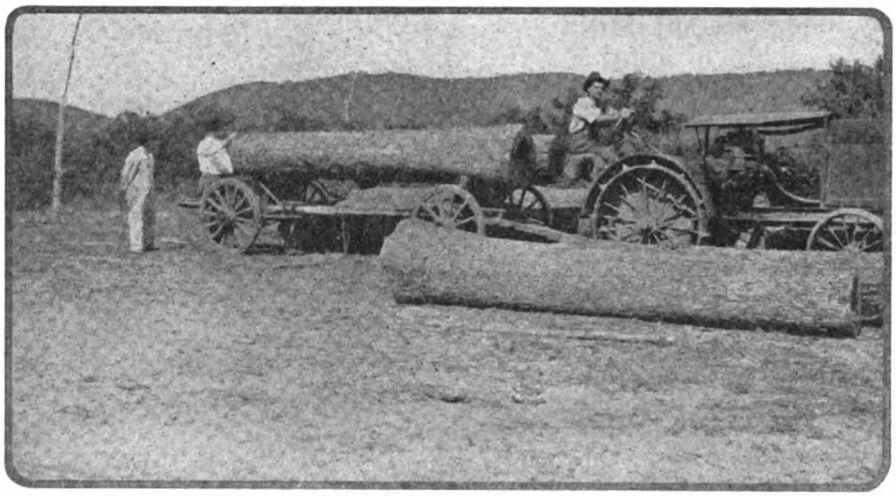
T. A. BECKMAN

Miscellaneous Suggestions and Helps on Battery Work

The diagnosing of troubles due to the battery is a very important part of battery work. If trouble should develop as shown by the engine not cranking properly, lights burning dimly, or missing of the

engine when battery is used, you may look for battery trouble as follows:—

First:—Make absolutely certain that all connections are tight and all contacts are clean. Connections may be terminals attached to battery and also ground connections to frame of car may not be properly made. Second:—Take a hydrometer reading of each battery cell. If the battery is found to be exhausted, or that the gravity is below 1.150, the battery should be charged. Third:—If after having been fully charged, the battery is again soon exhausted, there must be trouble somewhere else in the system, and this should be located and corrected.



THE TRACTOR WILL SAVE TIME, LABOR AND HORSE FLESH IN HANDLING HEAVY CUMBERSOME LOADS

If the wiring has become grounded to the frame of the car, a leakage of the battery current has been caused which will very quickly discharge the battery.

In order to test for such a ground, make the following test in the darkened garage, or at night:—Turn on all the lamp switches, but remove the bulbs from the sockets, and then disconnect the battery ground wire at the ground plate. Now strike the bare end or terminal of the ground wire against the ground plate. If sparks are noted, there is a ground in the wire which should be looked for and removed. Upon examining the wiring, it will undoubtedly be found that the insulation on some of the wires has been worn away, and thus laying bare the wire at the point of chafing.

If a broken jar, or cell is indicated this will be shown by the solution being considerably lower in this cell than in any of the others, the battery will of course have to be taken down and repaired.

As has already been intimated on a number of occasions in this series of articles, the hydrometer is the most important instrument for the location of battery troubles, and a hydrometer reading of the cells should be taken on every occasion when battery trouble or failure is indicated. Of course, it does not always follow, that when low gravity is indicated in all of the cells that the battery is at fault and when this indication persists after extra chargings the trouble may be with the generator failing to put enough energy into the battery, and thus the generator may require overhauling or tuning up.

An excellent means to determine whether the battery is holding its charge, is to try out the battery on the car with a drive in the evening to test the charge of the generator. Take down on paper the readings of the individual cells before putting the car up for the night, and then compare this reading at night with a similar reading in the morning. If all of the cells maintain the gravity uniformly well, you may be sure that the battery is in excellent condition.

Common Battery Troubles and Their Cause and Remedy

If the battery exhausts very quickly while idle, the cause is undoubtedly a short circuit or ground in the wiring system. The remedy for this is of course to go over the wiring carefully.

If the liquid or electrolyte is low in one cell, the cause is either a cracked or broken jar. The only remedy for this is to take down the battery and replace the broken jar with a new one.

If the gravity of the electrolyte will not rise, the cause is the sulphation of the plate. The cause of this sulphation is over-discharge, or allowing the battery to stand discharged, or the electrolyte level has not been properly maintained, or there is an internal short-circuit. The addition of raw acid to the electrolyte instead of distilled water, will also cause sulphation. The remedy for this is to give the battery a long twenty-four hour charge at a low rate. If this fails, it will be necessary to put in new elements, supply the proper strength of the electrolyte in each cell, and then to charge for a long period.

If the electrolyte leaks out at the top of the battery, the acid solution has been brought too high in the cell. The obvious remedy for this is of course, to draw off a quantity of the electrolyte with the hydrometer syringe.

If the battery persists in heating, it may be taken as an indication that either the electrolyte is too low in the cell, or that the battery is being charged too rapidly. The remedy is of course to maintain the electrolyte level with water in the case of the low liquid, and to alter the generator regulation in the case of a battery charging too quickly.

If the battery is constantly low, the difficulty is the result of undercharging by the generator. In this case, examine the brushes of the generator, and if these are found to be O. K., increase the charging rate, and have the battery placed on a charge from an outside source.

If the terminals of the battery are unduly corroded, you may be certain that acid is leaking through the vent or some part of the top of the battery. If the vents are leaking, replace the rubber gasket to make them tight, and if the acid is leaking around the edge of the jar covers, it may be necessary to melt up some of the sealing compound in order to seal the covers properly. Corroded terminals should be cleaned with ammonia or a solution of washing soda, and then greased with vaseline.

If the battery fails to operate quickly after replacement, the battery is undoubtedly loose in its fastenings on the car. In this case of course the remedy is obvious:—

See that the bolts holding the battery are properly fitted, and that other means of holding the battery on rigid and tight.

If the battery fails to operate after a period of storage, it may be taken for granted that the battery has not been maintained properly during the storage period, and undoubtedly the only remedy for this is to take down the battery and to build it up entirely with new elements.

If, in testing the cells of the battery, one cell is found to be dead, the cause is undoubtedly the destruction of the insullation. It will be necessary to carefully watch over-heating and over-charging, to keep the electrolyte up.

A Few Battery Pointers

Battery grids should always be at least one-half inch below the surface of the electrolyte solution.

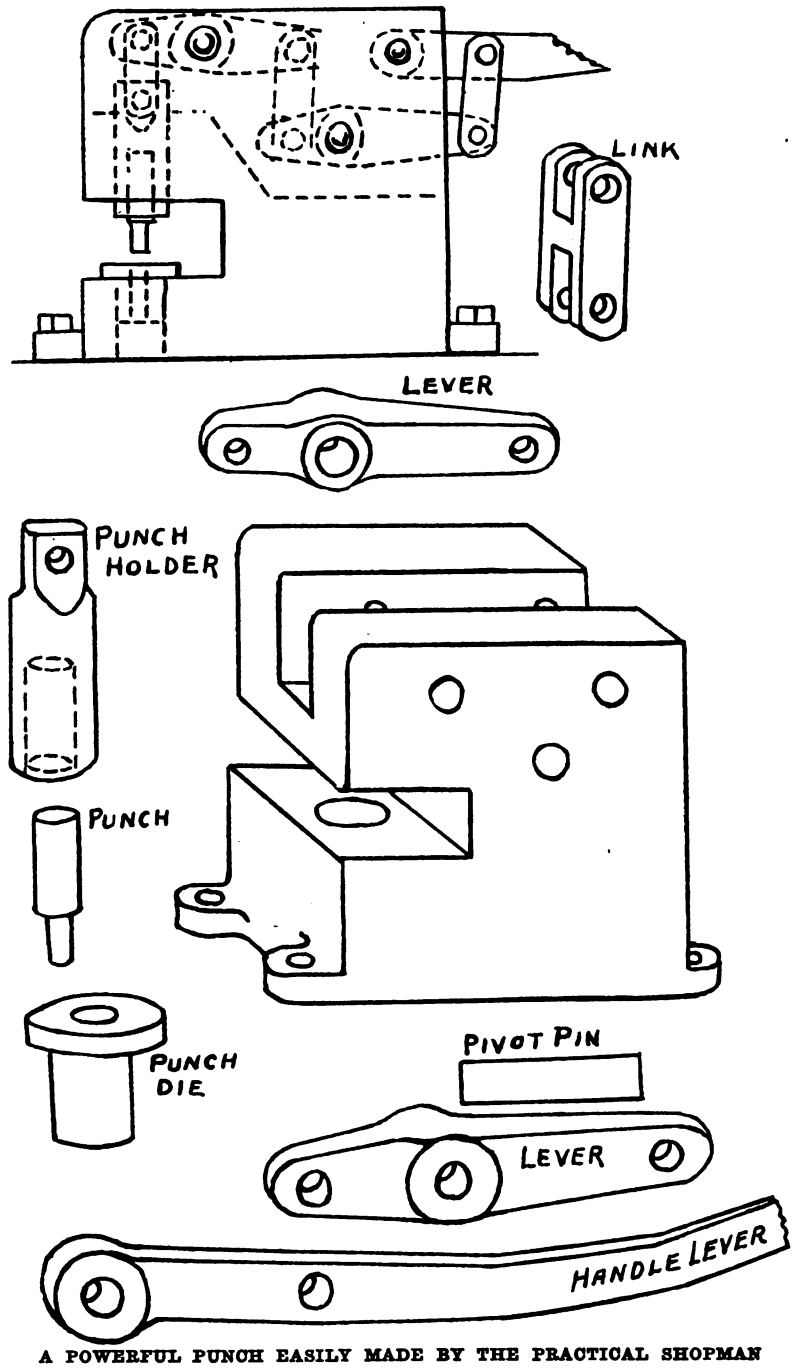
In working with electrolyte and in mixing the electrolyte solution remember that woolen clothing is little affected by acid. Should acid be splashed on the clothing, ammonia applied immediately will neutralize the acid and prevent burning of the fabric. In the case of acid being splashed into the eye, wash well with warm water, and put a drop of olive oil into the eye.

Here is a caution that cannot be emphasized too strongly:—Never use an open flame in a room where a storage battery is being charged on in which the battery has been left for some time. An explosive mixture of air and hydrogen may be formed.

The practice of applying a wire, screwdriver, or a pair of pliers across the positive and negative terminals of the battery, is a common one with many so-called battery repair men. It is not good practice however. Usually this means is taken to see if there is any spark. It is, however almost a dead short circuit for the battery, and if the cell be of small capacity, there will be an over-discharge of current for the fraction of a second, which is very detrimental to the cell, and assists very materially in dis-intregation of the plate, and the active battery material.

If, in charging, the cells become hot, reduce the charging current immediately. The temperature of a battery should never exceed 100 degrees F.

The proper way to keep batteries when not in use, is to give them a short charge once a month, or if the battery is to be stored for length of period, charge the battery fully and then siphon the electrolyte from the jars, remove the plates and store in this manner.



A POWERFUL PUNCH EASILY MADE BY THE PRACTICAL SHOPMAN

Powerful Punch for Bolt or Rivet Holes

G. A. LUERS

The punch illustrated in the attached sketch is an especially advantageous arrangement of levers combined to form a simple device with multiplicity of power sufficient to drive a punch through plates when rivet or bolt holes are required. The use of a tool of this design for making holes, is a time and labor saver, in that a punch will only shear the metal at the desired opening, while the drill shears or shreads the entire center, cutting this into small chips. The chips from a drill represent labor wasted, and the punching of plates should be resorted to when possible. The anvil for this punch can be made from a cast iron block with a slotted opening for entering the plate. A bored hole is made perpendicular to this slot. The lower section is used for punch dies, while the upper opening is the punch

guide. The punch holder is linked to the first lever. This lever is pivoted to the block, and linked to a second lever with a support further back. The third lever is the handle through which the pressure is applied.

The details of this punch are not important, except possibly the punch and die, which should be made of tool steel and tempered. As an example of the work which this tool will accomplish, where the main lever is twenty times the length of the short arm and each of the other levers is twice the length of its short arm, a force of two hundred pounds at the handle is multiplied eighty times or equals sixteen thousand pounds at the punch. This will pierce a piece of three-eighth inch plate, with a three-eighth inch punch easily.

This makes the tool advantageous to use on structural material, angles beams, etc., in addition to lighter sheet metals.

Finishing and Polishing Aluminum

CHARLES H. BUTCHER
"WORK"

Lightness, low cost and ease of working have combined to make aluminium one of the most popular metals for the making of various articles of utility. It is readily obtained in a great variety of forms, such as sheet and tube, rod and bar, and in grades varying from dead-soft to hard. The metal can be worked and shaped by all modern processes, and articles may be finished in a variety of ways.

Polishing

Aluminium will take and retain a very high polish equal to that of silver. The polishing wheels should run at a very high speed, from 2,000 to 3,000 revs. per min., and a very greasy polishing material should be employed. After sanding with ordinary sand and oil on a wheel covered with leather, greasy tripoli compound should be used on a stitched canvas wheel. The final lustre is imparted by buffing with dry lime on a soft mop.

Satin-finishing

Although the true and distinctive colour of the metal is best brought out by machine polishing, the satin finish gives excellent results and may be recommended for many articles. The operation is effected by scratch-brushing with a fine steel brush, running at about 1,500 revs. per min. The best effects are obtained by light easy strokes given evenly in one direction, but the brush must be kept dry and quite free from grease. An accidental splash of oil from the machine should be removed by applying finely-powdered lime to the brush.

Frosting

The matt or frosted finish of aluminium is sometimes preferable to a brightly-polished surface. The articles should be freed from dirt and grease by washing in hot water, and then immersed for a few seconds in a hot solution of caustic soda. After washing in cold water they are dipped in cold dilute nitric acid, and the black deposit, formed on the surface of the metal after treatment with the caustic, is removed. The operation is completed by further washing in water and drying in clean warm sawdust.

A solution containing about 1 lb. of caustic soda per gallon of water will be found suitable for the first bath, and the second should be made by diluting concentrated nitric acid with six to seven times its volume of water. Heavy frostings may be obtained by adding common salt to the caustic soda solution.

Burnishing

In burnishing due allowance must be made for the softness of the metal. The tools may be of agate or steel, and a well-shaken emulsion of olive oil and alcohol in equal parts forms a good lubricant. Some classes of work may be carried out to satisfaction by means of a piece of soft wood well soaked with olive oil alone.

Coloring

For some purposes it is desirable to give a dull black finish to articles of an ornamental nature. One method of treatment is to immerse the articles, after a thorough cleaning, in a hot solution of equal volumes of concentrated hydrochloric acid and water containing 5 oz. of white arsenic and 5 oz. of iron sulphate per gallon. When sufficiently blackened they are removed and washed and dried. The deposit is fairly firm, but it is advisable to protect the surface with colourless lacquer.

By means of another method gradutions of colour ranging from steel-grey to black are obtained. The articles are carefully heated over a hotplate and painted with ammoniacal copper chloride. The solution is made by dissolving 1 oz. of copper chloride in 5 fluid oz. of water, and adding ammonia in excess until the precipitate formed is redissolved. The shade may be deepened by repeating the operation, or by dipping into solutions of sodium sulphide of varying strengths.

Owing to the non-porous nature of its surface aluminium takes paint and enamel very easily. The metal should be frosted or rubbed down with emery flour to produce a matt surface, and traces of grease should be removed with benzol. A mixture of 3 parts of raw linseed oil to 1 part of quickdrying varnish may be recommended for priming, or gold-size may be used.

When aluminium is repeatedly exposed to moisture oxidation takes place slowly and very evenly over the surface. To the thin film of oxide produced the cause of the comparative immunity of the metal from corrosion is due. By heating kettle a slight dulling of the surface is produced, and eventually this film of oxide thickens and assumes a lustreless whitish appearance.

For repoussé and other ornamental work the frosted finish is very effective, and in spun and turned work a fine effect may be produced by a combination of frosting and polishing. The article is first given a fine white frosted appearance and parts picked out are then polished.

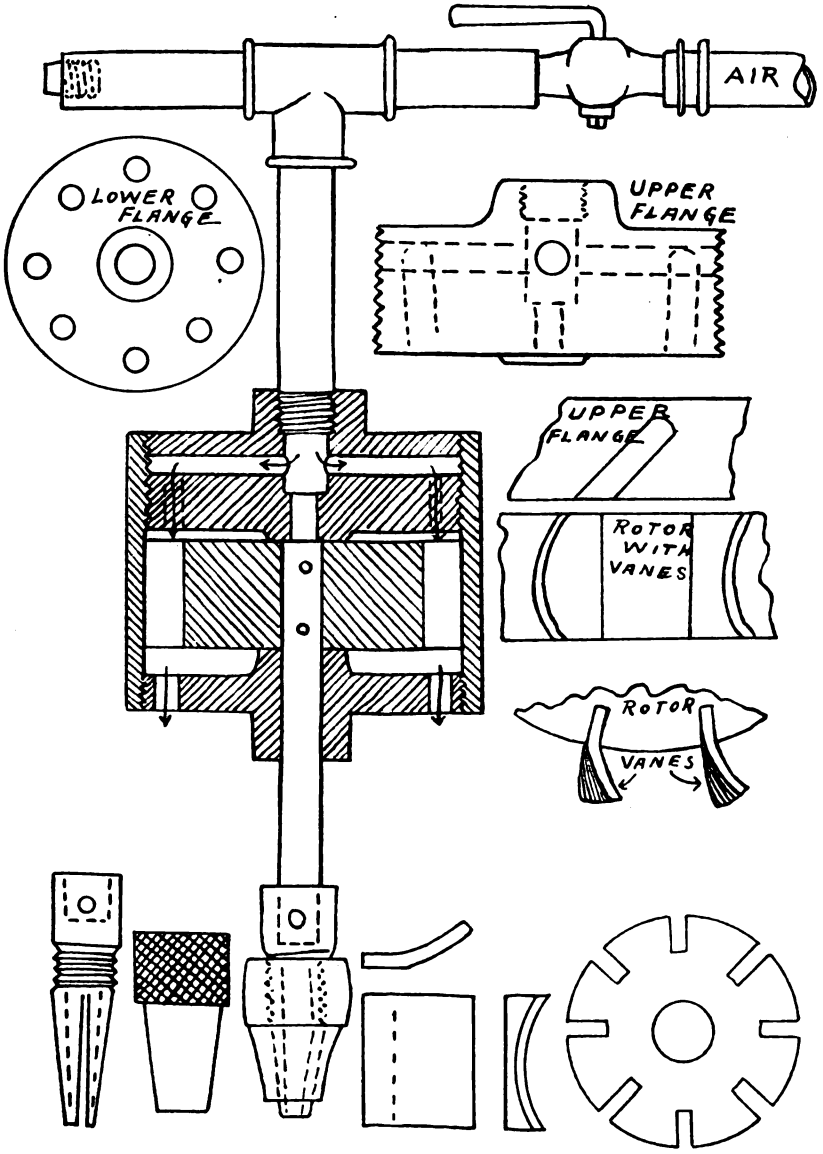
A Small Air Driven Motor

G. A LUERS

Where a supply of compressed air is available the construction of a small motor driven from this supply is suitable for driving small drills, small polishing wheel, or even for purposes of grinding valves.

The motor as is shown in the engraving, consists of a cylindrical body of metal tubing, into the ends of which screwed flanges are placed. An inside drum, is supported on a shaft bearing at opposite ends in the flanges, one end of the shaft protruding and holding a small chuck for the tools or parts to be turned. The outside of the inner drum is fitted with vanes made as shown in the engraving. The air is led to this section through the pipe which also serves as a handle for holding the motor.

At one side the supply of air is controlled by a valve. The holes and groove leads the air directly over the vanes. In the lower flange a series of holes permits the air to escape. This motor of course has not much power, however this is compensated for to some extent by the high velocity which it will attain. It is only serviceable for light work where high speed is desired.



AN AIR MOTOR TO OPERATE ON THE COMPRESSED AIR LINE

Getting Full Value Out of "Our Journal"

One of our new readers related an interesting happening which prompts this editorial.

This new subscriber's first letter reads: "I enclose one dollar for a year's subscription. Start me with February as I received a copy of January from a neighbor. If I had seen that January paper a few days before I would have saved just $3.50."

When we asked him to explain he said: "Among other lines of work I also do battery repairing and charging and while I have been buying sealing compound all ready for use I have several times thought that I could save money if I made it myself. So when some chap came along and offered me the recipe for battery sealing compound I didn't hesitate to hand him the three-fifty he asked for it. Of course I don't feel I got stung, but if I had been a reader of your paper at the time I would have saved that three-fifty and gotten that receipe out of the January number. You can bet I'm not going to miss anything in the paper after such a demonstration."

The price of one receipe would in this case have paid for three and a half years subscription—and have brought thousands of other hints, suggestions, and receipes to this reader.

In the first place, no one will ever get anything out of any paper unless he reads it. The Subscriber who merely **subscribes** and does not **read** might better save the price of subscription, small as it is.

Every page, of every issue of "Our Journal" is printed only after careful thought as to its practical value to readers. Matter is never put into these columns simply to "fill space." Every article, every item, every letter, must have a distinct message and a distinct purpose to appear in the pages of "Our Journal." You are therefore assured of finding in these columns articles that are practical, valuable and interesting.

We want you to get full value out of these pages, these articles and these practical items. Time without number readers tell us how an article that could be read in fifteen or twenty minutes saved them hours in the actual accomplishment of the work. So instead of just being a Subscriber be a Reader also.

And for this informal "Reader's Club" suppose we adopt the following platform and resolutions:

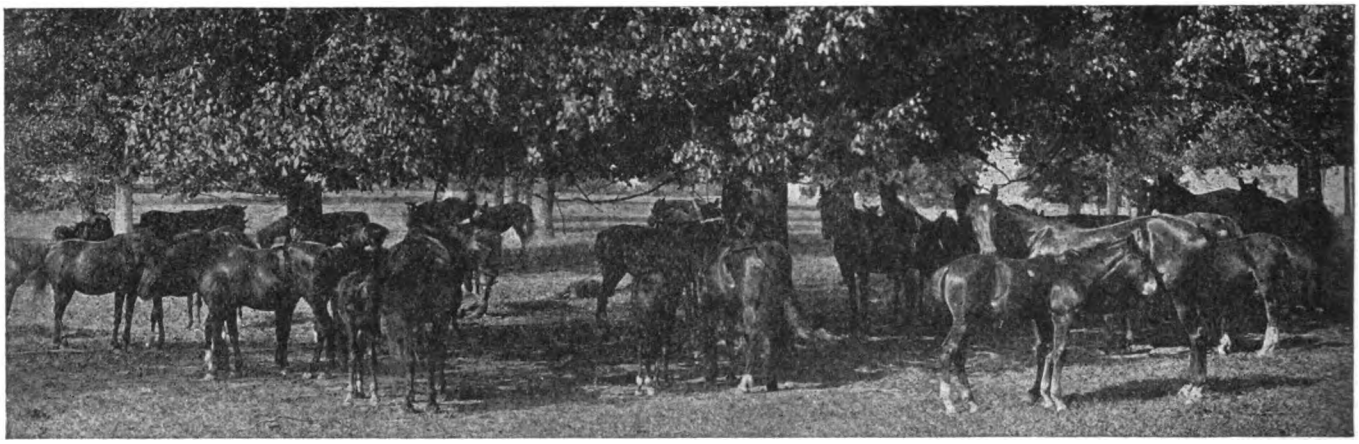
1—To get Full Value from "Our Journal I will be a Reader and not merely a Subscriber.
2—I will not have time to READ "Our Journal" unless I TAKE time.
3—MINUTES taken to read "Our Journal" will save HOURS on the job.
4—Time spent the right way doubles its value.
5—"Our Journal" will HELP ME only as I HELP MYSELF to the good things it contains.

Shoeing the Colt and the Care of Its Feet

The subject of shoeing the colts foot has recently been mentioned by a number of readers. The following article by Dr. Jack Seiter, from an earlier number will undoubtedly be of interest and practical value to all of the readers interested in the subject. Dr. Seiter is an authority on shoeing especially as it applies to the harness and track animal. His article on shoeing the colt is one that should be read by every shoer of man's best friend.

The Care and Shoeing of the Colt's Foot

When shoeing a colt, I have found that a study of the gait of its parents, when possible, is of great assistance, for, in correcting a fault, it is well to know whether it is individual or hereditary. And before going into the subject of this article I wish to register a note of warning as regards heredity of gait. Time and again have I seen a breeder attempt to produce a colt of good conformation by crossing a horse of excellent structure (one with which the most exacting judge of horseflesh could find no fault) with a spindle-legged, knee knocking mare; simple because she was well bred or had considerable speed. Naturally he figured that the stallion would predominate in this union and the colt would be of the desired conformation. I have seen this mistake made year after year. The influence of heredity (for bad as well as good) cannot be better illustrated. The result is usually a leaning toward the bad, and the colt is usually of faulty conformation in one or more respects. Naturally, this condition will also exist if we reverse the order of thing and cross an ill structured stallion with a perfectly-developed mare. The bad will invariably crop out in preference to the good. If more attention were paid to the conformation of both the sire and the dam we would not be obliged to cope with the large number of misfit animals. It is not uncommon to hear some horseman remark, that "Such a colt has license to be very fast, but he hits his knees, or toes out with one foot," or some other malformation handicaps him from being a world beater. And after several years of training, during which time the horseshoer and the bootmaker receive enough money to purchase a good animal, the colt is given up as a bad racing prospect and is retired—if a filly—to the broodmare ranks, to produce more of the same type; if a stallion—to do stud service, to fill the country with more troublemakers. These are the sort that drive prospective owners out of the business. But this thing has been going on for ages, and the chances are that it will continue to do so as long as the breeders insist on breeding their "pets", regardless of conformation or temperament, attempting to get perfectly-developed animals that will do to race and fix a standard type of race horse. Many prominent stallions, standing at high fees, have been handicapped because wealthy horsemen would insist on breeding their worn-out favorite road mare to the stallion then in the limelight.



A STUDY OF THE GAIT OF THE PARENTS IS OF GREAT ASSISTANCE WHEN SHOEING A COLT

First Trip to the Blacksmith Shop

When the colt arrives at the age of two months its feet should be carefully examined. If dressing is needed it should be attended to at this time. Just as the human baby becomes bow-legged, the colt is liable to be foaled with or to acquire a faulty conformation. If the toes are excessively long they must be shortened. If the heels are abnormally high they must be cut down. And if the foot shows more growth on one side than the other the high side should be trimmed down far enough so that the low side will also receive its share of the weight and bearing. If the colt shows the slightest inclination of being deformed, knock-kneed or nigger-heeled, we must dress down the outside of the hoof, especially the outer toe. It is also advisable in cases of this kind to rasp off the edges of the wall at the outer toe, enough so as to reduce it to the same thickness as the inner wall. By following these instructions at least once a month one can work wonders with a foot of this type.

Under no conditions should one apply a knife to the sole or the bars of the foot of a colt. Excessive cleaning out of the feet is not advisable, either. Naturally, we must look after the cleanliness of the feet, but unless there are positive signs of thrush one must not go to extremes—such as the free use of the "foot hook," which is often the direct cause of forcing filth into the cleft of the frog or bars. If the parts were left intact and filled up with the natural growth of horn that nature provided it would become almost impossible for the seat of the trouble to become infected. One must try and save all of the healthy frog, consequently only the ragged edges should be removed, for by carving out the healthy portions of the bars or the frog we only invite future trouble in the form of contraction and consequently more thrush. In the majority of the cases the knife is entirely unnecessary, but generally a good washing out with warm water and soap to which some good antiseptic solution has been added will relieve the trouble. After this the foot must be thoroughly dried (generally, it will dry out by itself in a few minutes). Then the parts involved, the cleft of the frog and the parts surrounding the frog and bars, must be packed with some antiseptic powder. It is also a good plan to force some cotton or oakum into the crevices to help retain the powder in place. Svereal treatments of this kind generally suffice to cure the most stubborn case of thrush. But, as in all other cases of affliction that horseflesh falls heir to, an ounce of prevention is worth a pound of cure.

Care in Dressing Hind Feet

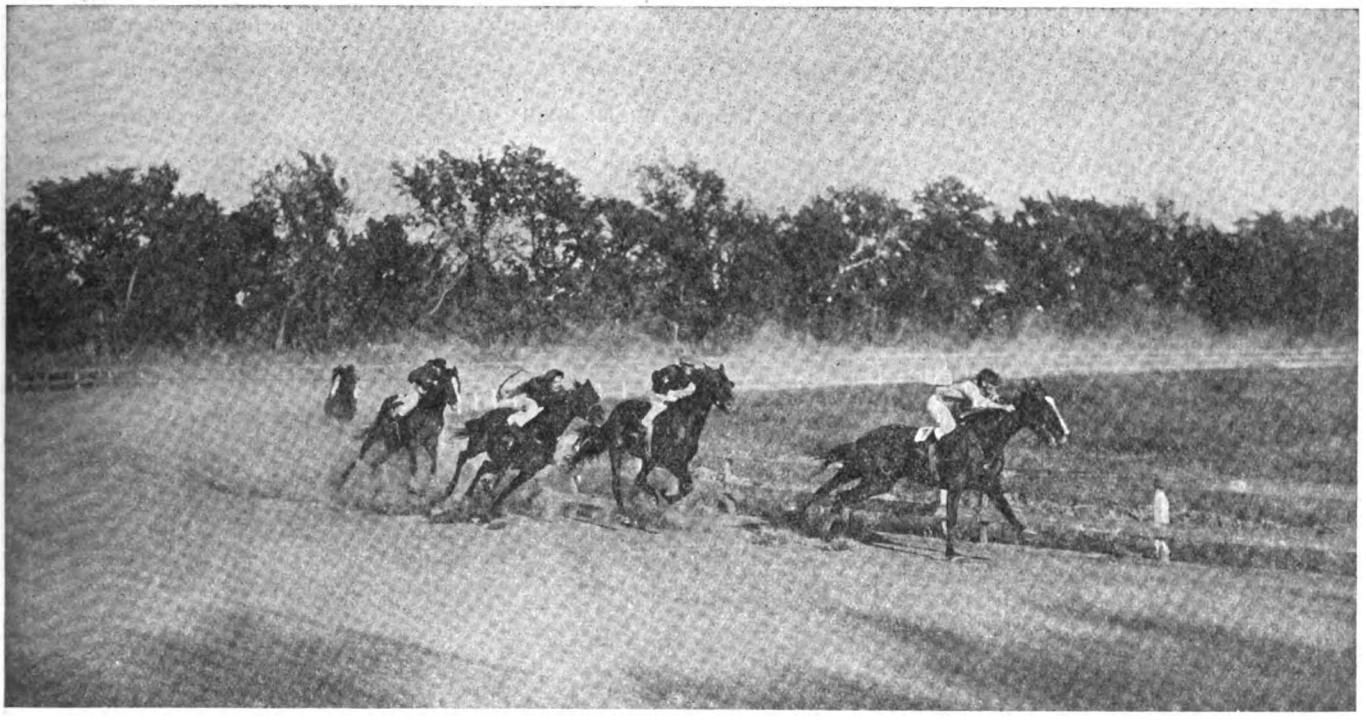
In dressing the hind feet it is as a rule advisable to keep the toes short and well rounded off, but the conformation must never be lost sight of. If there is the slightest sign of curby hocks we cannot cut the toes down too short nor keep the heel too high. And where there is a strong predisposition to this unsoundness early shoeing is strongly recommended—the shoe to be square-toed and set well back from the toe, and the heels to be high and of good length.

Now, the above rules are simple, so simple in fact that they are known alike by the humble stable boy and the prosperous owner, but we often overlook small details; consequently, the oftener we have them drilled into us and the oftener we are reminded of them the more apt are we to remember them. If we overlook the most minute detail which goes to build up an animal we will have a correspondent weakness somewhere; and "A Chain is Only as Strong as Its Weakest Link."

With the above precautions and preventives ever before us we will have the proper sort of a foot to work on when the time for the first shoeing arrives.

The first shoes should be applied for protection only, consequently they must be as light as possible and the nailholes as few as possible and punched well toward the toe, so as to allow for the natural expansion of the heels. The foot should be leveled with the rasp only; no knife must be allowed to mutilate the sole, the frog or the bars. If we leave those structures intact and apply a thin shoe we do not rob the frog of its function—that of acting as a cushion not only to the foot but to the entire limb, also. The frog is the one the foot in its natural elastic state. The sole and the bars depend upon the frog to furnish them with moisture, and they in turn protect the structures immediately above them. If the frog and bars are left intact as nature intended they should be we would not be troubled with contraction and its sequels—such as corns or quartercracks. The frog takes care of the entire foot. Man has as yet discovered no substitute that will take the place of the good, healthy, un-mutilated frog as a moisture-secreting structure; and never under any conditions should it be cut into. It is permissible to cut off the ragged edges, but there are few who can resist the temptation to cut off a little more than is necessary—the idea being to give the frog a symmetrical appearance—to make it take on the appearance of some of the pictures we occasionally see entitled "A natural foot, untouched by the hands of man or his misery-producing tool, is about as unsymmetrical a piece of handiwork as the Creator ever endowed any animal with. Yet we attempt to make a model-shaped organ out of this crude-appearing mass of sensitive and insensitive tissue. It is undesirable to interfere with the growth of the foot, at all, outside of reducing the wall sufficiently to enable us to get a good bearing for the shoe. The frog, bars and sole must never be touched. The more sole we leave, the less will we have to contend with bruises and corns. The frog bearing we can save, the more jar and concussion will we prevent. Consequently, we will have to cure fewer corns and quarterbacks, and above all we preserve the natural moisture which evaporates the moment we apply a knife to the parts and thus open the moisture-secreting cells.

(To be concluded next month)



THE ANIMAL HAS BEEN SCIENTIFICALLY REARED, FED, EXERCISED AND SHOD FOR THIS SUPREME MOMENT

Si Clone says:—"It's a rough ol' world, but—y' can't smooth a stick with the smooth side of the sandpaper."

What anyone says about you is not so likely to harm you as what you DO about what they say.

Suppose you were selling your work, services and goods to yourself—would you be a satisfied customer? Think it over.

Dou you mant six months? We'll give you six months for every new subscriber you send in. Just show your copy to your neighbor—you'll hardly need to invite his order. "Our Journal" almost talks for itself.

Right is might—right methods, right treatment of customers and the right kind of work have been the start of some mighty big bank accounts.

Queries Answers Notes

Practical Plow Information:—In response to Mr. D. Gram for information on John Deere plows of 14 an 12 inch shares: Place the plow on a level platform, and see that the share and the land side are level and also that the beam is bolted properly in place. The height from ground surface to the second hold in the beam were the clevis jaws go should be 18 inches. The 14-inch may take a bit higher, but as a rule it will run at 18. Either of them is very seldom lower. It is just according to the soil you are in. Put the straight edge along the landside and up towards the clevis jaws. Put your square up and you will want to see the beam to measure 1¼ inches to center of beam near clevis. I do not give shares any dip (down). I think all should be done with the cross clevis.

I never have any trouble with hard plows in sharpening shares. They should be hammered on ground surface till near throat. Then turn over and sharpen on top L. Griffith, Fiji Islands.

Straight from the Shoulder:—Now look here Boys: Don't cut prices And how the world are you going to get through life if you let the fly-by night auto mechanics, tell us how to do a job, that you and I have done long before he went to school! Think it all over. You may be sure he will charge you not less than $1.00 an hour if you want your Ford patched up a little. Then why give him a $1.00 job for $0.75?

And then there is the smith who just picked up the trade by himself; it looks as if some good old members of the trade have not back-bone enough to tell the auto man and the self-made smith that it is "out of our way" of doing things when they want us to help them out with a good job of welding. And when you say $1.00 for a good weld or a spring a car they turn right at you, get all excited and say with plenty of sarcasm "$1.00 for that job!" I told a man the other day when he complained on shoeing prices to ship his horse to Sears-Roebuck.

G. E. Anderson, Pennsylvania.

A North Dakota Price List:—Enclosed find check for $5.00, and push my name a notch on your subscription list. I like "Our Paper" very much, and I always read it as soon as it comes. I'll give you a few of my prices that I get for blacksmith work:

Sharpen 12-14 in. lays, 50c; 16-18 in. lays, 60c; Pointing and Sharpening, $1.50 and $1.60; Hardening Edge, extra 15c; New common horse shoes $1.00; Neverslips $1.25; Setting shoes, 50c; Setting tires, per set, $5.00; Time work $1.00 to $1.50 stock extra.

I'd like to see Price list on work from different parts of the country. I am going on strictly cash basis this spring, and I'd like to find out what success others have had that have changed from credit, to cash. Albert Mellum, North Dakota.

Shoeing the Interfering Horse:—Please give me some information on the way to shoe a horse so as to prevent his interfering. Delphis Chretien, Quebec.

In Reply:—Articles on shoeing the interfering horse have appeared in our columns at various times as follows:—"Shoeing the Ankle Hitter"—October 1917—Pg. 10. "Shoeing the Horse That Forges"—January 1917—Pg. 84. "Shoeing the Horse That Strikes"—March 1916—Pg. 146 "Shoeing an Over-Reacher"—March 1916—Pg. 148. "Shoeing the Horse That Interfers"—August 1916—Pg. 263. "The Three-Quarter Shoe in Treating Interfering—October 1914—Page 5. "How a Bad Case of Over-Reaching was Cured"—October 1914, Page 5. "Shoeing to Prevent Interfering"—December 1914, Pg. 68.

Sub. Service Dept.

Recoating Canvas Wheels—Will you kindly tell me how I can recoat my canvas polishing wheel, which is 2 by 10 inches in size? I have been painting it with Le Page's glue, then covering it with grain emery, and then let it dry from Saturday night until Monday morning. But after running it over a few plow shares, the emery seems to burn off, getting warm by friction. I always have my shares cold when grinding. Any information given to recoat the polishing, so it will stand, will be received thankfully. Wm. P. Schrink, Montana.

In Reply:—The proper way of making these wheels was detailed in these columns some months ago, but very evidently your wheels are heating up too fast for economical use. Would it not be possible for you to make up these wheels, three or four at a time, and then as one heats up, change it for another, allowing the heated wheel to cool off before again using.

In the May number, you will find another description of another method of building up a polishing wheel which does not suggest the use of glue. This writer suggests the use of liquid gloss, which is something similar to a varnish. We would suggest your using or trying out this method of attaching the emery powder to your wheel. S. S. D., New York.

Aluminum Soldering and Motor Timing:—I have a soldering job on aluminum, and can't find any solution that will cause it to stick. Any information on this subject will be gretly appreciated.

In timing a car using degrees, how many degrees count an inch?

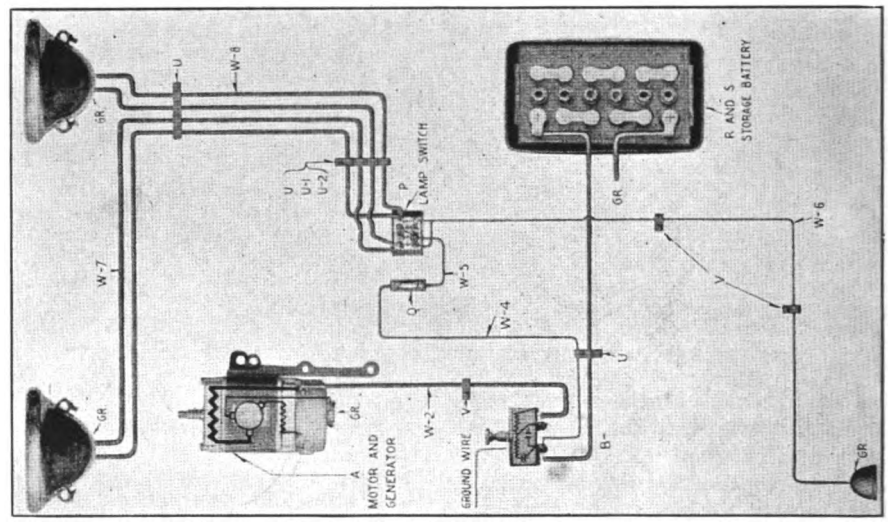
R. A. M., North Carolina.

In Reply:—With reference to the soldering of aluminum we refer you to page 295 of the September number of 1919. Here is a very complete article on the soldering of aluminum, which will give you just the information you want. Should you require any further information along this line, do not hesitate to ask for it.

With reference to the timing of an automobile.—This question is not entirely clear, and we would therefore suggest that you write us again in greater detail.

It is of course, impossible, to give you the number of degrees equalling an inch. without knowing the size of the arc, or circle which you are considering. You of course understand, that there are 360 degrees to the complete circle, or 90 degrees to the right angle or quarter-section. Perhaps this hint will enable you to get at the problem which you are considering. However, in any event, we would be very glad to go into further detail with you if you will give us more definite information on this time problem.

Sub. Service Dept.



HOW THE WIRING IS ARRANGED FOR THE WESTINGHOUSE SYSTEM WHEN WESTINGHOUSE FORD LAMPS ARE USED. WHEN OTHER LAMPS ARE USED THE TWO WIRES ATTACHED TO LAMP SWITCH ABOVE ARE GROUNDED

On Disc Plowing for Cane Land:—I always look forward to the American Blacksmith, Auto & Tractor Shop with pleasure. Not being much of a quill driver, I am a bit slow to put anything on paper. At the same time, I have thought it was up to me, as I have received so much useful knowledge from "Our Jouranl."

In my question in the January issue I could not have made myself properly understood, as I am myself an agricultural smith. At the same time, I thank Bro. Edwards for the quick and generous way he answered my appeal for information.

It is really plowing with disc plows and small cletrac tractors, that I wish to know about. Our troubles are with the double disc plows. You will understand it is several plows I am speaking about—not one in particular. The rear wheel will sometimes skid onto the land, and it does not seem to mattr how we alter the hitch or draw bar, we cannot keep the rear wheel from swerving over towards the land.

At another time, it will dig in front and life up the rear of the plow.

This is a cane growing country. We have a lot of trouble in covering the trash; by that I mean, the leaves of the cane that are left after the cane is cut. It lies about six inches deep and we cannot get the double disc plows to cover it. It will not cut and turn it over, but will clog up or push it along. In the days of mules the plowman used to cover it with a single disc plow with a rear attachment, but a rear attachment makes it too heavy for the tractor. We have only just started plowing with tractors. The mule being more in our line. I will be pleased with any information about plowing with tractors.

L. Griffiths, Fiji Islands.

In Reply:—The questions and problem have been submitted to a man thoroughly familiar with cane cultivation in both the United States, and Cuba as well as the Central and South American countries and the following points were made by him:—

In the first pace the amount of trash in the field after the cane has been cut seems excessive. At most there should not be more than four inches of trash on the ground. If there is more than this, the field workers are cutting too much from the cane.

With trash depth of six inches, the disc cannot of course enter the ground to a sufficient depth to work steadily. In other words, the penetration of the disc into the ground is not enough to hold the disc against the crowding of the large amount of trash.

The ground penetration should be at least ten or twelve inches in order to turn the trash under properly.

To steady the discs used at present try spacing the discs farther apart. This will not tend to an accumulation of trash ahead of the discs, and enable the discs to turn it under more easily. However, unless there is sufficient pentration of the disc into the ground, even this will probably not be sufficient to overcome the erratic action of the discs.

The uncertain action of the plows in running first to one side and then to the other is no doubt because of the accumulation of trash. It may be necessary, in order to enable the discs to work properly, to make suggestions regarding the proper trimming of the cane by the cane gatherers. If the trash were not so deep there would surely be little difficulty in getting the proper disc penetration as well as steading of the plows.

Sub. Service Dept.

Trouble Pouring Brass:—Some time ago I received instructions from you on melting brass, and bronze which I followed from the letter and I got excellent results. Now when I pour the molten metal into the mold it seems to boil, and the result is a casting which is very full of holes some of them unfit for use.

The molds have been made of molding sand secured from a foundry, that was engaged in making iron castings, but the above mentioned foundry is not in operation or has not been for several years.

I am sure there was no moisture in the mold, as I baked some of them in an oven until they were thoroughly dry. Also there was plenty of holes for the gas to escape from the top; I made at least three holes and as an etra went I ran a small wire through the mold in numerous places, but with the same results; a casting full of blow holes.

I would like very much to have you help me as the castings are needed. I have been told there is a certain flux needed to keep the metal from boiling or jumping in the mold, but I have used no flux.

Albert C. Gran, Missouri.

In Reply:—From the information we are inclined to believe that too much moisture is present in your molding sand. However, if you say, you have baked your molds and eliminated all excessive moisture, we cannot understand why you should have such great difficulty in getting a good clean casting.

A good flux for brass may be made up of one ounce of common, yellow laundry soap; ½ ounce of quicklime; and ¼ ounce of saltpeter. These ingredients are thoroughly mixed, and formed into a ball, and when the crucible is lifted from the furnace, the ball is dropped into the molten metal. This quantity of the flux is sufficient for about 50 lbs. of metal. You might try this flux in your next pouring, and see if this overcomes your difficulty.

In your letter you say that you are using sand secured from a foundry. We presume that this is sand that has been previously used for molding, and inasmuch as it is best to use new sand, for brass work, it is possible that this old sand is causing all of the trouble.

Sub. Service Dept.

Heinze and Westinghouse Systems for Ford:—Can you favor me with the wiring diagram for the Heinze starting and lighting system as used on the old Ford cars also the Westinghouse?

Philip Wand, New York.

In Reply:—We reproduce herewith through the courtesy of the Service Products Company manufacturers of Heinze-Springfield equipment, the wiring diagrams for the first, second and also the latest models. We are also pleased to publish, in connection with these charts, some suggestions for the location and correction of troubles and failures, which will be of practical value to Mr. Wand as well as other readers.

Subscriber's Service Dept.

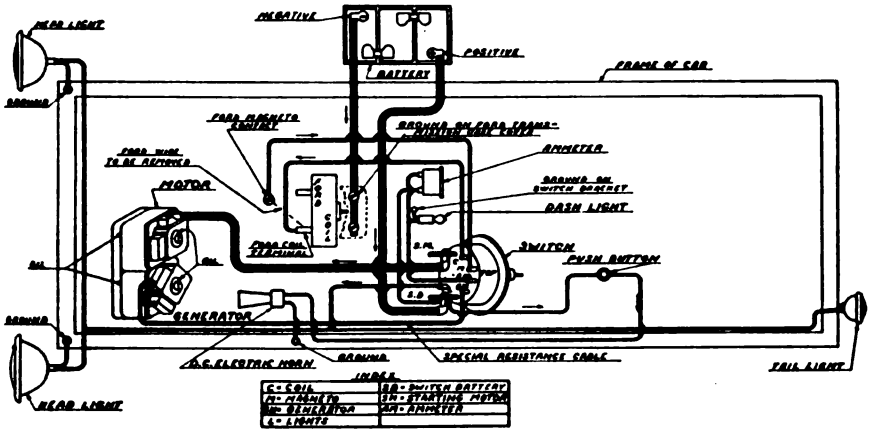
How and where to look for trouble when your ammeter does not show charge or your generator does not give you enough current to keep up the batteries.

1 (a) First test your ammeter by turning your lights on and off—If the lamps light up and the hand does not swing, the meter should be returned for repairs.

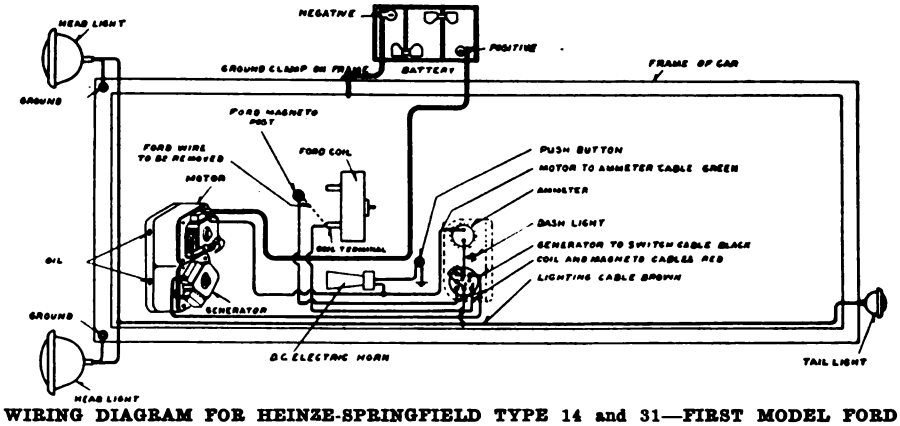
(b) Make sure that the ammeter connections are tight, and not grounded to the car.

(c) See that the generator brushes are making good contact on the commutator of the armature, and that they are free to slide in their holders.

(d) Make sure that you have from two to three pound spring tension on the brushes and not any more, in order to avoid excessive wear of brushes, and commutator. If the brush spring tension is too strong, bend back the spring until the right tension is obtained. If the spring is too weak, pull out the pin which holds the spring in place on the brush holder and bend down the



WIRING DIAGRAM FOR THE HEINZE-SPRINGFIELD TYPE 33N LATEST MODEL FORD



WIRING DIAGRAM FOR HEINZE-SPRINGFIELD TYPE 14 and 31—FIRST MODEL FORD

ends of the springs.

(c) Make sure that the commutator is free from oil and grease and is very smooth. For cleaning the commutator, hold against it while it revolves a strip of No. "00" sandpaper on which have been placd a few drops of machine oil. Do not use emery cloth.

(f) See that the brush leads do not touch the heads of the brush holder hold down screws and that both wires on your brush terminal are fastened securely and make good contact.

(g) See that the battery terminals are tight and clean, and that the connections at the switch and ammeter and securely made.

How and where to look for trouble when the cranking motor will not crank the Ford engine.

1 See whether you can crank the motor by hand.

2 Remove the heavy wire at the cranking motor brush stud and strike the termial which you removed to some metal part of car to see if you get a good hot spark. A hot spark indicates that you are getting current up to the cranking motor; if the spark is absent or very weak, you will probably find that the trouble is:

(a) Battery run down.

(b) Loose or dirty battery terminals.

(c) Loose or dirty ground connections at the end of the wire leading from the negative side of the battery to ground.

(d) The long positive wire leading from the positive side of the battery to the motor cut thru or grounded to some part of the car or battery box.

(e) Loose soldered connections at the terminals which are on the large wires.

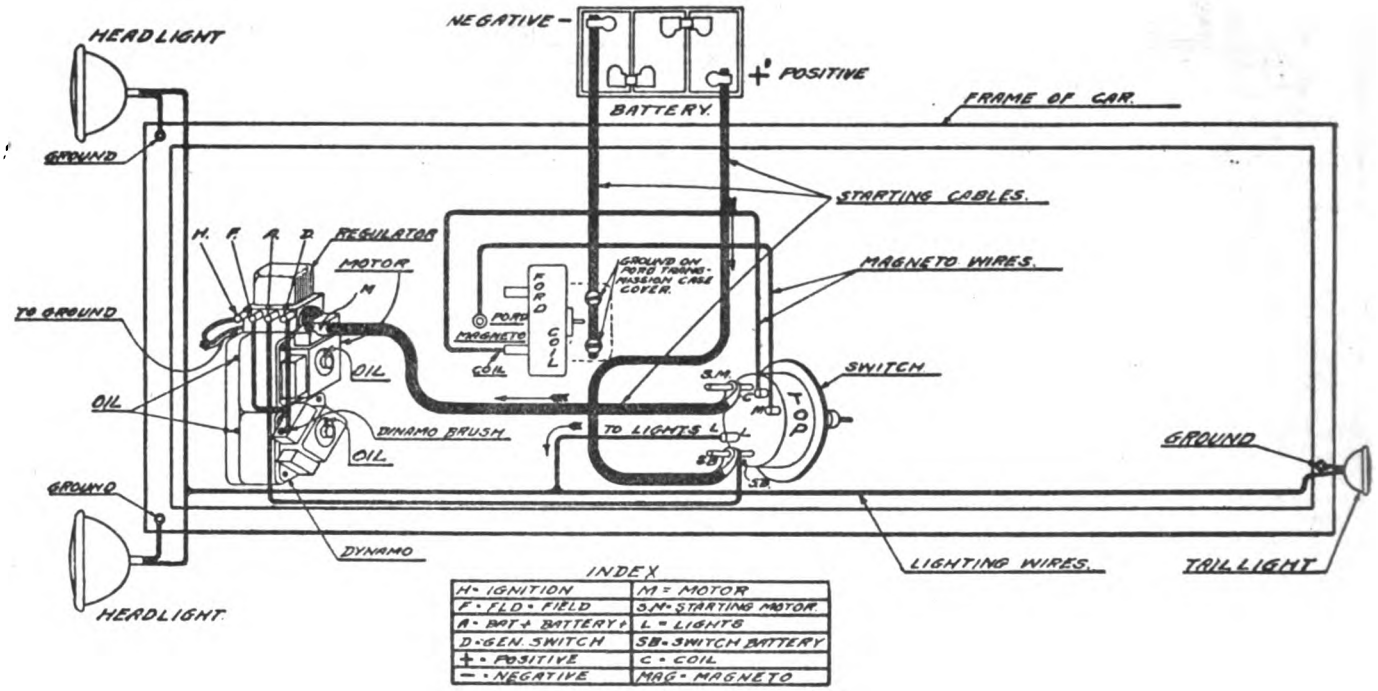
3 See that the cranking motor brushes slide freely in their holders and make good contact on the commutator. They should have from two to three pounds spring tension. The brushes in the motor are made of metal and have large lead wires inserted in them. The generator brushes are of carbon with smaller lead wires.

4 See that the commutator of the armature is free from oil and grease and is very smooth.

5 See that the armature turns free when the Bendix gear is not in mesh with the large gear which is on the generator shaft. If not, put a little light oil on the plain bearings thru the oil holes from the outside of the cranking motor.

5 See that the armature turns fre when oil and grease and that the gear works free on the Bendix screw shaft.

A York State Shop Poet:—N. R. La Duke runs a general shop over her in New York State. This shop was established in 1878. Mr. La Duke has been a reader of "Our Journal" for years and just to show what he thinks of it he sent in two new subscribers the other day. (and incidentally received a full year's credit on his own account). Also, he sent along a little advertising circular that contained among other reading a poem which told in very good verse just what he can do for folks in a service and business way. The poem is reproduced herewith:—



WIRING DIRECTIONS FOR THE HEINZE-SPRINGFIELD TYPE 33—SECOND MODEL FORD

A SONG OF THE TIMES

Know all ye good people
  Surrounding our town,
If you reaper's broke up,
  Or your binder's broke down,
Just bring them to LaDuke's,
  The place for repair,
Where everything's fixed
  That's been on a tear.

It may be a planter,
  A disc or a rake,
A wagon or a buggy,
  Fifth wheel or a brake;
A tongue or a pole,
  A reach or a thill—
And send along your old iron
  To pay up your bill.

You may have a cushion
  That's out of repair,
And want it stuffed full—
  Excelsior or hair;
Or it may be a buggy top,
  Socket or bow,
For which LaDuke's prices
  Are reasonably low.

If you're wanting new wheels,
  Either heavy or light,
The LaDuke's Carriage Works
  Will fit you out right.
We furnish new tops,
  Tires, bodies or stubs,
And repair your old wheels
  From the tire to the hubs.

We sometimes fix castings
  That are hard ones to do—
But when they are done
  They're as good as the new.

So when you're in need
  Of a job all complete,
Just give LaDuke's a call
  Any day of the week.

If your horses need shoeing,
  Either heavy or light,
Just bring them to LaDuke's
  And you'll know they're shod right.
Then go home rejoicing,
  And bear it in mind
That LaDuke's repair shop
  Is the best you will find.

What chance would a blind-folded man have in a race with men who could see? Some shop owners try to run their business blindly, without any attention to costs, and expenses. Eyes wide open and books carefully kept will show you just where you are running your business, whether into the ditch of failure or on the road to success.

Shop work is a lot easier these days. There is no excuse for not having modern machines and equipment to help carry the heavy burden. There are machines and devices now to make practically all lines of work easier. Watch the advertising

VOLUME 21 NUMBER 7

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

JULY 1922

BUFFALO, N. Y., U. S. A.

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G. A. Castle, Vice-President

Member The Associated Business Papers, Inc.

A. W. Bayard, Secretary
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Correspondence solicited on all subjects connected with auto, truck and tractor work, blacksmithing and general repairing. Always give name and address when writing.

AMERICAN BLACKSMITH COMPANY
BUFFALO, N. Y.
Cable address: "Blacksmith, Buffalo"

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SUBSCRIPTION AGENTS:

Do Not Give Money To Agents Whom You Do Not Know

There are many unauthorized agents and unscrupulous collectors representing themselves as agents, and collectors for American Blacksmith, Auto & Tractor Shop, and we warn every one of our readers against them. Under no circumstances give money to any agent who is unknown to you. It is a very simple matter to send money order, check or stamps direct to Buffalo, and it is always best to send your order and remittance direct.

Contents July 1922

THE PRIZE CONTEST

The winners in the prize contest are announced in this issue. Don't fail to look for your name on page 156.

You should have seen the fine reports and papers received; and then consider what a job it is to judge a big stack of generally good papers and you will have some idea of a judges task.

The next contest will be announced at some future date. The success of this one, the interest shown and the great amount of valuable information secured has encouraged the Editors to plan another contest. This will probably be announced some time in the fall—so watch these pages for your next chance at a real worth while prize.

REAL PRACTICAL VALUE OF OUR JOURNAL

From far-away Australia comes a testimonial of the sound practical value of "Our Journal" that we must pass on to "Our Folks." Over there in Queensland on the other side of this good globe is a firm of general smiths known as Miscambles Ltd. They do all kinds of work in the general smithing, auto and "coach" (as they say it over there) lines: they are agents for Mr. Ford's well-known gas chariot, agents for a famous line of agricultural implements, gas engines, and plows and build prize winning sulkeys.

Their paid subscription period drew to a close and in the regular course of business in the subscription department they were duly notified of the fact. In the course of reasonable time a money order came from Miscambles and this letter:

"We are enclosing money order for subscription to American Blacksmith, Auto & Tractor Shop. We must say the paper is a great one and is the best one which we receive. Our head blacksmith says that he took a correspondence course with a famous school but that he got more by reading a couple of your journals than from the whole course."

This is not intended as a knock on any school or against correspondence courses. They are good with several of very high grade records. But when you seek real practical information gleaned from the field of practical work the answer is plain as given in the letter from Miscambles Ltd.

OUR NEW COVER DESIGN

From the number of letters received from readers asking what had happened to our blacksmith on the covers for April and May we are inclined to believe that our cover friend has worked his way well into the affections of "Our Folks."

Of course, we had to explain what was happening and last month the reason for his absence from the April and May covers was apparent.

We now have a cover that more clearly typifies the modern blacksmith, auto and tractor shopman. In the newer design the sturdy worker has lost none of the strength, character and sound reliability that was so thoughtfully expressed and pictured in the other picture. But the newer design gives a better idea of the modern repairman. Here he is shown not only as a forger of iron and as a true and worthy disciple of his true and worthy ancestors, but the items of his modern craft show that he has progressed; that he has not stood idly by and observed the procession of progress from an old tumble down shack.

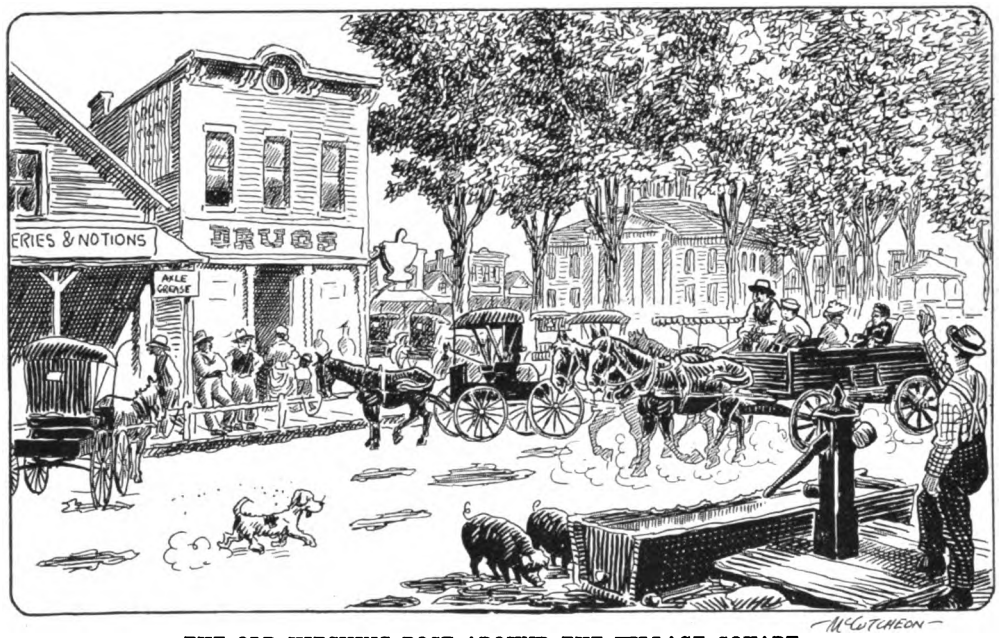
This modern smith and automotive repairman is a man of might just as Tubal Cain of earlier days. He has lost none of his importance in the trend of modern development, but is today a bigger factor than ever in the march of progress.

As pictured, the modern smith and repairman, backed by the oxy-acetylene torch is careing for auto, truck and tractor just as he has always cared for wagons, carriages, implements and horses. Today the latter items are still a most important factor in rural shop work. The general smith is still called upon to do horseshoeing, wagon and buggy work, but the auto, truck and tractor work belongs to him also.

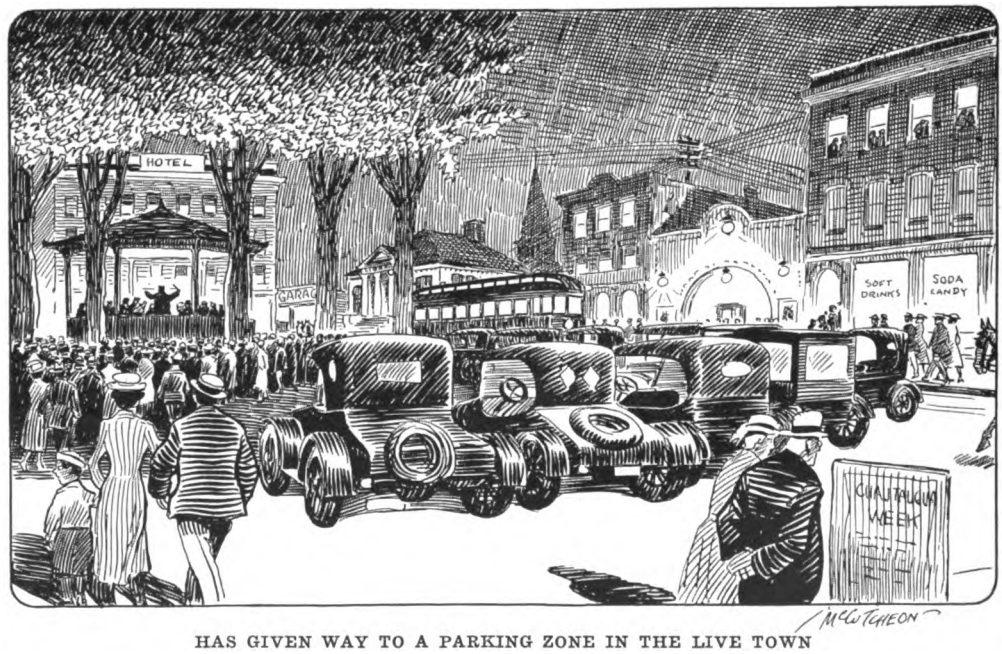
And so we instructed our artist to picture, if possible, this modern shop man. We think he has succeeded most admirably in the picture that now graces our cover. We hope "Our Folks" will like it.

"The Changing World"

By John T. McCutcheon



THE OLD HITCHING POST AROUND THE VILLAGE SQUARE—



HAS GIVEN WAY TO A PARKING ZONE IN THE LIVE TOWN

This is the first of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

Regular Smith Shop Tools Aid in Torch Welding

DAVID BAXTER

There seems to be an idea among some general shop owners of the country that repair work cannot be done by the oxy-acetylene process with any degree of real success without first purchasing a lot of expensive equipment besides the torch, regulators and gas supply. In fact, some blacksmiths seem to think that they must practically give up smithing, buy a new outfit and remodle their shops before they can engage in the oxy-acetylene welding business; that they must discard most of their present equipment and install a lot of welder's tools and apparatus and that the welders apparatus and tools are radically different from the smith's.

In reality the general and jobbing smith shop is the ideal place to install an oxy-acetyene welding plant, because it already has a great many of the things so essential to the welding craft. In other words the forge welder has on hand all of the tools and much of the other equipment needed to conduct a repair welding establishment fitted for a general line of work.

Nor is that all, for the smithy is also mentally and physically equipped or prepared to take up the welders trade. He is already equipped with a large experience in working metals, hot or cold. He knows the effects and reactions of heating and cooling metals and can therefore learn the welders methods of making repairs a great deal easier perhaps than any other mechanic.

Of course this modern method of joining metals has evolved and developed some special machinery and tools which are used by the torch welder only. And every blacksmith torch operator should have them by all means if possible. But these new devices are not absolutely essential to a successful welding business, especially where the blacksmith is just getting started or is branching out into the torch welding work; or if he wishes to take up torch welding merely as a sort of adjunct to his already established smithing business.

Take the instance of heating a cast iron job previous to applying

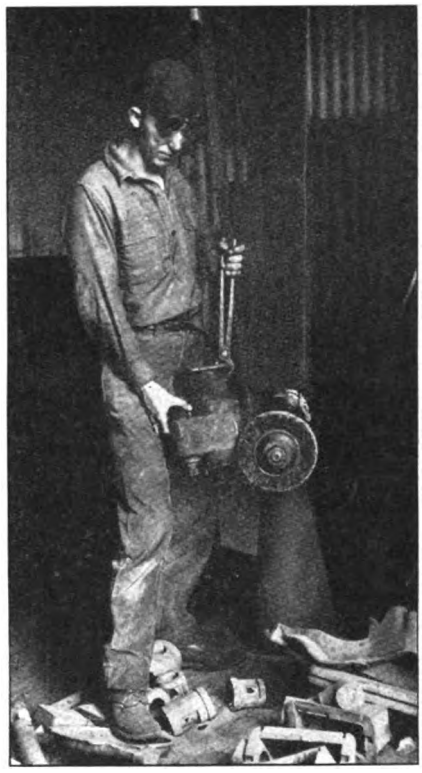


FIG. 1—THE CRACK WAS GROOVED OUT AND THE SURFACE CLEANED WITH THE WIRE BRUSH

the welding flame. The smith may feel that he must have a special preheating device made especially for use in the welding shop for this; particularly if he desires to feature automobile and truck repairing, as most blacksmiths are now doing. He has been told that cylinder blocks, heads, crank cases, etc., reqiure the strictest care in heating before and during the welding process, and he believes he should buy a regulation preheater to insure against failures.

And perhaps he should; but by exercising a little thought and ingenuity, he can use his present smithing equipment with good results. That is he can use his forge for preheating most automobile work and a great many jobs beside.

All he will need to make a preheater out of the forge is some arrangement for confining the heat to the job. Such as a cylindrical section of boiler iron with which to enclose the heating job. In some cases all that is required is some sheet asbestos. And sometimes a quantity of charcoal or hardwood chips is a helpful addition to the ordinary forge coal fire. This is in event it is necessary to heat the job all over as is frequently the case with auto engine cylinder castings when the fracture to be welded is quite extensive.

Then there is another piece of blacksmith shop equipment which the welder uses on almost every job. That is the emery grinder with its abrasive wheel and wire-brush polisher. The emery wheel is handy to form the V-groove along the fracture or to bevel the broken pieces in preparation for welding. Where it can be utilized, the emery wheel is the safest and most rapid tool for chamfering the edges of the fractures.

After the weld is finished the emery wheel is again used to remove the rough, crude appearance of the added filler metal. And there is no danger of re-breaking the casting as is sometimes the case when the surplus metal is removed with a chisel and hammer. Heavy castings that cannot be held to the emery wheel by hand, may be handled with a lever constructed of a heavy plank having a flucrum attached to one end, which permits the casting to be raised to the wheel from below.

The wire wheel is handy to polish the finished weld, especially when it is of aluminum or alloy metal. It is also convenient for cleaning the surface of the metal in the vicinity of the crack or break a feature of correct welding methods designed to prevent rust, paint or other foreign substances from becoming entangled in the weld, to cause brittleness or weak spots. This rapidly revolving circle brush removes the objectionable matter a great deal faster and better than any method. Approximately an inch should be cleaned on each side of the proposed weld and the metal should be polished bright and clean.

Still another device the welder needs, and which is already in the possession of most blacksmiths, is the leveling plate. The torch welder needs it for aligning broken castings or distorted forgings. While the smithy uses one for leveling

plow shares sickle bars, etc. However, it will be more convenient if the leveling plate is elevated to about waist high upon a bench or some sort of metal frame-work.

In this connection, even the blacksmith's anvil is useful to the torch welder. It may be utilized as a leveling plate in aligning small jobs for spot welding or tacking parts together previous to pre-

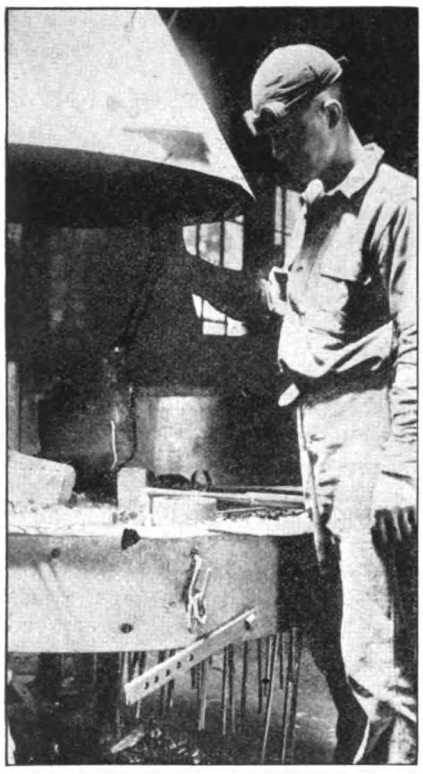


FIG. 2—THE CYLINDER WAS PLACED IN THE FORGE FIRE FOR PREHEATING

heating or welding. And in some instances the complete weld may be made on the face of the anvil. As there may be danger of damaging the anvil a sheet or two of asbestos paper can easily be spread over the face to protect it from the direct action of the welding flame.

Outside of the drill press, which need not be idle in the welding shop, we have now covered the larger part of the equipment of the average country shop. It is needless to mention the hammers, tongs, chisels, files and other hosts of small tools that are always found in the smithing establishment. Even the power hammer may be very useful to the torch welder in welding steel and wrought iron jobs and in bending, shaping and straightening.

In order to make use of these tools clearer let us take a typical auto repair job and follow it through the blacksmith shop, going somewhat into the details of welding for the benefit of the beginner.

First, this repair job consisted of welding a crack in the water jacket of an automobile engine casting. This crack extended from the top of the shoulder several inches down the side of the water jacket, which made a quite simple job of the actual welding but a rather complicated one of the preheating in so far as taking care of expansion and contraction were concerned. In other words, the preheating was probably the most particular part of the work since the weld did not require machining afterward. The application of the filler metal was not somaterial to the success of the repair.

In nearly all cast iron jobs the crack should be grooved out by removing the metal on each side of it to form a wide V-shaped groove the full length of the fracture. This is for the purpose of assisting the welder to fuse the full depth of the weld without danger of burning the metal or leaving poorly connected spots in the finished job. All cast iron welds over an eighth of an inch thick should be grooved out along the crack if it is possible to do so.

In this particular instance the grooving was accomplished by holding the cylinder casting to the corner of the grinding wheel and cutting the metal away on each side of the crack. The groove was made twice as wide at the top as the metal thickness and almost the full depth of the metal.

The next step, which is really essential on all casting welds, was to further prepare the job for welding by cleaning the surface metal on each side of the new groove. All paint and rust was removed from the metal with a wire wheel brush as is indicated in Fig. 1 of the illustrations.

After preparing the job for welding, the next step was to prepare it for preheating, which is indicated in Fig. 2. An ordinary smithing forge was utilized as a preheater. The cylinder casting was arranged with the crack end downward and rested upon three fire bricks as shown in the picture. It was arranged in this position so that the section of the job including the weld would be fully expanded when the weld was executed. The fire bricks elevated the casting so there was little danger of burning it.

Where the job is raised several inches above the forge fire it will heat more evenly and the risk of burning will be practically eliminated. If the casting is placed directly in the coal fire it will not heat evenly and it will likely have a hole burned or melted in it before the welder realizes what is happening.

After the preheating position was arranged for this particular cylinder, the blower was started

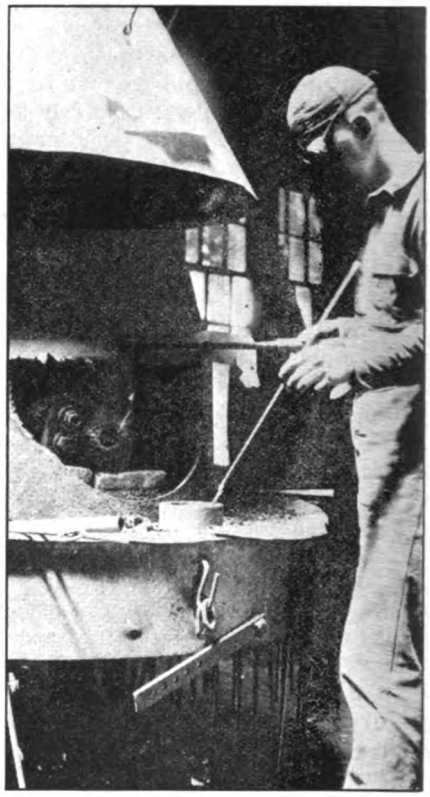


FIG. 3—THIS SHOWS THE WELDING POSITION OF THE CASTING SHOWING HEATING OVEN IN PLACE

and a wide, shallow fire made. As at the start, the blower was manipulated throughout the whole welding process; it was started and stopped according to the condition of the fire to keep it at about the same stage of heat.

A ring of boiler iron was placed around the heating cylinder and covered with some strips of asbestos paper. This was to confine the fire and thus cause the casting to heat evenly and more rapidly. Which in turn prompted a well distributed expansion throughout the cracked end of the cylinder.

When the whole lower end, well above the crack, had attained a dull red heat, ascertained by peeping at intervals beneath the asbestos covering, the welder removed enough of the covering to permit him to turn the cylinder down to the welding position as shown in Fig. 3.

This picture also shows the welding in operation. The casting lies upon the firebricks with the cracked side upward and the groove in a nearly horizontal position. There is also indicated here the application of a cast iron flux by dipping the heated end of the filler rod into a shallow pot of the powder.

It will be noted in Fig. 3 that a section of the boiler iron ring has been cut out. This was accomplished with the oxy-acetylene cutting torch, and was for the purpose of facilitating the flame and filler rod manipulation. During the preheating process a curtain of asbestos paper hangs down over the opening in the side of the ring; after the welding, it is replaced and the job is allowed to cool very slowly.

A shop-made sheet iron preheating oven like this is handy in connection with the forge as a preheater. For that matter, several of these rings of different diameters should be on hand to save time on different sized jobs. They are easily put in place and as easily removed when the job is cold.

As this weld neared completion the forge fire was permitted to die. And when the last half-inch of the groove was filled the job was ready to commence the slow cooling process. Which was accomplished by covering the entire furnace with asbestos paper and permitting it to remain intact until the casting was nearly cold.

After which the cylinder was taken to the emery wheel where the roughness of the weld was ready for the customer.

In Fig. 4 is illustrated the idea of utilizing the anvil as a leveling plate for keeping the broken lug in line on the cylinder casting while it was spot welded. In which the entire weld could have been made on the anvil since there was no need to preheat the job because there was no danger of expansion cracking the weld.

To sum up the use of a blacksmith forge for a preheater, it might be well to once more point out the main essentials. One of which is that the casting is not placed directly in the bed of fire but is raised above it. Another is that the pressure of the blower must be regulated to suit the heating condition of the casting. As soon as the casting attains the dull red stage of heat the weld should be executed immediately and as rapidly as possible. Otherwise the metal of the job may distort or be injured by the fire. The heat must be evenly distributed through the casting else the expansion may be unequal which may result in contraction cracks when the job cools.

FIG. 4—THE ANVIL TOP CAN ALSO BE USED AS A LEVELING PLATE FOR ALIGNING SMALL JOBS

Thus we see a quite common welding job accomplished in the blacksmith shop with only the usual tools.

The Repairman's Opportunity

We hear and read a great deal these days in automobile circles, about "asking' em to buy". And the automobile dealer and regular garage owner have been enthused with the slogan "Ask 'em to buy."

And it is an excellent idea to further the sale of accessories, parts and supplies. As told in these columns many times, the customer is not inclined to voluntarilly purchase anything except his absolute needs.

And while the slogan of the dealer and garage man is an honest effort to increase trade, how much stronger is the position of the repair man who bases his arguments on "Ask 'em to buy" upon the actual needs and requirements of the motorist.

Picture for example the auto owner bringing in his car for some repair or overhaul. The practical repairman sees the need for new lining for the brakes—or a new clutch facing—or possibly new pistons or piston rings or the need for any one or two of a dozen or more replacements or renewals. Isn't it the very essence of logic and sound reasoning to suggest the installation of the parts thus noted?

What is more logical than to suggest the repair of a bent fender when a car with one comes up for gas or oil?

What is more sensible than to suggest the purchase of an extra set of plugs when you are called upon to examine a set of sooted ones?

What is more logical than to sell a set of patented wire terminals when you find that a motorists engine trouble" is merely a broken terminal.

Of course, it is possible to make the "Ask 'em to buy" slogan an actual trade and business "chaser" —especially if the shop-owner is too persistent in his attitude of asking 'em to buy.

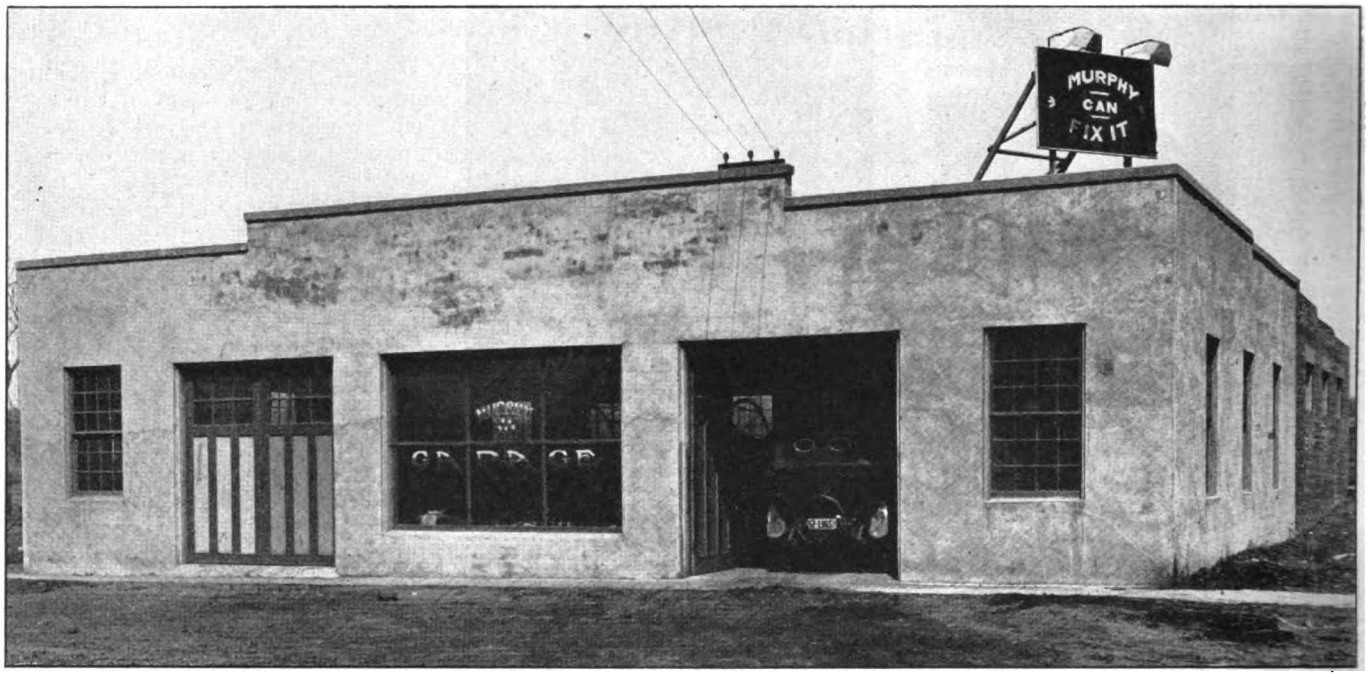
But when good common horse sense is liberally mixed with business sense it usually means added business and increased profit.

The practical repairman and shop owner is usually well-versed in his judgment of human nature and he will not go far astray in his tactful suggestions to the auto, truck or tractor owner as to needed repairs, parts and accessories. Of course, it is most important that the matter of Honest Service to the Customer be kept in mind at all times when suggesting additional repairs or the purchase of accessories. Suggestions born of a desire for added profits ONLY will soon be detected by regular patrons and such practices will soon result in a loss of patronage instead of an increase in business.

But the point we wish to emphasize most strongly in this little talk to the repair man is the logical arguments he has to "Ask 'em to buy." No other individual from car, truck and tractor manufacturer to the used car dealer and junk man has a more logical stand or position in the "Ask 'em to buy" campaign. The bootblack suggests his services when he SEES the need for them. The barber suggests a hair remedy when he SEES the traces of dandruff and falling hair. The successful salesman suggests

the purchase of logical accessories when you buy necessary fundamentals.

The same logic, the same arguments and the same good common business sense applies in the case of the auto, truck and tractor repair man. The automotive repair shop owner has an opportunity for selling accessories that is not surpassed by any other individual in the entire automotive industry. He suggests the purchase of added parts when he SEES the need for them. He has arguments that are the clearest logic and which will be thoroughly appreciated by his customers.



WILLIAM MURPHY'S BUSINESS PLACE IS KNOWN AS "THE MURPHY SHOP"

Repairing 680 Cars A Year

T. M. E.

Over in Iowa, the big fertile state that is so well known for its success in growing corn, is a little town of about 2000 population, in which is located what is known as "The Murphy Shop". William Murphy is the proprietor. Last year his record for the number of cars repaired was 680. Of course, you can figure it out on any basis that you want to, but that averages a little more than thirteen cars per week. To be perfecly frank that is "going-some" for the small auto repair shop.

Mr. Murphy says "We repair anything from a tractor to a phonograph. We also do practically all of the electrical work necessary on an automobile, and in fact, we do not send any of our customers away if we can make a satisfactory repair for them. We do not carry accessories in any great quantities simply a few necessary parts, as ours is a strictly repair business on a strictly cash basis."

And even though Mr. Murphy does not carry any great number of accessories, his record for last year was 200 spark plugs, 150 Pistons, 1000 Piston rings and a number of other necessary parts as incidental. His sale of Ford parts alone averaging about five hundred dollars.

Mr. Murphy's equipment consists of a lathe, an air compressor, an arbor press, three power drills, a power blower, a power hammer, two welding outfits, a forge, two anvils, and the necessary grinding wheels and other incidental equipment. As shown in the photographs of the exterior and also the interior of his shop, it will be noted that he has a very up-to-date establishment. The shop building is of concrete while the floor of the shop is of the same material.

How Tim Donahue Started And Kept Going

J. N. BAGLEY

Three years ago Tim Donahue worked for Dug Dugan at the princely salary of $22.40 per week and supported his family. Tim was a wide awake fellow, a good mechanic and a man with ideas. Dug Dugan ran a general repair shop.

One day he said to Dug, "You sell very few auto accessories, will you give me a commission on the sales I make to the owners of cars brought into the shop? But Dugan said: "Naw! you've got enough to do to tend to the shop and besides there is nothing in accessories any how." And with this the matter dropped for the time. Then one day Tim gave Dug notice that he intended to quit and go into business for him-self over at the "Springs".

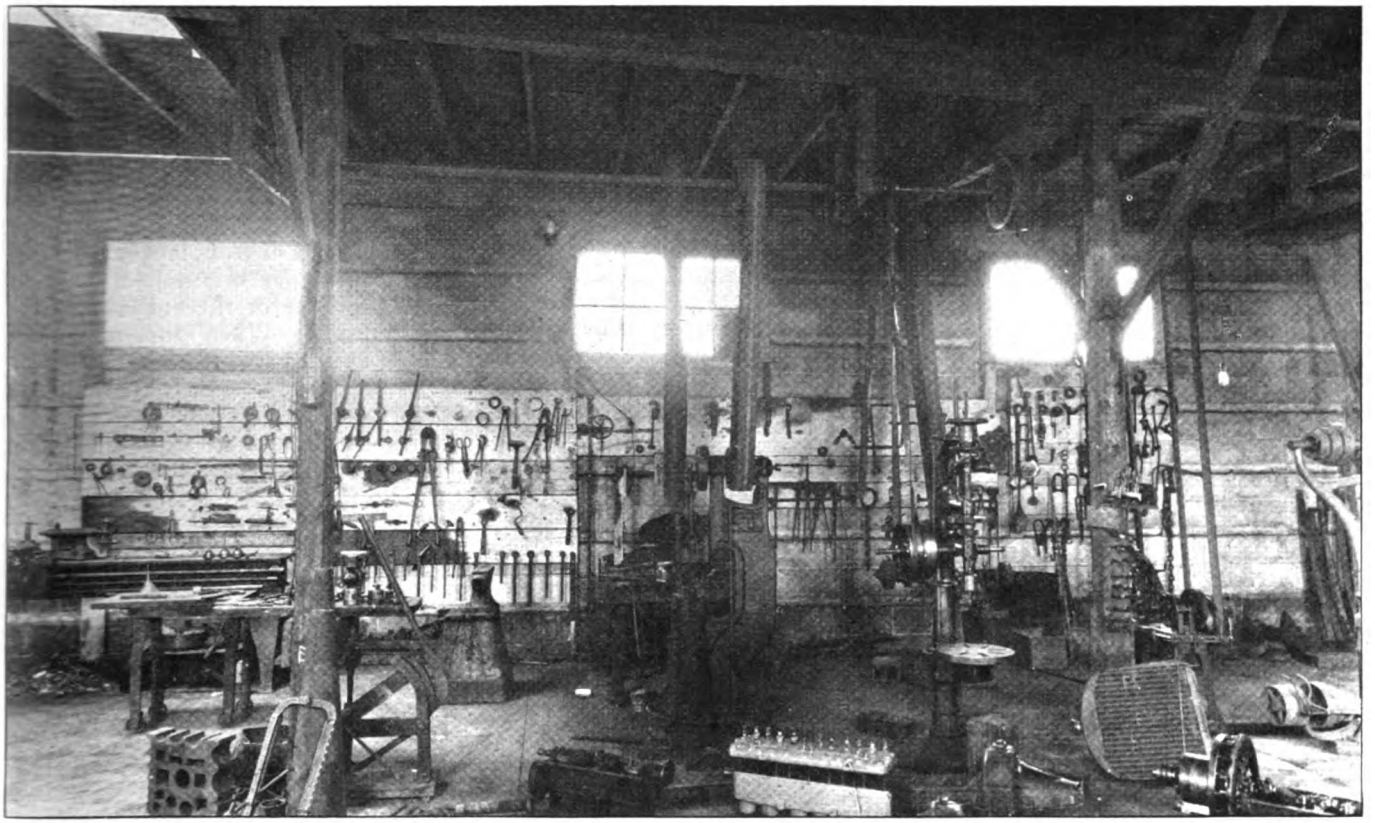
The place known as the "Springs" was a little "one horse" town as most folks termed it and the thought of Tim doing any thing over there amused Dugan and the only reply was that he would be back for his old job in the course of a month or so.

The few weeks wore away and Tim packed his belongings and bade good-bye to his old friends at the County seat and moved to the "Springs." He rented a small shop about large enough to hold two cars, purchased a few tools and a small stock of such accessories as he considered standard.

The writer happend to have business at the "Springs" the day Tim opened his shop for business and it did look like taking a leap in the dark but Tim was feeling fine over his venture. Later my business called me to other sections of the country and I did not return for

some time and when I did Tim was still at the "Springs." This story concerns my next introduction to Tim and his shop after he had been at the "Springs" for some time.

It was the 3rd of September when I left Paleigh enroute for the County Seat, a distance of about 115 miles. When about one-half of the distance was covered clouds gathered and in an hour or so it began to drizzle one of those slow fall drizzles that usually last for a



THE MURPHY SHOP TOOK CARE OF 680 CARS LAST YEAR

week or ten days in that section of the country. After driving fifteen or twenty miles the roads began to get slick and I realized the necessity of chains. I found I did not have them with me. The result was I slid into a tree by the roadside, damaging the radiator, jambing a fender and breaking the glass out of a lamp besides jambing it up quite a little.

After a time I succeeded in getting out of the ditch and back onto the road and finally I got into the little town of "Ord" a distance of seven miles. The rain had let up a little by this time and I was getting on very well, but I found that I needed oil and so decided to drive into a garage and get it. When I came up to the garage I found a steep planked approach and tho I tried many times I could not persuade my "Lizzie" to climb up—the rear wheels would spin on the wet planks.

In the door way stood three greased-up fellows, one of whom seemed to be the cock of the walk. They stood and grinned like a lot of Chesire Cats for a few minutes and after a time came out and pushed when I succeeded in getting the car inside. After I had gotten inside two of them went back to their game of unfinished checkers while the "Big Boss" dragged his old cob pipe out and filled it (it was not necessary for him to drag it out for if he opened his pocket it was strong enough to jump out) and lit it. He then gave the match a flp and it landed in a pile of greasy waste setting it on fire. This again disturbed the checker game and the three of them smothered the fire with their brogans.

After things had gotten back to normal and the checker game was again well under way I ask the "Big Boss" if he would sell me a quart of good oil. He said he would sell me a quart of oil but just how good it was he couldn't say for he didn't just remember what kind of oil it was.

I got the quart of oil and handed him a dollar and he gave me back a mess of black greasy change that took an hour to scour up after I got home. As I backed out of the garage he leaned up against the door filling his old cob the second time and when I went around the corner and started up the road he was trying to strike a match on his greasy overhalls.

Whether they kept chains in that place I'll never know for I didn't ask. I stopped at eight or nine shops before I reached the "Springs" and not a single one of them ask me to buy chains, neither did they offer to repair my lamp or radiator.

When I drove up in front of Tim Donahue's place at the "Springs" he popped out of his place the minute I stopped and asked me to drive in and let him put on my chains as it was dangerous driving with out them. I told him that I didn't have any chains with me and would try and get home without them. The argument that Tim put up and the scenes he pictured of fellows who had driven without chains would have made a fisherman buy chains, even tho he intended to spend the balance of his days on the water.

I finally drove in and Tim put on the chains. No sooner had he gotten the chains into place when he began to give me a list of the dan-

gers that might befall my engine if I drove it with a leaky radiator, and I guess he was right, or at least he made me think so for he was soon busy on the radiator. Then next in line was the lamp and he fixed that up.

By this time it was getting late and as I didn't have my watch I asked Tim the time. He promptly gave me the correct time and bounced into the office and brought out a little dash clock that could be attached to the dash in a couple of minutes. The result was I purchased a dash clock and that was'nt all for when I was ready to leave I owed that fellow $33.25 for things that I acutually needed and did'nt fully realize until he told me I did and "Asked me to Buy."

I noticed that Tim's place had taken on an entirely different appearance than since I last saw it. The stock of accessories was new and clean and well assorted. The building was painted inside and out and I asked Tim how he managed to turn the trick in so short a time. His answer was. "First I buy the goods I know you fellows need and then I Ask 'Em To Buy".

In the three years that Tim Donahue has been in business he has made money enough to buy and pay for a nice little brick building well located and Dugan, for whom Tim worked at $22.00 per week, is still grinding away making just a skimpy living.

Every man in Tim Donahue's place (he had five) gets a commission on sales at the end of the week. Tim says some fellows who are in the repair busines can't sell merchandise because they don't "Ask 'Em to Buy". Their men don't sell merchandise for there is nothing offered to encourage sales. The men in the shop can sell a line of merchandise that cannot be sold successfully in the show room for the man in charge does not know when to ask them to buy rings, bearings, break lining, etc., as does the man who is working on the car. Tim Donahue gives his boys a chance to be merchants as well as mechanics and Tim watches sales move skyward.

And Tim Donahue is not only a seller of merchandise but he's a buyer of merchandise as well. He buys only standard advertised goods and buys from one or two reliable houses. Quick turn-over is his hobby. He never buys in large quantity for the extra discount. Tim says it doesn't pay.

The "Gip" salesman has poor picking around Tim's place for Tim sticks to the regular boys; the manufacturers of standard advertised goods. These establish a last-

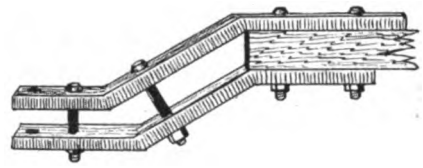


FIG. 1—A TONGUE HITCH FOR THE TRACTOR

ing friendship between buyer and seller and Tim takes advantage of the fact. When a large spread comes out in some publication and Tim is selling the line advertised he pastes the add on his window and puts some of the advertising banners or signs outside the shop. Tim writes the different manufacturers for attractive signs and banners and uses them from time to time with profit. For example; During a wet rainy spell he will get out his large cards advertising chains and hang some chains in the

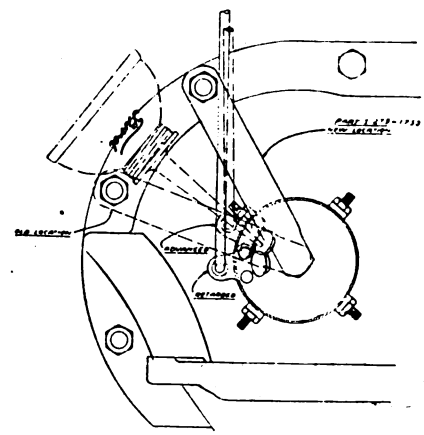


FIG. 2—HOW THE FORDSON COMMUTATOR CASE SPRING IS INSTALLED

windows. This gets attention and the window itself "asks 'em to buy" as they pass.

In hot weather he specializes on tire covers, motor meters, etc. Very few people get into Tim's place with a spare tire on the rear of the car without buying a tire cover. He "Asks 'Em To Buy" and they do buy.

Tim has been nicknamed "Bumper Tim" by one of the salesmen who calls on him because of the number of bumpers he sells. It is safe to say that not one car in twenty-five in his territory is without a bumper and 50% of them have bumpers on both front and rear. They don't come in and ask for them, not by a jugfull. Tim stocks the bumpers and when they come in without them they go out with them. That's all there is to it. He just "ASKS 'EM TO BUY."

Several Hints on Tractor Work in General and the Fordson in Particular

A Tongue Hitch

The accompanying engraving shows an easily made tongue hitch for drawing a horse drawn wagon with a tractor. The engraving shows this simple device so well that description or dimentions are unnecessary.

Don't Race the Tractor Motor

One of the worst abuses that can be given the Tractor is by racing the motor. Drivers must avoid this at all times. The proper speed to run the Fordson motor is 1000 revolutions per minute. This will give the Tractor the correct working speeds. When the motor is idling cut the speed down as low as possible and retard spark (spark lever down). When starting do not speed the motor to heat up the vaporizer quickly. This is destructive to the Tractor and will not accomplish your purpose.

Splitting the Tractor

When removing the Fordson fly wheel it is important that the rear end be drawn back far enough to remove all possibility of the wheel striking the drive shaft. The weight of the fly wheel together with long leverage of the shaft, is likely to crack the transmission plate or spring the shaft.

Do Not Use Shellac

Many repairmen use shellac in fitting cylinder head gaskets. This is unnecessary and is not considered good shop practice.

Installing Tractor Commutator Case Spring

Fordson tractors are now coming through with the commutator case spring S-79-1750 and commutator case spring stud S-280-2022 assembled in the next hole above their former location in the cylinder front cover. See Fig. 2.

This is to make it easier to oil the present type commutator which is now used on both Model T car and Fordson tractor.

When installing present type commutator cases on old tractors, assemble the commutator case spring stud and case spring as shown in Fig. 2.

Don't choke the engine while

running on kerosene, as this will foul the spark plugs.

Don't run a tractor with loose bearings nor allow one with loose bearings to leave your shop.—adopt the "stitch in time" policy.

Don't forget to release clutch before shifting gears.

A Guide for Scraping Bearings

J. M. HARD

The usual method of scraping bearings is with the half-round scraper made especially for this purpose. This method, it will be generally admitted I am sure, is at best an inaccurate practice and requires considerable skill on the part of the scraper operator.

Here is an idea worked out because a number of bearings had to be scraped and because it was desired to fit them with the greatest possible dispatch.

A piece of round hard wood stock was taken exactly the same diameter as the shaft which was to run in the bearings. This was of a length slightly longer than the bearing. The blocks was now cut exactly in half for its entire length producing two semi-cylindrical blocks.

One of these was then fitted with two rods to act as guides for the scraper. The guide rods, of course, allow just enough space between them and the flat face of the block to permit the easy manipulation of the scraper.

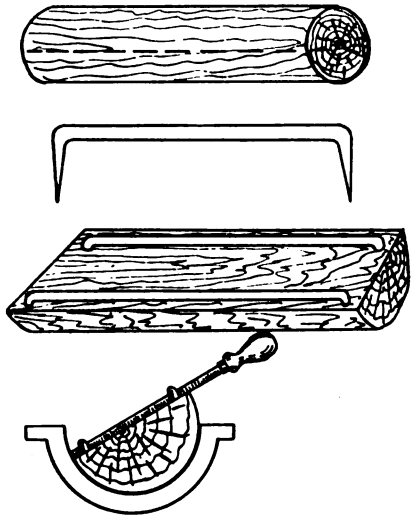
With this scraper guide the scraper can be manipulated easily and quickly and the bearing can be quickly scraped to a correct fit.

How to Collect Shop Accounts

A very considerable proportion of profit in a mixed cash and credit business is lost through the barnacles generally known as dead beats. They attach themselves to the ship of business impeding its progress and ofttimes pulling it down to the depths of failure. These slow payers absorb your financial energy, and you cannot hope to make the progress you should with these risks adding to your burden. Keep down the burden of your business by pursuing collection systematically, persistently and efficiently. The shop owner who hits the trail quickly after the elusive dollar and then sticks to its track like a bloodhound until he gets it, is most likely to make a success of his business. You cannot build up a business or support your family on the money outstanding anymore than you can build a home on the foundation under your neighbors residence.

Killing Two Birds with One Stone

No man no matter how much of a beat he may be, finds any particular comfort in being stung for someone else's debt. This idea was worked out with a deliberate intent by one shop owner as follows:—A man named Barton came to this show owner with the intention of buying a trailer for which the



A SIMPLE GUIDE FOR SCRAPING BEARINGS

shop owner acted as agent. The shop owner knew of Barton's reputation for getting things and not paying for them yet did not want to turn the man down cold. He acordingly suggested that if Barton could not pay cash, that he give the shop owner a 90-day note secured by a man named Joe Edwards. Edwards was on a par with Barton as far as paying for anything went but he was about the only man who would endorse Barton's note. Edwards himself, was owing the shop owner a bill which was considerably overdue. Nevertheless, the deal was put through, the trailer duly delivered, and the note turned over in payment, duly and properly endorsed by Edwards.

Very naturally of course, the note was not met when due, and the smith didn't expect it would be, but the real plan for killing two birds with one stone was then set into motion. The shop-owner got after Edwards as endorser of the note, and Edwards got after Barton. The shop-owner made it plain to Edwards that he expected him to get the money. Persistency was of course necessary in this case, and hitched-up with the proper kind of talk to the note endorser it finally brought the money from Barton. When the note was paid, the smith informed Edwards of the fact, and complimented him upon the help and assistance in getting a settlement and a few carefully laid references on the subject of prompt payment, and honesty, lead to the settlement of Edwards account, which had been long overdue.

In cases such as the foregoing, a great deal depends upon the argument used, and the kind of men concerned, and it is well to spend considerable time to put the argument in just the right manner in order to strike the responsive chord in the matter. If it is important to study the best selling argument, in order to make more sales and in order to increase business, how much more important it is to study collecting arguments in order to place your account before your debtor in the proper light and with the proper degree of consisting firmness.

Close Collection as Business Insurance

The matter of collections is one of great importance, not only as insurance against the lack of necessary cash, but it is also directly connected with the expansion and growth of the business. Properly pursued collection insure proper working capital, and a fund for the growth and expansion of the business. Unreasonably long credit deprives the smith of money which rightly belongs to his business. The average shop owner carries an enormous load of unpaid accounts. These are continually keeping him pinched for ready funds, and naturally handicap him in the way of business expansion and the enlargement of his service to the community.

Fundamentally, the repair shop is a business of service. The success of the business depends upon its service to the community. The expansion of this service is responsible in large measure, for the degree of success which the shop owner who keeps a sharp eye on collections and pursues them persistently and efficiently, will not find himself handicapped because of inability to expand his business in order to take advantage of opportunities for enlarged service as they present themselves. A certain

amount of ready funds in the bank often enables the shop owner to take care of profit opportunities which could not otherwise be grasped if he did not have the funds available in his bank account. Carelessness in the connecting end of the business does not generally permit an accumulation of surplus funds in the bank for emergency use. A sharp eye on collections will assure the shop owner of ready funds, and insure him against failure.

AN EXAMPLE OF FRED CORRELL'S SNAPPY ADVERTISING

Collecting for Small Jobs

Perhaps the worst evil in the entire business of the repair shop and the biggest hole into which a great deal of profit goes is the small or petty account abuse. By this is meant, the many little accounts that sometimes require more time collecting than they are worth. For example:—Farmer Brown comes in with a little 25 or 35 cent job. After it is finished, he says "Charge it". And you think: "Oh it's too much trouble to charge a little thing like that", and so you let him have it and make no record of it.

Here is a suggestion to take care of these little things:—Get a common ordinary counter or day book. Hang it where it will be handy at all times. When a little job is charged jot it down in the book. If the customer has a regular account, add that little job to his account when you post your books, or make out bills at the month's end. If some of the little charges are not for regular charge account customers make out memorandums on bill heads and send the memorandum to them by mail. If you do not run across such customers very often, another good way is to jot these items down in a little pocket memorandum book, and then keep this little book in your pocket, and when occasion permits, just remind your small-job customer of the 30 or 40 cent job you did for him.

If the customer is in business—a grocer, butcher, or hardware merchant, just drop in some day when passing, and get anything you want or need, and thus square up the account. If he is a farmer, you can get eggs, butter or potatoes, to even up the matter with him, and when these small job folks see you mean business they will respect you for it. Don't allow any false ideas on the matter of the smallness of the charge to interfere with your getting what is coming to you. Of course, don't go to the other extreme and waste more time and energy on a little bill than the charge is worth. The small charges amount to a very considerable sum in a month or two if you keep a record of them, as suggested here, and you will see that you cannot afford to let these little jobs go uncharged and unpaid for. These little charges in some shops make the difference between a profit and a loss at the month's end; and with respect to these small charges, it is an excellent idea to become a firm believer in the fact that anything worth doing is worth charging and collecting for.

How a Poem was Used to Collect Money

"A few weeks ago I composed a poem which was published in our country paper", says Adam T. Wible, "It was the means of my collecting about $150.00 in a short time after the verses appeared. "The poem written by Mr. Wible and used as a collection medium reads as follows:—

The blacksmith shop on a country road—
The blacksmith stands within;
You see his forge's gowing flame
While you hear his anvil ring.
And as you see him swing his sledge
And watch the sparks fly high,
You hear him sing his favorite song
Of the good old days gone by.
And so you see him toil each day—
To toil with main and might,
Till rest he finds beside his hearth
And family there at night.

He's always ready, never cross,
He'll fix your truck, and shoe your "Hoss";
He'll repair your car, an' mend your plow
And you need not wait for he'll do it "Now".
He is always ready and with smiling face
He greets each man who enters his place.
He makes no enemies, has host of friends;
For he fixes up breaks, repairs and mends.
And when he's done and your're so bold
As to say: "Just wait 'till my crop is sold"
He'll turn to his desk with a smiling face,
And charge the job in the proper place.

But don't forget he has to live,
Must pay for stock and tools,
So when he sends a bill to you,
Don't act like sixteen fools,
But with your purse just seek the smith—
The man who's been so true,
And pay the sum you're owing him,
And he'll think more of you.

The Man Who Can Afford to Pay, but Won't

One of the chronic offenders who seem to delight in making the path of the practical repair shop owner anything but a rosy one, is the man

who can pay but won't. He seems to delight in making the path of the practical repair shop owner anything but a rosy one, is the man who can pay but won't. He seems to be unwilling to let go of his money, even to pay for his just debts. You will find this man in practically every community, and you will find his name upon the books of the smith as well as the butcher, baker and candlestick maker. Generally he is well-to-do, and he is of such prominence that he feels that he can do as he pleases when it comes to paying his bills.

"The man of this calibre is a particularly hard case to deal with," says an Illinois shop owner, describing a recent collection experience. "I had a tilt with a man of this kind just recently. This man (we will call him Harris for convenience), ran up quite a large bill for repair work. I permitted the bill to run for several months, not daring to speak to him personally regarding the account for fear that I would lose him as a customer. Finally after thinking about the matter and considering it from all sides, I came to the conclusion that it would be better to lose his trade than to allow his account to mount higher and in the end to run the risk of losing a very considerable amount of money. In this frame of mind, I armed myself with a complete statement of his account, and presented it with a courteous intimation that I could use the cash very conveniently. Naturally, as is usually the case with the debtor of this calibre, he told me that he was highly insulted. But I came back at him with a plain but courteous talk on business which was coupled up with several pointed references to the fact that his case was not one of not having the required money, but simply a matter of paying what he owed. I told him plainly that I had to have money in order to do business, and that was just exactly what I was in business for. I told him that just because he was able to impose unreasonably upon other merchants in town, was no reason why he should think he could do the same to me. I also informed him that while I was glad to do his work and to have him for a customer, that it was absolutely necessary for me to collect my accounts promptly as I could not afford to carry the unreasonable burden imposed upon me by long credit. Of course, I finally got my money after a lengthy argument, and what is more after a period of two months I got him back as a regular customer but you may be sure that it was upon a monthly settlement basis."

...OFFICE OF...

The Correll Shop & Store

Dealers in "Everything the Farmer Uses"

Chauncey, Illinois, May 22, 1922.

American Blacksmith,
Auto & Tractor Shop.
Buffalo, N. Y.

Gentlemen:

In connection with the enclosed question sheet, it is necessary for me to remark that last year was a "bum one". But we took our mark downs as they came, and kept our stock moving fairly well, and we are now in good shape to start right. Spring is opening up fine, and we are looking forward to a bigger season then we have ever seen.

We classify our business under five departments, and this is our record for 1921.

Shop dept. (labor and materials)	$2,567.15
Auto Parts and Accessories	2,889.50
Implements and hardware	1,532.00
Tires and Tubes	1,680.00
Gasoline	1,799.80
Total:--	$10,468.45

We do all kinds of work including oxy-acetylene welding, tire repairing, horseshoeing, farm implement repairing, wagon and carriage work, storage battery work, and also rebuild autos. As you will note, we sell practically everything the farmers use, beside catering to the tourists.

Our Shop Equipment includes an oxy-acetylene lead-burning, welding and cutting outfit, complete power equipment for the general repair shop, and we also have an air compressor, as we find that the free air service paves the way for the sale of accessories as well as repair work.

With best of wishes for "Our Journal", we remain

Sincerely,

J. H. Correll

THIS DETAILS THE RESULT OF SNAPPY ADVERTISING PLUS ABILITY TO BE "ON THE JOB" ALL THE TIME

Benton's Receipe Book

An Auto Top Dressing is requested by L. G. M. of Iowa. Our friend does not specify the nature of the top for which he requires a dressing but we will endeavor to give him enough information that will include any top he may have to deal with. For a leather or rubber top use one part liquid asphaltum to two parts castor oil. To this add one-half ounce of ivory black for each pint of the mixture. This is applied with a soft brush. For a mohair top about all that is necessary to brighten it is a thorough cleansing with soap and water. Take a pail of warm water and make a good suds with a bar of castile soap. With a large, clean sponge wash the top thoroughly and leave open and well stretched until absolutely dry. A pantasote or similar top may be cleaned with a brush dipped in weak ammonia water. And in this connection it may be a good idea to include here what should NOT be done to tops and curtains. And that is do not try to clean or brighten them with gasoline or kerosene.

A Box of Sand in the shop may save rebuilding the shop in case of a gasoline fire and its cost is so small that every shop owner should see that one or two boxes are well-placed. Gasoline or oil fires are only spread by water. Sand thrown on the small blaze will smother it. Don't take chances these days. Gasoline and lighted cigarettes and cigars do not mix well. Be safe by placing boxes of sand about the shop.

To Clean Old Files the following treatment is suggested: First brush and clean them well with a file card. Then wash them in a solution made up of 4 ounces of washing soda in a quart of hot water. After receiving a good scrubbing to remove loose dirt they are transferred to a bath of dilute sulphuric acid (4 oz. of acid to 1 qt. of water). The files should remain covered in the acid for twelve hours, after which they are washed in water and dried.

The Prize Contest Winners

We are at last able to announce the names of the Prize Contest Winners. The judging of the many papers received was a most trying task and though the contest closed on May 1st, it was not until June 8th that the judging was completed.

The basis of the awards as announced in the March and April issues was strictly observed namely:
First:—Neatness,
Second:—Readability,
Third:—Clearness and Thoroughness.

On the above basis the following awards were made:—
First Prize—A Gold Watch.
Peter L. Zifka, New York.
Second and Third Prizes—Gold Shaving Outfits.
J. H. Saak, Missouri.
J. S. Rorison, Quebec, Canada.
4th to 28 Prizes—Auto Strop Razor Outfit.
J. L. Schulte—Missouri.
J. R. Plante—New York.
J. W. Franklin—California.
H. A. Law—Missouri.
J. W. Olds—Kansas.
A. J. Neal—Texas.
John Lanby—Wisconsin.
C. Zimmerman—Kansas.
F. C. Wankum—Missouri.
C. M. Jacobs—Kentucky.
W. Murphy—Iowa.
L. W. Surritte—Kansas.
Robert Hardwick—England.
F. W. Brownback, Jr. Montana.
G. G. Schauppner—Nebraska.
O. H. Colwell—Rhode Island.
Mark Peterson—Minnesota.
J. E. Beatty—Missouri.
T. W. Kitto—Illinois.
H. B. Markus—Illinois.
O. T. Cavanaugh—Ontario, Canada.
J. H. Wells—Texas.
E. G. Munson—Illinois.
C. M. Lockard—West Virginia.
Sweitzer Bros.—Missouri.

All other contestants will receive a copy of the blacksmith picture in colors. It is of course impossible for us to announce the names of all of the other contestants.

The Value of the Contest

The greatest value of the contest and questionaire will be found in coming numbers of "Our Journal". The information contained in the questionaires is now being considered by Our Editors in planning new articles, new features, and new departments for "Our Journal". We are also reproducing several of the outstanding reports that came in the form of letters. These will show you what some readers of "Our Journal" are doing in the way of business.

Prize Contest of Future

It is the intention of the Editors to arrange other contests in the near future. The success of the one just closed indicates that "Our Folks" are generally very willing and anxious to give freely of information that will assist our editors. Therefore watch carefully for the next prize contest. It will probably be announced in the course of the next few months. And if you didn't win a prize this time, get into the next one determined to carry off the first prize.

High Spots

Hy Drometer ses: "Sum folks remind me of a sulphated battery—they lack pep."

A divorce is the thing for the shop owner who is married to easy-going methods.

A "sputtering" lamp is no good—and isn't a "sputtering" man in the same non-essential class?

Blessings in disguise are usually well disguised tho' the blessing argument usually depends upon the view point.

When satisfaction motors up to the front door progress airoplanes out of the window.

Don't let the hot weather wilt your enthusiasm to ask 'em to buy and to pay for what they purchase too.

If men had nobody to gamble with but their wives, how much gambling do you suppose would be carried on?

When you get to thinkin' what a rotten job you've got just remember the rafts and oodles of men who would be glad to have just your job.

You can hardly blame the average man for being dissatisfied with his lot—for there are always some people with a lot more.

A mighty small bump often spoils a very pleasant trip—but then a little bit of a smile often clears away some mighty big clouds.

Are you grasping the tremendous opportunity you have for selling parts, supplies and accessories? You have a bigger chance than anpone in the auto, truck or tractor buiness.

Uncle Jed ses: "Sum shop owners run their business as tho' it wus a cuckoo clock—they let it run down 'til they don't hear the bird any more an' then they wonder what'n-'ell killed the bird."

What have you learned about batteries and battery work in the excellent series by Mr. Becklin? A great many of "Our Folks" are finding battery work decidedly profitable—why not you?

What do you think of that fine appreciation of the blacksmith written by Mr. Parker in the Saturday Evening Post of June 3rd? He has described the honesty and reliability of the smith as another Longfellow. "No man was more really trusted than the Blacksmith," says this writer with truth and appreciation.

It may be hard to get away on a vacation—sum of "Our Folks" are mighty busy these days—but try taking a day or so eack week if you cannot make it for a week or two all at one time. And, of course, when you do go don't forget the Missus and Kiddies. They'll enjoy it too and they usually need it as much as you do. And if you can't take 'em better stay at home. Don't make it a one-man vacation.

"Guess you can help me"—was Tom's greeting when we chanced into his shop on our usual monthly visit and found him busyily engaged in studying several columns of figures and a stack of miscellaneous memorandums on odd scraps of paper. 'We'll be glad to help you Tom, if we can—what seems to be the difficulty?" And with that invitation Friend Tardy explained that he had kept strict and careful record of his sales of Ford parts but that he was losing money on 'em every week. "Here I've sold six dollars worth this week and I should really have a profit of two dollars and a quarter but I can't figure it out "that way on my books" and Tom pointed to his conglomeration of record slips. "Well, Tom, "we began, without even a glance at his figures or slips," we can't see how you can make any money selling Ford parts the way you try to do business. The last time we were in here you sold a bunch of those fake parts to some poor chap who paid you six or seven good hard dollars for them before he found out that they were made of lead or worse. Then he brought 'em back to you and you gave him his money back—because he made you—and you put back into your case those parts that weren't broken. Now you've checked up what you've got in your case added what you've actually sold and you are naturally short on the proposition. If you continue along that line until you have apparently sold the entire stock you will find that instead of making the hundred or two hundred per cent that the faker told you would, you will be several good hard dollars out of pocket." And with that we left Tom to his figures.

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H. Pass, Minn. ..... Dec., 1941
E. Krebbiel, Colo. ..... May, 1937
The Fix-It Shop, Utah ..... July, 1935
P. Cacks, S. Aust. ..... Sept., 1934
J. Torrey, Mass. ..... Dec., 1933
D. Elledge, Nebr. ..... Mar., 1933
Pat Martin, Nev. ..... June, 1932
L. White, Vt. ..... Feb. 1933
J. Gamble, N. D. ..... Feb. 1932
R. Tompkis, Texas ..... Sept. 1932
C. Graf & Sons, Ohio ..... June, 1931
A. Rice, Pa. ..... May, 1931
C. Crossen, Ill. ..... Feb., 1931
W. Waldorf, Ore. ..... Feb., 1931
W. Watt, Kans. ..... Dec., 1930
W. Waldeck, Ind. ..... Nov., 1930
O. Colwell, R. I. ..... Oct., 1930
A. Reeve, Fla. ..... Sept., 1930
J. Huntington, Calif. ..... Aug., 1930
H. Sherman, Pa. ..... Aug., 1930
A. Ross, Scotland ..... July, 1930
E. Stroup, Ind. ..... July, 1930
C. Hawkins, Ore. ..... May, 1930
G. Lawrence, Mass. ..... Mar., 1930
A. Danielson, Wisc. ..... Feb., 1930
J. Sefcik, Kans. ..... Jan., 1930
B Olson, Minn. ..... Jan., 1930
J. Erickson, Minn. ..... Jan., 1930
J. Ennis, N. J. ..... Jan., 1930
R. Curtiss, N. L. ..... Jan., 1930
C. Fischer, Ind. ..... Jan., 1930
J. Grunlund, Conn. ..... Dec., 1929
R. Wilson, Md. ..... Dec., 1929
C. C. Lewis Co., Mass ..... Oct, 1929
C. Winslow, Calif. ..... Aug., 1929
N. Smithson, Tex. ..... Aug., 1929
M. Barnardi, Calif. ..... July, 1929
J. Wilder, Mo. ..... May, 1929
C. Vanblad, Pa. ..... Mar., 1929
J. Bulley, Vt. ..... Feb., 1929
F. Price, S. C. ..... Jan., 1929
New Jersey Reformatory, N. J. .. Jan., 1929
S. S. Albright, Calif. ..... Dec., 1928
F. Trelegan, Calif. ..... Dec., 1928
J. Wind, Ky. ..... Dec., 1928
M. Malenock, Pa. ..... Dec., 1928
E. Krueger, Wis. ..... Dec., 1928
J. Wurst, Fla. ..... Nov., 1928
H. Ellenbarger, Tex. ..... Nov., 1928
A. Brookman & Co., Vict., Aust Sept., 1928
J. Valchetti, Colo. ..... Aug., 1928
D. Dyson, Cuba ..... Aug., 1928
T. Farrish, Wash. ..... July, 1928
D. Rumsey, So. Africa ..... June, 1928
J. Utz, Ill. ..... June, 1928
F. Brackett, Mo. ..... June, 1928
C. North, N. J. ..... June, 1928
K. Reimer, Manitoba ..... June, 1928
P. Schnydre, Pa. ..... May, 1928
J. Miles, Ky. ..... Apr., 1928
E. Harris, N. Y. ..... Apr., 1928
H. Hangse, N. D. ..... Apr., 1928
L. Bergouts, Pa. ..... Apr., 1928
S. LeClair, Vt. ..... Apr., 1928
E. G. Jones, New Zealand .... Mar., 1928
F. Ulrich, Calif. ..... Mar., 1928
J. Eyre, Nebr. ..... Mar., 1928
E. Wilner, N. Y. ..... Mar., 1928
H. Boger, N. C. ..... Mar., 1928
A. Simpson, N. D. ..... Mar., 1928
Waddington Farm, W. Va. .... Mar., 1928
P. Costa, Terra Haute ..... Mar., 1928
G. Smith, New Zealand ..... Mar., 1928
A. Black, Calif. ..... Feb., 1928
L. Eisenhart, Idaho ..... Feb., 1928
A. Wible, Md. ..... Feb., 1928
W. Rogers, Md. ..... Feb., 1928
L. Larsen, Nebr. ..... Jan., 1928
J. Barnhart, Pa. ..... Jan., 1928
J. Burns, Conn. ..... Jan., 1928
S. Portelance, Quebec ..... Jan., 1928
C. Forrest, Calif. ..... Dec., 1927
R. Leventon, Calif. ..... Dec., 1927
F. Vanneter, Calif. ..... Dec., 1927
J. Kirsten, So. Afr. ..... Dec., 1927
R. Keeney, Colo. ..... Dec., 1927
G. Travis, Ill. ..... Dec., 1927
E. Lewis, Iowa ..... Dec., 1927
J. Forschel, Tenn. ..... Dec., 1927
D. Meason, Scotland ..... Dec., 1927
J. Templeton, Scotland ..... Dec., 1927
S. Frey, Ind. ..... Nov., 1927
A. Wilson, Iowa ..... Nov., 1927
Morley Garage, Mo. ..... Nov., 1927
B. Miller, Ark. ..... Nov., 1927
O. Roberts, Calif. ..... Nov., 1927
H. Facklam, Wisc. ..... Nov., 1927
J. Staats, Mo. ..... Nov., 1927
W. Morrison, Calif. ..... Sept. 1927
W. Wilson, New Zealand ..... Sept., 1927
W. Morrison, Calif. ..... Sept. 1927
F. Bock, Nebr. ..... Aug., 1927
D. Lyon, So. Africa ..... Aug., 1927
E. Delay, Ill. ..... July, 1927
W. Patterson, Okla. ..... June, 1927
W. Egly, Pa. ..... June, 1927
A. Gooding, So. Aust. ..... June, 1927
W. Geer, Pa. ..... June 1927
A. Mellum, N. D. ..... June., 1927
R. Wilson, England ..... May, 1927
J. Brenneman, Va. ..... May, 1927
C. Stebbins, Kans. ..... May, 1027
J. Devero, Iowa ..... Apr., 1927
F. Bruschi, Calif. ..... Apr. 1927
S Forman, N. J. ..... Apr., 1927
H. Dyressen, N. D. ..... Apr., 1927
M. Griffin, Conn. ..... Mar. 1927
E. LeClair, N. Y. ..... Mar. 1927
P. Flanagan, Calif. ..... Mar., 1927
J. Anderson, Calif. ..... Mar., 1927
F. Evarts, Calif. ..... Mar., 1927
J. Peterson, Iowa ..... Mar., 1927
G. Shoemaker, Pa. ..... Mar., 1927
C. Geiger, Pa. ..... Mar., 1927
G. Norton, D. C. ..... Mar., 1927
T. Tillman, Calif. ..... Feb., 1927
J. Haught, Ill. ..... Feb., 1927
W. Pontius, Iowa ..... Feb., 1927
J. Howes, Md. ..... Feb., 1927
M. Goller, Pa. ..... Feb., 1927
F. Roschy, Pa. ..... Feb., 1927
O. Knisely, Pa. ..... Feb., 1927
L Stocker, Texas ..... Feb., 1927
C. Adams, Conn. ..... Jan., 1927
C. Radeleff, Iowa ..... Jan., 1927
H. Lamons, Aenn. ..... Jan., 1927
J. Schneider, Calif. ..... Dec., 1926
P. Kauth, Ill. ..... Dec., 1926
A. Grandadam, Ill. ..... Dec., 1926
F Harding, Iowa ..... Dec., 1926
H. Grimm, Utah ..... Dec., 1926
J. Smith, Wash. ..... Dec., 1926
C. Hall, Wash. ..... Dec., 1926
H. Mokler, Ill. ..... Dec., 1926
F. Bird, N. Y. ..... Dec., 1926
R. Sherman, Maine ..... Dec., 1926
C. Hardy, Mass. ..... Dec., 1926
L. Cordes, Mo. ..... Dec., 1926
R. Pogue & Son, Texas ..... Dec., 1926
H. Rickley, N. J. ..... Dec., 1926
A. Hallander, Calif. ..... Dec., 1926
J. Griffiths, Iowa ..... Dec., 1926
W. Swetnam, Ky. ..... Dec., 1926
F. Hoopengarnder, Md. ..... Dec., 1926
L. Turner, Kans. ..... Dec., 1926
W. Matthews, England ..... Dec. 1926
W. Branch, N. C. ..... Oct., 1926
Hanson & Marvin, Cal. ..... Oct., 1926
W. Branch, N. C. ..... Oct., 1926
F. Mataocks, Ark. ..... Sept., 1926
E. Jones, Wise. ..... Sept., 1926
J. Clark, Jr., Vict. Aust. ..... Aug., 1926
L. Wesley, Ariz. ..... July, 1926
J. Buchner, Mich. ..... July, 1926
J. Dambach, N. J. ..... July, 1926
H. Mitchell, N. Y. ..... July, 1926
I. Boles, Ohio ..... July, 1926
F. Vavasour, New Zealand ..... July, 1926
S. Butler & Son, Mich. ..... June, 1926
A. Schmitt, Nebr. ..... June, 1926
M. Broton, N. D. ..... June, 1926
J. Campbell, Oregon ..... June, 1926
F. Over, Pa. ..... June, 1926
A. Clark, Jr., Ciet, Aust. ..... June, 1926
C. Sager, N. Y. ..... May, 1926
H. Pirret, Oregon ..... May, 1926
P. Sowa, Oregon ..... May, 1926
D. Ackland & Son, Man. ..... May, 1926
J. Sinclair, W. Aust. ..... May, 1926
C Sex, England ..... Apr., 1926
P. Peterson, Iowa ..... Apr., 1926
G. Bowers, Okla. ..... Apr., 1926
E. Dignan, South Aust. ..... Apr., 1926
J. Carswell, Ark. ..... Mar, 1926
C. Burton, Mass ..... Mar., 1926
W. Pochelu, Oregon ..... Mar., 1926
A. Bowman, Va. ..... Mar., 1926
W. Widger, N. Y. ..... Mar. 1926
W. Glenn, Colo ..... Mar. 1926
T. Moore, Vict., August ..... Mar. 1926
H. Brown, Va. ..... Mar. 1926
H. Barnes, Va. ..... Mar., 1926
G. Iller, N. S. W., Aust. ..... Mar., 1926
E. Jones, New Zealand ..... Mar., 1926
B. E. Campbell, Mass. ..... Mar., 1926
G. Torrey, Calif. ..... Feb., 1926
E. Schauppner, Nebr. ..... Feb., 1926
F. Trogdon, N. C. ..... Feb., 1926
A. Garver, Ohio ..... Feb., 1926
C. Jones, Pa. ..... Feb., 1926
J. Fox, Kans. ..... Feb 1926
R. Dean, Texas ..... Feb., 1926
Inglis & Son, Nebr. ..... Feb. 1926
J. Murphy, Calif. ..... Jan., 1926
O. Temple, Idaho ..... Jan., 1926
F. Kearns, Ill. ..... Jan., 1926
J. Murphy, Nevada ..... Jan., 1926
W. Post, N. Y. ..... Jan., 1926
J. McIntire, Pa. ..... Jan., 1926
N. Karolewics, S. D. ..... Jan., 1926
L. Messersmith, Idaho ..... Jan. 1926
J. Merritt, Calif. ..... Jan. 1926
J. Hess, Ohio ..... Jan. 1926
W. Pederson, Ill. ..... Jan. 1926
Powell Bros. & Whitaker, Eng. . Jan., 1926
H. White, N. Z. ..... Jan., 1926
Geo. Jones, Ore. ..... Dec., 1925
H. E. Hiers, S. C. ..... Dec., 1925
M. Rawlins, Calif. ..... Dec., 1925
J. Hulvey, Ill. ..... Dec., 1925
P. Nelson, Minn. ..... Dec., 1925
J. Devine, N. J. ..... Dec., 1925
S. Wright, N. Y. ..... Dec., 1925
E. Lain, N. Y. ..... Dec., 1925
W. Jones, Texas ..... Dec., 1925
Williams & Turner, W. Va. ... Dec., 1925
A. Spence, B. C. ..... Dec., 1925
N. Buchanan, Ont. ..... Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ..... Dec., 1925
W. Snyder, N. Y. ..... Dec., 1925
J. Skiff, Pa. ..... Dec., 1925
F. Cronk, N. Y. ..... Dec., 1925
J. Singer, N. Y. ..... Dec., 1925
H. Edwards & Sons, N. Y. .. Dec., 1925
G. Strait, N. Y. ..... Dec., 1925
E. Monroe, N. Y. ..... Dec., 1925
L. Luch, N. Y. ..... Dec., 1925
L. Rajewsky, Minn ..... Dec., 1925
W. Bolle, Ill. ..... Dec., 1925
F. Carlson, Ill. ..... Dec., 1925
W. Seamans, Ky. ..... Dec., 1925
J. Wriey, Mo. ..... Dec., 1925
J. Mallay, N. J. ..... Dec., 1925
S. Hazlett, Ohio ..... Dec., 1925
C. Seidles, Pa. ..... Dec., 1925
W. Robertson, S. C. ..... Dec., 1925
H. Collins, Ohio ..... Dec., 1925
G. Hanshaw, Okla. ..... Dec., 1925
W. Bate, Conn. ..... Dec., 1925
R. Shipley, Iowa ..... Dec., 1925
W. Nattress, N. M. ..... Dec., 1925
J. Sammerlee, N. Y. ..... Dec., 1925
D. Rhymes, Texas ..... Dec., 1925
L. Heath, Calif. ..... Dec., 1926
E. Wright, Ill. ..... Dec., 1925
C. Frazier, Ky. ..... Dec., 1925
G. Leuts, Ohio ..... Dec., 1925
J. Sebesta, S. D. ..... Dec., 1925
P. Oram, England ..... Dec., 1925
F. Wortell, Calif. ..... Dec., 1925
E. Thomas, N. Y. ..... Dec., 1925
H. Miller, Wash. ..... Dec., 1925
M. Bates, N. Y. ..... Dec., 1925
J. Woods, Oregon ..... Dec., 1925
W. Areford, Pa. ..... Dec., 1925
J. Howell, Mo. ..... Dec., 1925
J. Morrow, Pa. ..... Dec., 1925
A. Darling, Sr., N. Y. ..... Dec., 1925
J. Goebel, Kans. ..... Dec., 1925
C. Rausch, Ohio ..... Dec., 1925
R. Noble, Jr., Ont. ..... Dec., 1925
C. Lynch, Oregon ..... Dec., 1925
H. Clauson, Pa. ..... Dec., 1925
Neles, Bros., Calif. ..... Dec., 1925
H. Lefler, Mich ..... Dec., 1925
D. Bullinger, Mo. ..... Dec., 1925
A. Potter, Conn. ..... Dec., 1925
R. McMains, Calif. ..... Dec., 1925
W. Jordan, Maine ..... Dec., 1925
R. Fisher, Pa. ..... Dec., 1925
P. Kaimulos, T. H. ..... Dec., 1925
H. Hesse, Kansas ..... Dec., 1925
F. Hinkey, Ohio ..... Dec. 1925
N. La Duke, N. Y. ..... Dec., 1925
A. Wassmuth, Idaho ..... Nov., 1925
G. Illsley, Mass. ..... Nov., 1925
A. Speir, Ohio ..... Nov., 1925
W. Clepper, Texas ..... Nov., 1925
J. Mallett, Queensland, Aust. .. Nov., 1925
J. Dribble, South Aust. ..... Nov., 1925
W. Schaid, Wis. ..... Nov., 1925
D. Fraser, N. J. ..... Oct. 1925
L. Krause, Ind. ..... Oct. 1925
Nugent-Covey Wagon Co., Calif. Sept., 1925
M. Pople, N. S. W., Aust. .. Sept., 1925
J. Wilkinson, Queens, Aust .. Sept., 1925
C. Williams, Victoria, Aust. .. Sept., 1925
Reynolds Bros., Pa. ..... Sept., 1925
F. Krens, Calif. ..... Aug., 1925
D. Allen, Mont. ..... Aug., 1925
G. Fisher, & Bro., Ohio ..... Aug., 1925
W. Dixon, Ohio ..... Aug., 1925
F. Shupe, Pa. ..... Aug., 1925
W. Wright, Va. ..... Aug., 1925
H. Knoues, Ill. ..... July., 1925
A. Veit, Mass. ..... July, 1925
J. Stadler, Calif. ..... July, 1925
Sligo Iron Co., Mo. ..... July, 1925
G. Hogoboom, N. Y. ..... July, 1925
H. Schriber, Pa. ..... July, 1925
Torris Fortune, S. D. ..... July, 1925
Wm. Loveless, Mo. ..... June, 1925
C. H. Fries, Mich. ..... June, 1925
V. E. Oliver, Iowa ..... June, 1925
J. H. Cook, Ga. ..... June, 1925
Gladstone Holway, Ohio ..... June, 1925
N. H. Black, N. Y. ..... June, 1925
C. H. Fakenstein, W. Va. .... June, 1925
H. Fast, Manitoba ..... June, 1925
G. Broughan, N. Y. ..... June, 1925
A. Nordstrom, Iowa ..... June, 1925
C. Holton, Okla. ..... June, 1925
D. Conillard, Vt. ..... June, 1925
Rasmussen & Baasch, Nebr. .... May, 1925
J. O'Rourke, N. Y. ..... May, 1925
A. Spangberg, Oregon ..... May, 1925
C. DeVore, Pa. ..... May, 1925
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H. Wiese, Iowa ..... Apr., 1925
Heart's Delight Farm, N Y. .. Apr., 1925
S. Wilkin & Sons, N. Y. .... Apr., 1925
P. Wand, N. Y. ..... Apr., 1925
M. Settle, Ohio ..... Apr., 1925
D. Kille, Okla. ..... Apr., 1925
J. Helms, Calif. ..... Mar., 1925
E. Moon, Ind. ..... Mar., 1925
A. Holmquist, Iowa ..... Mar., 1925
G. Fredericks, Minn. ..... Mar., 1925
O. Martinson, N. D. ..... Mar., 1925
C. Lindquist, Minn. ..... Mar., 1925
F. Locke, N. Y. ..... Mar., 1925
G. Follmar, Nebr. ..... Mar., 1925
J. Pool, Texas ..... Mar. 1925
W. Thomas, Mo. ..... Mar. 1925
Higgins Blk. Shop, S. D. ..... Mar. 1925
C. Wiesner, Calif. ..... Mar. 1925
J. Guthrie, Va. ..... Mar. 1925
C. Alexander, N. Y. ..... Mar., 1925
P. Chemin, Ohi ..... Mar., 1925
F. Faistinger, Pa. ..... Mar., 1925
E. Roseth, S. D. ..... Mar., 1925
V. Priesmits, Wisc. ..... Mar., 1925
A. Hersog, Misc. ..... Mar., 1925
W. Snider, Ind. ..... Mar., 1925
B. Christianson, Wis. ..... Mar., 1925
J. Cattanash, Colo. ..... Feb. 1925
S. Stevenson, Kans. ..... Feb. 1925
F. Hall, Wyo. ..... Feb. 1925
J. McCallum, N. D. ..... Feb. 1925
C. Ford, Oregon ..... Feb. 1925
F. Chaves, N. Mexico ..... Feb. 1925
J. Taugher, Ont. ..... Feb., 1925
G. Lawton, South Aust. ..... Feb., 1925
E. Dillabough, Tnt. ..... Feb., 1925
J. Ford, Wash. ..... Feb., 1925
J. Kers, Ill. ..... Feb., 1925
E. Price, Ill. ..... Feb., 1925
R. Nystrom, Mich. ..... Feb., 1925
E. Hiteshue, Ohio ..... Feb., 1925
D. Garber, Ohio ..... Feb., 1925
A. E. Meier, Wisc. ..... Feb., 1925
J. Beyerholm, Calif. ..... Jan., 1925
C. Lake, Colo. ..... Jan., 1925
H. Draper, Ind. ..... Jan., 1925
J. Damm, Iowa ..... Jan., 1925
R. Atteberry, Mo. ..... Jan., 1925
A. Hahn, Colo. ..... Jan., 1925
D. Shearer, Ohio ..... Jan., 1925
H. Compton, Tenn. ..... Jan., 1925
C. Jacobitz, Wis. ..... Jan., 1925
A. Witt, Wis. ..... Jan., 1925
J. Withers, Terre Haute ..... Jan., 1925
M. Bennett, Miss. ..... Jan., 1925
J. Howard, Jr., Ala. ..... Jan., 1925
J. Flynn, Iowa ..... Jan., 1925
S. Bradford, Miss. ..... Jan., 1925
T. Elam, England ..... Jan., 1925
R. Staley, Calif. ..... Dec., 1924
J. Davis, Calif. ..... Dec., 1924
G. Tatum, Fla. ..... Dec., 1924
G. Laughlin, Ill. ..... Dec., 1924
R. Booker, Ill. ..... Dec., 1924
F. Jarvis, Ind. ..... Dec., 1924
W. Herdt, Ky. ..... Dec., 1924
E. Naylor, Md. ..... Dec., 1924
J. Klein, Md. ..... Dec., 1924
M. Bailey, Mich. ..... Dec., 1924

The Repairing and Building of Tops

H. S. BANKS

This is a branch of repair work that the average general automotive repair shop can take care of with considerable profit, and with a very small outlay for equipment or machines. In fact, practically all of the tools and equipment necessary are either now included in the average general repair shop or equipment which can be easily made by the practical shop man.

The repairing and building of tops is just as much a part of automobile repairing as is the vulcanizing of tires or the repair of batteries, and when one considers that the trimming and top-making forces of the average automobile plant were recruited from both large and small carriage building plants throughout the country, you will quickly realize that none of this work is beyond the capacity of the average practical repair man. In fact the average general repair shop owner is now doing work much more complicated and requiring much more skill than is required in the repairing or building of an automobile top.

In considering the proper equipment and machines for the top building department a sewing machine is of course an absolute necessity. It is not always necessary to buy a new one, and the wise business shop proprietor will be able to pick up a good used sewing machine at a considerable saving over the cost of a new one. With the exception of the sewing machine, all of the other equipment for the top repairing department can be built right in the repair shop.

The next important item in the department is an adjustable dummy frame. This frame is for the purpose of fitting tops to be built when the frame work upon which the new top is to be fitted cannot be left in the shop. When it is at all possible, it is of course best to have the owner of the car leave the top in the shop while the new top is being built.

This frame is simply an adjustable arrangement of bows, so arranged that they may be adjusted to fit any sized top, and thus enable the top builders to fit the new top over the frame work, and thus be sure that it will fit the actual frame work of the car when fitted over the bows upon which it is to be attached permanently.

Such a frame can be easily arranged so it can be adjusted to take several different sizes of tops. In use, the frame is set to the very carefully determined measurements of the top as found on the car, and when thus set, the workman can fit his top over this frame knowing that it is an exact duplicate of the frame work upon which the top is to be actually used.

The next item of equipment is a cutting table upon which the top material can be easily measured and cut to the desired dimension. The table illustrated in Fig. 1 shows a very handy arrangement whereby the top material is held conveniently in a rack at the end of the table, while below the table top are additional notches in the supporting table legs for the storing of two extra rolls of top material. This table should measure at least 12 feet long, about 6 feet wide, and be of the height convenient for the top builder.

The hand tools for use in connection with top work are a steel square, a good clean straight edge at least 10 feet long, a good yard stick, a plumb bob, a trimmers hammer, with a tack lifter, in the end, a heavy pair of shears, small cold chisel, and a nail set or punch. In addition to these tools, a few special tools may be necessary, depending upon the style and type of fasteners used in fitting the top. While some of these special tools can be made by the handy repair man, it will be best for the top builder to secure them ready-made from his top supply house. For example, there are special punches for trimming and cutting top materials for the insertion of washers and drommets, which are necessary for the application of the various types of fasteners now used for applying tops and side curtains.

A big labor saver for the practical top workmen is the special little apron which they generally wear. This is a short abbreviated affair, which fastens about the waist, and has special pockets in the front for holding the large shears, the hammer, a small or light weight cold chisel, and the punch or nail set. With this handy pocket arrangement, the workman will save considerable time which will otherwise be wasted were he to take time to reach to a work bench or table while at work upon a top.

Should the prospective top builder consider his venture into this work somewhat of a foolish one, let him consider that is not supposed that he is going to enter into the building of new tops without some sort of guide or pattern. Remember that every car upon which you expect to place a new top already has a top of some kind, and it is simply your job to duplicate that one which is now has. With this idea in mind, picture the simplicity of taking the old top from its present frame, taking it down carefully step by step, keeping in mind just how it was fastened, making notes of these facts if necessary, and then marking each part to indicate just exactly where it is to go, or where it was taken from, and then the simplicity of cutting new pieces from new material to build up a top just exactly like the one you have taken down.

Isn't there lots of work that you are now doing that is considerably more complicated than this? Aren't there jobs after jobs which require considerably more skill, more experience, and more real brain work than is necessary in refitting and rebuilding a top after the plan just outlined above?

It is of course hardly necessary to inform the beginner to proceed carefully and slowly with his first top job. Extreme care is necessary in the removal of an old top in order to preserve it as a pattern and speed cannot of course be acquired until the work of top building and repairing is thoroughly understood. This however, should not require any great length of time, for after taking down several tops, cutting the new parts according to the old pieces, and then building up the new top will soon give the beginner a thorough insight into the repairing and building of tops and thus enable him to turn some real worth-while profit into his own pocket.

It seems hardly necessary to review the work of removing the top covering from the frame piece by piece, as the general procedure in this work is very evident. It is only necessary to caution the worker to use extreme care in removing the top covering and to employ his hammer and cold chisel carefully, so as to damage the old top as little as possible.

It is perhaps necessary to warn the top builder regarding the cutting of his new material. Be certain that your pattern is cut carefully, or rather that your new

material is cut exactly to the pattern made by the old material. See that all of the old material is ripped apart before laying it upon the new material for cutting. All seams must of course be allowed for. If you will take the old parts and place them on the material, after they have been ripped entirely open, there will be no danger of your not allowing sufficient material for your seams.

In removing each part from the top, it is well to mark it with chalk with perhaps indicating crosses or marks to show just exactly how various sections of the top go together. These markings if duplicated upon the parts which are cut from the new material will enable you to put the new sections together with little or no difficulty.

Of course, it is also necessary to mark and indicate where washers, fasteners, or grommets are to come in the new material, and absolute accuracy in marking for these is necessary.

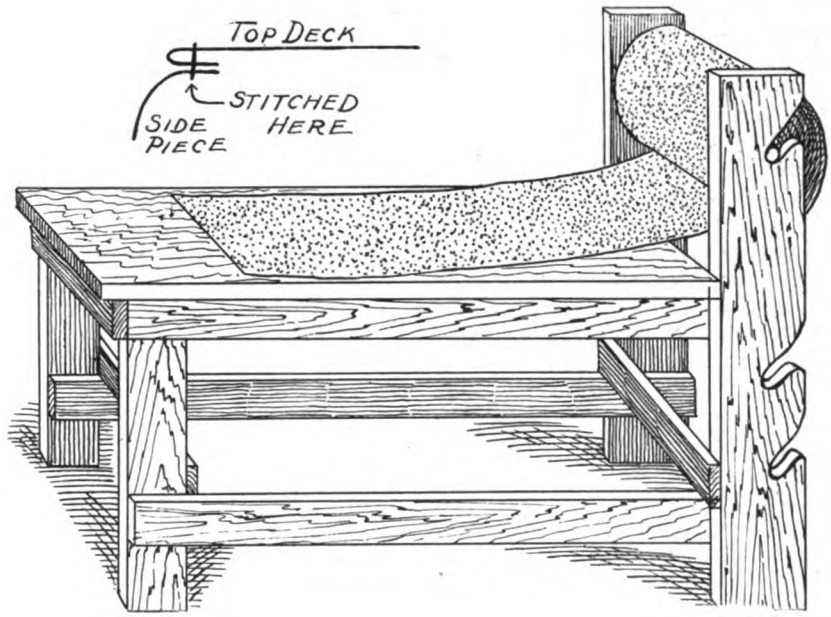
After the old top has been entirely removed from the frames, the bows should be carefully examined for breaks and failures, and these of course should be renewed or repaired before the new top is replaced. If new wrapping is necessary for the bows, now is the time to put it on.

All parts of the bows or frame work which are in a vertical position, should be carefully plumbed with the plumb bob. Nothing but an exact plumb position for these bows should satisfy the top worker, as these will make all the difference in the world in the appearance of the top if these are not exactly plumb.

After you have cut your material according to the pattern made by the old material, fit your various sections to the auto top temporarily by attaching with tacks. This is simply to guard against any mistake that may have been made in the cutting of your material. By carefully fitting and changing the different sections to fit to the bows in exactly the position they are to occupy when finished, you will find that you will secure a top that will fit its frame work exactly. After putting the parts together emporairly by means of tacking them to the frame work, it may be well to now fit the side curtain to the top and see if they conform with the new top as temporairly fitted. If not. a slight shifting of some of the sections of the top is about all that will be necessary. After ascertaining that the various sections fit exactly as they should, it is an excellent idea to chalk mark the sections so as to indicate just exactly how they are to go together, and then the sewing may proceed. Careful attention to the sewing operation, it now remains to attach the new top permanently to the frame work. This is easily accomplished after the top maker has carefully observed just how the original top was fastened to the bows.

Sometimes it may not be necessary to replace the entire top on a car, and the owner may desire just a section or two replaced where it has been torn. If this is a side or back section, the operation is simple. However, if the top deck is to be repaired the entire top will need to be removed.

This method of sewing the top deck piece to the side pieces is shown in Fig. 2. This shows the edge of the top deck turned under. The stitching goes through the top deck material twice and then through the edge of the side piece, thus making a water proof seam and one showing no raw edge on the outside. The same method is of course used in the other side of the top deck.



THE CUTTING TABLE AND THE METHOD OF STITCHING THE TOP DECK TO THE SIDE PIECE

While the beginner can gain considerable information from experienced top workers, and from a reading of articles on top work. most of his practical help will be gained by careful observation of the tops he works on. He should therefore lose no opportunity to see just how the tops on certain cars are assembled and attached. He should also note carefully the general appearance of tops and observe the reason for certain effects in the finished appearance of the tops.

The Storage Battery—What it Does for the Motorist, and How it Operates

T. A. BECKLIN

Few operators of automobiles, trucks and tractors, today realize the importance of electricity in the operation of these various machines. Electrical science has during the past several years overcome every objectionable feature of automobile operation which was experienced during the experimental days in the automotive industry. Night driving for either automobile, truck or tractor, has no more terrors for the driver; no longer is it necessary for the motorist to crank his motor; And while ignition troubles are still experienced by the automobile, truck and tractor operator, they are comparatively nothing when considered against the ignition troubles of years ago.

For example:—Let us take what has been done to make driving more pleasant for the automobilist. First—Electricity provides a reliable means of keeping the automobile engine running smoothly at all speeds. Second; it eneables the automobile driver to drive with perfect safety, and comfort at One third; it saves the automobile

owner the trouble and inconvenience of cranking his engine.

And all of these conveniences are brought about by the storage battery, and the related equipment. In order to thoroughly understand the operation and the function of the storage battery as used today on the average automotive vehicle, let us consider it similar to a small reservoir, or storage tank for water. We will suppose that a pipe is attached to this tank and somewhere in this pipe is a valve with which we can turn the water on and off. The pipe corresponds to the wire leading to and from the storage battery, while the valve in the waterpipe corresponds to the switch in the storage battery and wire arrangement.

For the purpose of filling the reservoir with water, we will suppose that there is a water pump at the other end of the pipe line. This water pump corresponds to the generator or electric dynamo, which generates electricity for the purpose of charging the storage battery. Thus, you will see how the storage battery wire, switch and generator, as pictured in Fig. ure 1, corresponds to the reservoir or tank of water, the waterpipe, valve and water pump similarily pictured in the same diagram.

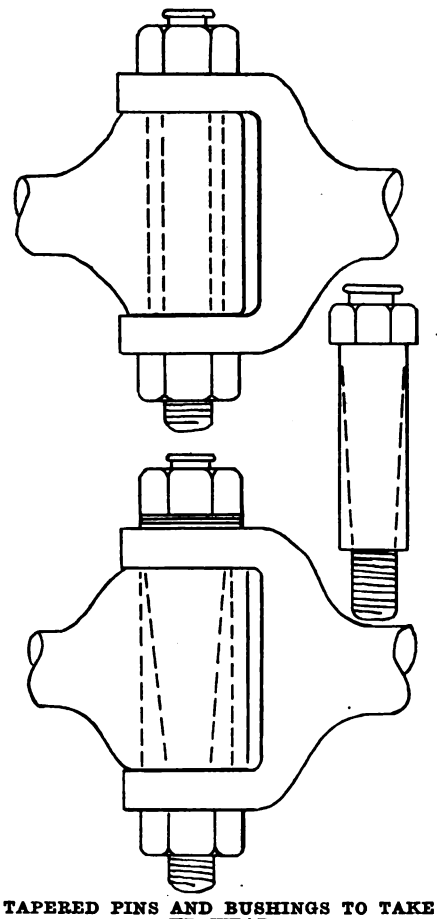
To carry this simile further, we will now suppose that it is desired to operate a water wheel or water motor with the stream of water that flows from the reservoir or water tank. Here again we have the reservoir or water tank, the water-piping, the valve to turn and shut off the water supply and the water wheel. As the valve in the pipe line is turned on, the water flows from the reservoir or tank through the valve and piping and revolves the wheel or water motor. In a like manner, when we have a storage battery with the necessary wiring, the switch and the motor of proper size, the electric energy will flow from the storage battery through the wiring and switch and turn the electric motor. The comparison is pictured in Fig. 2.

To carry still further the similarity in action between the flow of water from the reservoir in operating the water wheel, and that of the electric current from the storage battery which operates the electric motor, we will suppose that the valve in the waterpipe is open and naturally the moment the flow of water hits the wheel, the water wheel will begin to revolve. It will thus continue to turn until the reservoir is empty, but naturally it would run faster at first and continue to run faster as the height of the water decreased in the reservoir or tank. In the same way, the electric motor which is connected through a switch and wires to a storage battery, will continue to run as long as there is any current left in the battery, and it will also run faster and slower as the voltage in the battery decreases. Thus, it will be noted that the voltage in the case of the electric current corresponds to the pressure in the case of water flow.

Taper Pins and Bushings To Take Up Wear Easily

G. A. LUERS

The accompanying engraving illustrates a method for obtaining an adjustment for pivot yokes in which the original yokes were fitted with



TAPERED PINS AND BUSHINGS TO TAKE UP WEAR

ordinary pins. After a period of use these pins usually wear to the extent of allowing considerable play in the yokes. Inasmuch as these yokes were part of the steering gear of a car, the tie rod vibrated from this cause with added wear and considerable looseness in the steering gear.

Replacing the bushings was an all too frequent occurence and to avoid this the method shown was devised. When the hole in the yoke was busher, a taper reamer was used to bore it to a seat, cutting out only enough to make the taper continuous through the length. The taper reamer used was that normally used for cutting taper continuous through the length. The taper reamer used was that normally used for cutting taper pin holes, with a taper of one quarter inch to the foot. The pivot pin was then turned down by grinding to a correspoding taper. Several thin washers are placed under the head of the pivot pin and adjustment to take up wear is made by removing one of these washers. Where the shake is kept out of the bearing, the periods betwen adjustments are about equal to that, when the cylindrical pin is used, requiring renewal of the bushings to take out the play.

An Appreciation of the Blacksmith

From "Pioneer Methods" by George F. Parker. Reprinted by permission from the Saturday Evening Post copyright 1922 by the Curtis Publishing Company, Philadelphia, Pa.

In this very excellent article on the Pioneer and his methods Mr. Parker very ably describes the smith of the early days and the part the hardy wielder of hammer and sledge played in the early settlement and winning of new territory.

The most indispensable mechanic was the blacksmith. In his special work the farmer, however ingenious, could not compete. In general he had reached what then passed for middle life, with experience in several tasks in various stages of development. Though the shoeing of horses and, later in the season, of oxen constituted perhaps the bulk of his work during the winter, the summer brought with the making of plows or their sharpening, harrows, cultivators, hoes, scythes, rakes and tools used in field or garden.

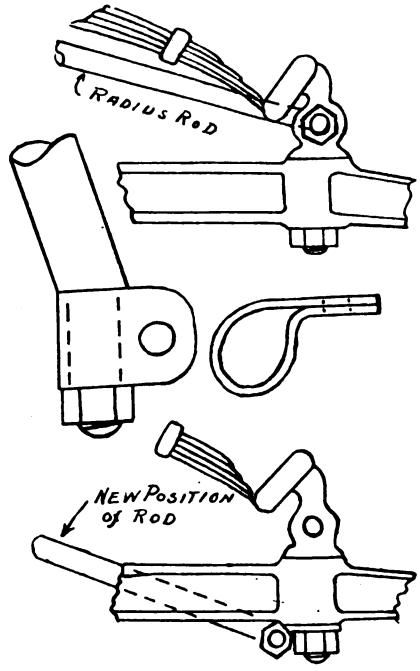
He must not only have acquired a fixed skill—something that would always stand him in stead—but must be able to work rapidly. When something went wrong with a prairie plow, leaving men and oxen idle, or with a threshing machine, where ten to fifteen men and almost as many horses were left for the time with nothing to do, the the blacksmith was expected to

drop everyhing else and, without regard to meals, sleep or rest, to persevere until his task was done. This was the essence of his unconscious contract with his customers and he must keep it. If there was one thing that the industrial leader in a pioneer community dreaded more than another it was that men assembled for a given task should be left idle while daylight and good weather were running.

The neighborhood that commanded the service of a really expert and artistic blacksmith could count itself fortunate. His trade was naturally the primary attraction, but it meant even more to have a smith who was really interested in the people who were his constituents and had their own peculiar interests. His shop was the recognized meeting place, a social center, even more important than the country store. It was the resort of boys of all ages, the older of whom were often gratified in their desire to blow the bellows or even handle that mysterious tool, the great sledge, when two red-hot heavy bars of iron were to be cut or welded or others were to be split into strips. The passing matron or schoolgirl looked in through the open door with a sort of awe; so that the blacksmith who either had or might develop the qualities of the curmudgeon was destined to a brief career or absolute failure, and might just as well make up his mind to move.

It was, however, as the meeting place of an every-ready debating society for religious questions that the smithy was most distinguished. There the fate of those mighty universal questions—baptism, infant baptism, free will, foreordination, election, predestination, the final perseverance of the saints—whatever this common though cryptic phrase might mean—were constantly under discussion. The smith literally earned his living by the sweat of his brow, but a day was never more than a day even if prolonged far in to the night. No true smith could resist the challenge to talk on these subjects, then the primary problems of surrounding humanity. He was nearly always active, sometimes even unctuous, in the Wednesday-night meeting or in the Sunday class meeting, so that in those historic days nobody even so much as thought it among possibilities that there could be an undevout blacksmith.

No man in any pioneer category was more really trusted than the blacksmith. His nature united with his trade to make him as nearly strictly honest as men can be. Other men—the carpenter, the shoemaker, the weaver or the tinker—might be suspect, and the customer could go somewhere else; but the blacksmith was the destined monopolist of a neighborhood,



A SIMPLE WAY TO STRENGTHEN THE FRONT RADIUS RODS

so that while he held his place there was little chance to question his position or his probity. Though seldom a leader in matters of high public import he was knowing to everything that was going on. Take him all in all, he was a fine figure in the pioneer life, as indeed he had been in his association with the yeomen during the preceding five hundred years. His character and its peculiar traits have been overlaid, though it is not possible even under the lavalike inclusions of the factory system entirely to hide him from view.

Strengthening Front Radius Rod With Clips

G. A. LUERS

A practical and novel means of strengthening the front radius rods of a car was devised by a local mechanic and is as shown in the accompanying engraving. Cars in which the radius rod is set into the spring bracket above the axle have a tendency for the axle to turn under, and this will occur abruptly where the front wheels hit an obstruction. With the axle canted backwards, the car steers hard and and at the least further obstruction, especially in sand or mud, the wheels wobble, making it very difficult to steer the car, or in fact making the steering uncontrolable. The repair of this part consists in making up two metal clips of three-sixteenths inch matrial, bent and drilled as shown. The ends of the radius rods are secured into these clips by the nut and the nut holding the spring supports is the means of holding the end of the rod. By lowering the radius rods to this position below the axle, the previous reason for bending is removed, and a much more substantial means of supporting the axle is provided.

The Soldering of Aluminum

J. A. DERBY

Ever since the discovery of aluminum its soldering has been a problem for the average repairman to wrestle with. The subject seems to be one of reoccuring frequency in the attention given it in the trade journals and especially those papers that devote their pages to the practical matters connected with the repair trades

Our own worthy journal, for example, has devoted considerable space to the subject in past issues and get the editors advise that the question of soldering aluminum comes up for discussion with no lessened frequency. The writer was therefore delegated to go into the subject with the idea of securing some real practical information on the work, the solders used and the actual working out of the successful methods.

In the first place and contrary to the thoughts and ideas of some otherwise practical repair men, aluminum can and is being soldered successfully by many practical repairmen. I say this because the correspondence from readers of "Our Journal" indicates a disbelief that this metal can be soldered successfully.

It is, of course, a rather difficult job. It is not one that can be disposed of as is the ordinary soldering job. Given an ordinary iron and a stick of solder and the average repairman can do a soldering job that will elicit high praise from his customer. But when that same practical repairman is asked to do a job of aluminum soldering he is

not quite so completely and efficiently "on the job."

In seeking information on the soldering of aluminum the writer went right out after the information. He didn't wait for the information to come to him. In other words, the places where most of the practical information on aluminum soldering is to be found is where aluminum is being soldered. And while methods and processes differed in the various shops and establishments visited, I am not going to detail all of them but am going to give here the results of the entire investigation. It is not intended that this article be the last and final word on the subject by any means, but it is hoped that the readers of "Our Journal" will get some practical information from this investigation. There is still too much uncertainty and difference of opinion regarding the soldering of aluminum to permit anyone to dispose of the subject with finality and absolute certainty.

The results of this investigation as given here are the composite opinions, ideas and practical suggestions from a number of sources and do not represent the ideas as expressed by any one individual.

Solder Only as Last Resort

The first outstanding suggestion with reference to aluminum is that soldering be employed only when other methods of repair or joining are impossible or impracticable. The reason for this is that at it's best the soldering of this metal is not always attended with success. The reason it is not would require delving into the make-up and chemistry of the metal and that is not the purpose of this article.

It is therefore considered best to repair or to join aluminum parts by some method other than soldering when other means can be employed.

Welding, for instance, by means of the oxy-acetylene torch is successful when the torch is in the hands of an experienced operator and if possible to employ the O-A torch it is best so to do.

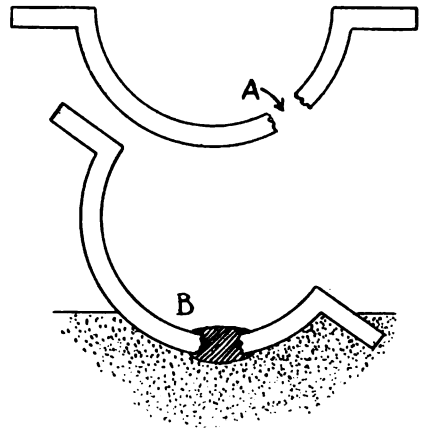
On the other hand, clamping, riveting and similar methods may be employed at times with excellent success. Of course, where tight joints are a necessity and absolute liquid tight seams are required these methods will not be suitable. otherwise the riveted joint, particularly if a third piece of the metal is employed in the riveting process, will make a strong substantial joint.

And the practical repair man will find, generally speaking, that if he seeks to repair aluminum breaks by some means other than soldering he will overcome a great many difficulties which he is likely to run into when attempting to solder this peculiar metal.

A Clean Surface Necessary

There is perhaps no other caution in any directions on soldering that is so oft' repeated as the one on the cleanliness of the surfaces to be joined. And when this is of such great importance in ordinary soldering work, it is of tremendously greater importance when soldering aluminum.

The very nature and chemistry of aluminum that make it such a valuable metal and cause it to be



AN EMERGENCY REPAIR ON A GEAR CASE

employed so universally in present-day life are the very elements that make for its difficulty in soldering. For example:—The surface of all aluminum is covered with a thin invisible coating or film. This is aluminum oxide and forms almost instantly on the surface of all aluminum. It is this oxide that so effectively and efficiently protects the aluminum metal from corroding agencies. Aluminum itself is soluble in a great many chemical compounds but this oxide is completely soluble in hydrofluoric acid only. And this little film of aluminum oxide and the instant formation of this film on the newly brightened surface of the metal is the little matter that interferes with the easy soldering of aluminum.

Dampness favors the formation of this film of oxide. It is therefore of extreme importance to keep the aluminum surface dry. The application of heat in some form will naturally tend to keep the metal dry and if this heating will also keep the metal clean we will accomplish two desirable requirements in preparing for our work.

Tinning the Work

As in other soldering, tinning of the surfaces to be joined is necessary. But in as much as the formation of the oxide interferes with the tinning process, the operation of tining becomes a most difficult one. With the foregoing facts in mind we naturally must apply our solder to the brightened surface of the aluminum immediately that the metal is cleaned. In other words, if we can clean the metal and apply the solder at one and the same time we will overcome the greatest difficulty to the successful soldering of aluminum.

We therefore clean the surfaces of the metal to be joined and heat the parts carefully, bringing the heat up to a point higher than the melting point of the solder used, but naturally below that of the aluminum to be soldered. The heat will keep the metal dry and thus minimize the tendency for oxide to form.

Now with a stick of the solder rub the brightened surface of the metal removing the film of oxide and at the same time depositing a film of solder on the surface. To make certain that the surface has been thoroughly tinned, brush the surface with its adhering film of molten solder with a steel scratch brush. This has a tendency to rub away any remaining oxide and insures a thorough union of the metals. Or this scraping may be done with the soldering tool.

If a thorough job has been made of the tining process the actual joining of the surfaces thus tinned will be a comparatively easy matter. It then remains to simply join the tinned edges together in the manner usually employed in soldering work.

Solders

No article on aluminum soldering is complete without reference to the make-up and composition of solders. It is, of course, possible to make your own solders, but why not leave this to men who have made a specialty of this work. I am all in favor of buying solder from a reliable maker. There are good solders on the market made by reliable makers and these are to be preferred over the home-made mixtures.

Summary

1.—If possible to repair or join your aluminum parts by some pro-

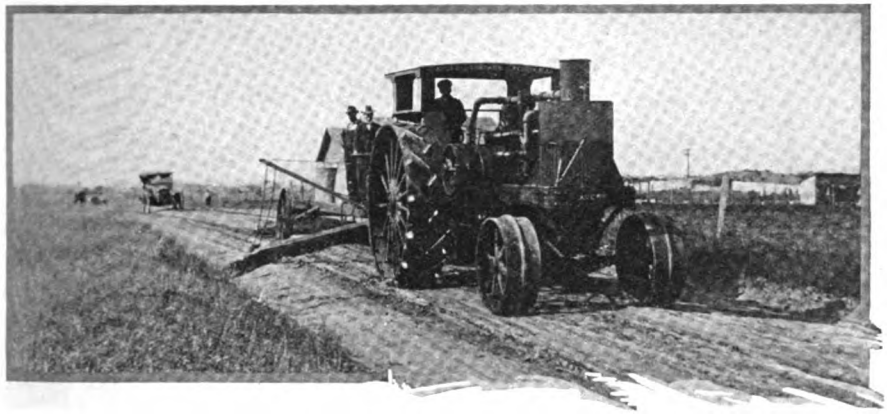
cess other than soldering do so. Welding, riveting. or the application of a patch or lap rivetted on, are preferable to soldering.

2.—If the parts must be soldered have the surfaces that are to be joined, absolutely clean and dry.

3.—Tin the parts to be joined while at a good heat and scrape off oxide film and at the same time apply a coating of solder to parts to be joined.

4.—Scrape or brush the molten solder with a steel scratch brush or the soldering tool so as to cause the solder to adhere thoroughly to the parts.

5.—After tinning the surfaces to be joined solder in the regular way



ROAD MAINTENANCE AND IMPROVEMENT IS EASY WORK FOR THE TRACTOR

bearing in mind that in the soldering of aluminum the solder will not flow readily into the joint as when soldering other metals.

6.—When soldering to any considerable depth it is good practice to press the cooling solder into place with a smooth hickory stick. This assists in securing a tight body of solder.

7.—In the actual soldering operation vaseline or paraffine may be used as a flux. There are other fluxes but these are the most easily obtainable and will be found efficient.

8.—A soldering tool of nickel will be found most suitable for aluminum work. The regular soldering cooper may be used but if considerable work is done on aluminum the nickel tool will be found best.

9.—Aluminum radiates heat very rapidly so that unless the pieces are well heated the parts to be tinned will cool the soldering iron as well the solder and thus prevent a good union between the aluminum surfaces and the solder.

10.—Workmanship has more to to do with the success of aluminum soldering than any other one thing. Unless the work is well and thoroughly done it had best be left undone. An aluminum joint that permits the entry of moisture will naturally be prone to oxidization and rapid deterioration.

An Emergency Repair on a Gear Case

J. B. CAMPBELL

Here is an emergency repair that we made in our shop some time ago. It may be well to explain that since we made this repair we have installed an oxy-acetylene outfit and we would now repair such a break somewhat differently. But this stunt will no doubt interest other readers and show what was done when at first thought it would appear as an impossible job.

The gear case had a hole punched in it as shown at A in the engraving. A nut had become lodged between one of the gears and the case wall with the result shown.

We had no oxy-acetylene torch at the time and the nearest one was miles away. We were really much puzled as to just what to do. We thought of reaming out the hole, threading it and then screwing in a plug, but the hole was too large. Finally we hit upon the simple stunt that proved successful.

We laid the case in a bed of well packed sand with the hole down as shown in the engraving at B. We then made a slight depression in the sand below the hole, brushed any remaining sand from the surface of the break and then we poured a quantity of babbitt metal into the hole and depression until it filled up the break. This left a small knob of babbitt metal on each of the hole thus wedging the hole shut and making it oil and grease tight. The operation is really much more simple than is indicated by this description and worked very successfully.

Selling Known and Unknown Accessories

JIM THORNTON

You have asked me to express my opinion regarding the selling of advertised and unadvertised accessories and supplies. I prefer to call them "known and unknown accessories," because after all, that is just exactly what it amounts to. The accessories and parts that are advertised are generally known products. The ones that are not advertised are generally unknown. Now to come to the point, I am going to tell you of an actual fact that happened not very long ago.

Art Williams was a salesman for one of the supply houses, from whom I have purchased for a great many years, and from whom I am still buying, although Art is no longer connected with this house. Well, Art got the idea that his house, a well-known. old established firm, was not sufficiently appreciative of his excellent services and Art accordingly went gunning for another job. He finally landed one, which he told me was going to make him rich within a couple of years. On the first trip around his circuit for the new house he called at my shop, all enthusiasm and as tickled as a kid with a new toy. It didn't take Art very long to get rid of what he had on his chest and then he began to sell his new proposition. Of course, his story was a long one, but it amounted to practically this:—

"Here's our proposition Jim—We are starting out in a big way, and have a fine line of goods that is simply going to clean up the market for certain lines of accessories. My house has planned on this policy for several years, and they have selected a line of specialties that are A No. 1 in their respective lines. Ordinarily, in order to put a thing of this kind over, it would take thousands of dollars in advertising to put it across with the competition that is in the field at the present time. However, here is our proposition—Instead of spending a lot of money in advertising, we are giving you fellows who sell the stuff for us all of this money in the shape of a big discount. In other words, instead

of giving you a little bit of a discount, that doesn't amount to a row of pins, we are giving you a great big slice of profit. We are also giving you a line of goods that cannot be equalled. This makes our line such a big money-maker that it is going to pay you time and time again to push our goods strongly. This, in turn will enable us to increase our output, and as our original figures allow for but a small margin of profit, we will get ours in quantity production. The result is we make our profit, you get your goodly share, and there is not a great big bunch of money spent in a lot of red ink and white paper." And then Art ended up with the mistaken idea, that he knew he could count upon my co-operation.

What I told Art Williams in reply to this solicitation will perhaps be the best possible article I can give you on the selling of known and unknown accessories. And this is what I told Art Williams:—

"Your talk sounds fine. It lends itself well to fine phrazes, rolls off of the tongue very smoothly, and is no doubt very convincing to the man who lacks experience or who knows little or nothing about modern sales methods, but let me tell you something right straight-from the shoulder—

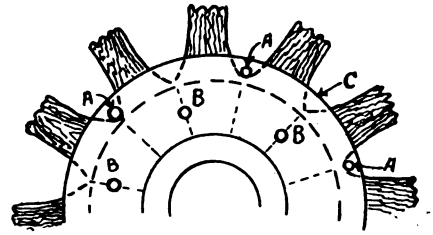
"In the first place, if I hadn't known you for so long Art, I would have stopped you in about the first quarter of your discourse, and have invited you to take the air, but you are too good a friend of mine, and also you are too good a salesman to permit me to lose this opportunity to give you some real advice that is going to save you a lot of time and money in the future.

"In the second place, the firm whom you now represent is absolutely unknown to me. I also will bet you a new hat against a doughnut that you didn't know of them previous to your negotiations to land a selling job with them. Just consider this Art, and ask yourself how many of the shop owners upon you have already called, have ever told you they heard of the firm before you called upon them. I bet you another hat that not one of them ever heard of your firm before.

"After turning that over in your mind, just think of how many of their brands are known. Just go out along the road there and ask the first ten autoists that come along how many of them ever heard of your spark plug for example, or your timer, or any of the other items that you are selling. I'll guarantee that not one of them ever heard about the stuff that you are so enthusiastic about."

At this point, Art attempted to interrupt in an evident endeavor to explain again his wonderful proposition but I insisted that he calm himself and let me finish.

"Now let me tell you something Art. In the early days back when



AN AUSTRALIAN SUGGESTS AN EXTRA FLANGE ON SARVEN HUBS

I opened up shop myself when I was everything from shop kid to proprietor, a talk like you just tried to hand me used to appeal to be. In those days when I began handling what was then called sidelines I was looking for an axle grease that I could sell at a profit. I hadn't given the subject much thought before a fine smooth talker came along, and handed me such a talk as you have just handed out.

"Of course, in those days, as I say, I was just getting started. But I have now cut my eye teeth on a number of so-called shelf warmers and I still had a box of that axle grease up there on the shelf. I keep it simply as a reminder of how I was taken in on a number of things in those early days.

"It is all very well Art to talk about the profits to be made on goods that are not advertised, and it is fine to speak of the charitable inclinations of such manufacturers to turn over to the dealer the great big appropriation which would otherwise be spent for advertising if they did not offer the dealer such a great big discount, but what I keep in mind at all times, is that when axle grease is packed one dozen cans to the box, my profit on that case of axle grease does not begin to accumulate until at least nine of them have been sold. You can talk all you want to about making a profit of twenty cents on each 25-cent can of axle grease, but if I cannot sell enough cans of the darn stuff to first pay for the entire case, I will never see any profit. The same thing applies to spark plugs, timers, carburetors, radiators, and parts for Fords.

"I have made it a firm and iron-bound rule, to never do business with a manufacturer who does not advertise in some way. If your firm hasn't the confidence in its own goods to place them intelligently before the buying public, and before the dealer who is going to sell them, then I certainly don't want to have anything to do with the goods.

"On the other hand Art, suppose your firm announced its line in my trade paper, and they told me something of the quality of their goods in that way. How much time do you suppose you would need to waste here in trying to tell me what a wonderful line of goods you sold, and what a wonderful proposition you had to offer me.

"The trouble is Art, you have been selling to men who have sold to the general public, and you haven't had any experience in supplying the demands or the needs of the public direct, otherwise you would not take any stock in the talk you have been handing out. And just to prove to you that what I say is true, the next time you go into a drug sore, ask the salesman what toothbrush, talcum powder, shaving soap, or any other item is most popular. If it isn't the one that is most advertised, I'll give you another hat. And to further prove to you that I am correct, just ask yourself what hat you buy when you go into get a real good hat, or what shoes you wear. And then just to make the demonstration absolutely fool proof, when you get home at the end of the week, ask the wife what brand of flour she uses, what kind of raisins she buys, or what brand of extract she uses when she bakes your favorite cake.

"Understand, I don't mean to say that there is not some selling of un-advertised products, but they are exceptions and the sales of advertised products are so far in excess that every argument is in favor of the well-advertised goods.

"Just remember this, that in every sale whether it is an entire navy of obsolete hulks, or a spark plug, there is a certain amount of sales resistance; that is, that there is a certain amount of resistance in the person of the purchaser that must be overcome. Anything that lessens this sales resistance de-

creases selling expense, and makesrivets. Others believe in taking selling just that much easier. Ad-out all the rivets, putting in the vertising is one of the greatestspokes, and then in drawing the factors in overcoming sales resis-flanges down with new rivets. Any tance, that has yet been discover-practical repair man who has given ed. the subject any thought whatever,

"And, now to show you that Imust agree that a good wheel can-am a believer in taking my ownnot be made by notching the spokes medicine, I will bet you anotherand driving them past the rivets. hat, that you cannot find in theOn the otherhand, when you realize flange tight. New rivets that fit the hole snugly, are the only ones that should be used. With these rivets securely in place, half of the wheel is now filled.

Now remove the other four rivets and repeat the above operation. If the end of each spoke is dipped into the hot glue, just before driving, and the glue is good and hot all of

WHEN ITS SEEDING TIME

entire line of accessories and specialities that we sell here, one single item that is not known to you and well advertised."

Of course I do not as a rule preach quite so long to the salesmen that call upon me, but Art Williams is still an old friend, but I am glad to say he is no longer trying to sell a line of unadvertised specialties and accessories.

Repairing Sarven Wheels

There have been quite a number of articles in the columns of "Our Journal" on the subject of repairing Sarven wheels, and there seems to be a very considerable difference in the opinion of the correct method of respoking and filling these hubs. Some repair man in notch the spokes and drive them past the that the flanges on a Sarven wheel have been pressed down by means of hydraulic pressure, you will know that it is almost impossible to draw the flanges down as they should be if all of the rivets are removed. Of course, naturally all of the flanges will spring away from the spokes when the old rivets are taken out.

It would therefore seem to be good practice, and certainly most sensible, to compromise between the two methods mentioned above. Remove every other rivet, thus leaving four to hold the flanges. The eight spokes adjoining those rivets are then removed, and replaced with new spokes which have been dipped into hot glue. The new spokes are now drilled for new rivets, an the new rivets drawn up solidly, gradually drawing the the time, the result will be a Sarven hub that is every bit as good as when taken from the factory.

Of course there is considerably more to the job than is explained here. For example, the first step of removing the first four rivets is carefully done, and then the old spokes should be carefully removed, and then every particle of the old spokes taken out of the hub. A good job of filling the Sarven hub cannot be made by a careless workmen. The riveting of the new rivets should not be done as though one were building a bridge. The rivets should be carefully but firmly drawn up. If the heads of the rivets are placed on the anvil, you can make a very neat job of riveting the other end. The wheel must of course be allowed to set firmly before the wheel is put into use.

Another Method

For the building of Sarven wheels, or for the filling of a Sarven hub, another practical wheelwright suggests the following method:—

First; make sure that you have the proper sized spokes. When you have ascertained this remove all of the rivets in the hub and all of the old spokes. Now drive your new spokes in fish glue, drill the holes for the hub rivet and set the hub to one side until the next day. This will give the glue a chance to set. The next day put on your rim leaving an opening of 1/16 inch and put on your tires and give the rim two turns in boiling linseed oil. After this has been done, rivet up the hub, put on your tires, and you will have a job that will not become loose the first warm day.

An Australian Suggestion

Another method of repairing the Sarven hub is suggested by an Australian wheelwright:

"From my experience with the Sarven hub, I am of the opinion that the metal flange generally used is not large enough. If it were of a larger diameter so as to come up about 1¼ inch farther up on the spoke, and rivets put in between the spokes, it would be far better for the work they are expected to do. I only give these wheels a little tightening when I repair them, is to place an extra flange on each side of the flange found on the wheel, and I do this by removing every second rivet. I then drill the new flanges which are 2¼ by 3/16 inch band iron, and put them into place on each side of the flange. I then put a rivet between each pair of spokes where rivets are not regularly placed, and just above the shoulder of the spokes, you will note that if the hub is well riveted, that the spokes are not so likely to become loose, and if the spokes are dipped in good glue and are of the proper size, this wheel will hold, while the best factory-made hubs are giving way. In the engraving, (A) represents the extra rivet placed between the spokes and above the shoulder, while (B) represents the regular rivet as placed regularly in the Sarven hub, and (C) represents the extra flange or band, placed over the regular flange at the hub.

Shoeing the Colt and the Care of Its Feet

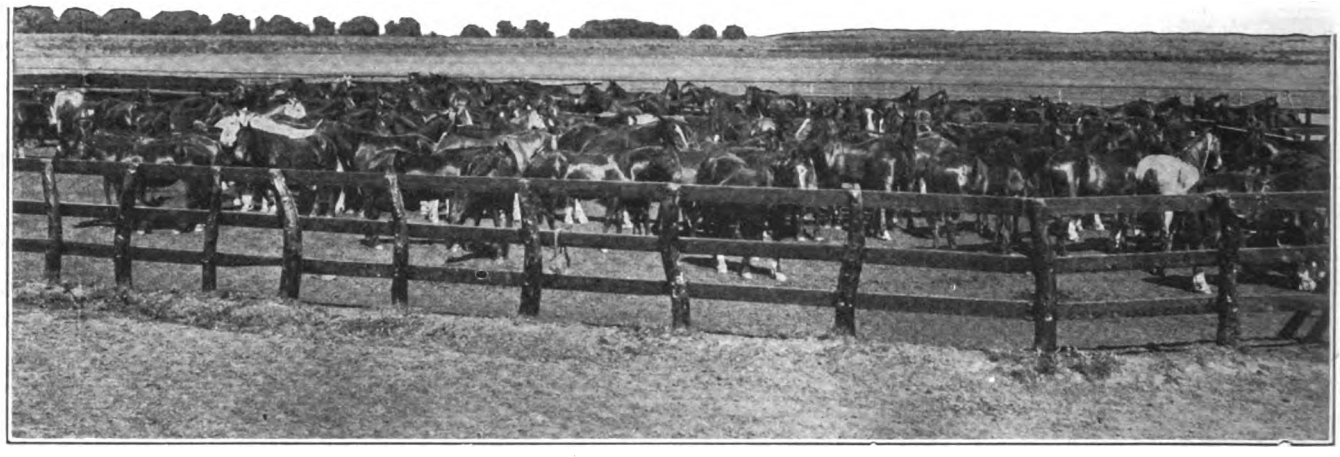
Editor's Note—The first part of this article appeared in the June Issue.

Hard Frog Unnatural

An animal will go lame if it steps on a pebble or a rock, especially if the sole, bars and frog have been excessively pared out. A frog that has been trimmed to the extent of robbing it of its natural function and in such a manner that it is forever kept off the ground will dry up and become as hard as a piece of stone. Most horsemen will admit that a stone will bruise a foot, but it is difficult for some to realize that a wired up frog is just as hard as a stone. The fact of the matter is they both do the same damage to the foot, with this slight difference, the stone acts on the sole, only, whereas the frog acts upon the sensitive structures that underlie it— the fatty frog, the preforans tendon (where it runs over the navicular bone to find its attachment on the semilunar ridge of the coffin bone), and above this the navicular bone. Can the frog protect those parts when it is robbed of the power to do so? Hardly.

"No foot—no horse," "No frog—no foot" are two true sayings; consequently, we must consider the frog as a link in the chain. In order to have a perfect working animal, all parts must work in unison. If even the most insignificant structure is out of order we are in trouble—the chain will have a weak link, and it matters not how powerful, speedy or game an animal is, when the crucial test arrives the entire structure will be no stronger than it weakest link or organ.

We hate to be told the truth. We do not like to have the little things that go to build the large ones drilled into us; and the majority of horsemen upon reading the above will say: "We know that much ourselves." Certainly you do—but it's the things we know the most about of which we grow careless. We are too anxious to learn something new; consequently, forget the old and fundamental principles of our work. For instance, if a horse becomes lame, it matters not where, we look for something to cure the lameness—a hot iron or a liniment that may be still hotter. We do not undestand the action of them, but they are the things we invariably go after; instead of looking after the little things, the things we understand and the things that are direct cause of our troubles. And if any one should endeavor to explain them to us we would exclaim. "Why, I know that much myself" Certainly you do, but why don't you use your knowledge before you are in trouble?



THE HORSE WHEN PUT TO THE TEST IS NO BETTER THAN HIS FEET

Changes in the Colt's Gait

The changes that take place in a colt's gait after being shod are due in a great measure to the abnormal changes that the structure of the foot often undergoes; changes that are not due to the ignorance of the persons in charge as much as to carelessness. In a natural foot the sole is perfectly flat. The frog, the bars and the sole all have an equal bearing upon the ground. If we take off just enough of the wall to

get a level bearing surface for the shoe and then apply a thin strip of steel (the thickness not to exceed the amount of wall we have taken off) we will shoe according to nature or as near as possible to nature. Of course it is understood that the bars, sole and frog are to be left intact. The following is, however, the general procedure: the sole is carved out, the bars are cut out and the frog is cut away and shaped up. Then a shoe is applied that is usually from a quarter to a half inch thick. The moment this shoe is applied, the sole, frog and bars are robbed of their functions as weight-carriers and concussion-destroyers. They dry out and become atrophied and as hard as a stone. The colt is worked, and goes well for the time being, but after a few weeks he shows signs of going rather short-gaited, does not extend himself as he should or as he did when first Again he is taken to the shop. We all know what the orders are: "Do not take a thing off of his feet and apply a heavier shoe"—a thicker shoe—in the effort to improve the action. In this manner the frog and sole are still further elevated from the ground with which nature intended they should come into contact at every step. After this change we have in rapid succession the dropping in of the quarters and contraction of the feet; followed by corns and quartercracks; and the foundation is laid for that dreaded of all foot troubles, navicular disease. When the hard, atrophied frog comes in contact with a stone or a rock, and the sensitive structures that it is supposed to protect with its rubber-like elasticity are bruised, then there will loom up in the near future a bloodshot sole, a bruised tendon or navicular disease.

Natural Dressed Foot

When the foot is dressed in the proper manner, and after it is shod receives the proper attention and care, it is essential to keep soft and pliable. It will be found that one half of the weight usually applied is necessary to balance a colt.

Now this may seem a broad statement to make, but it is a fact, as I have discovered during twenty years' work with the light-harness horse. Considerable of that time was spent shoeing colts and taking care of their feet on some of the most prominent stock farms of this country. What I say is not theory, but fact; as the average horseman or horseshoer is well aware. We all know better, but often overlook the small details, always looking for large causes. Instead of getting at the seat of the trouble and removing it, many entirely overlook the real cause in their endeavor to correct the gait with new fangled shoe, toe weights, pads, bits, straps and the like.

Queries Answers Notes

Books Out of Print:—Can you inform me where I can get a copy of The Blacksmiths Guide, written by J. F. Sallows?

In Reply:—The book "The Blacksmith's Guide" written by Mr. J. F. Sallows is now out of print.

Subscriber's Service.

Oxy-acetylene Plant Freezing:—I recently purchased an oxy-acetylene plant and welding and cutting outfit and would like to know how to keep the plant from freezing up in the winter. Can some reader who has a plant of this kind tell me how to take care of it in the winter? I will greatly appreciate any hints and suggestions any reader may give me.

H. C. D., Iowa.

Wants Speed Calculations:—I have been looking through the old numbers to find a table showing how to find different speeds of shaftings, as it goes through different pulleys and find none. Can you help me.

L. F. Crafts, New York.

In Reply:—A chart which will give practically any speed calcuation needed in figuring for power pulleys beside giving pulley sizes was published on page 82 of the December issue of 1920.

Subscriber's Service.

Welding a Broken Sledge:—Here is a kink that may benefit some of the readers of "Our Journal" when they have a like accident. While my helper was striking with a 12 lb. sledge hammer, it broke squarely in two, as shown at A in the engraving. I made a clamp as shown at B, made a good clean fire and welded it as follows:—I used borax for a flux, and iron drillings for a filler. When it came to a welding heat, I upset it in the fire after partly welding it and then discarded the clamp. I then had a good chance to draw to a goow welding heat and welded it on the anvil. I then straightened it and dressed the hole with a dresser pin. I then finished it up and it is now a good as ever.

Morgan Jenkins, Iowa.

Filling Sarven Hubs—Smith and Auto Work:—I would like to find out through "Our Paper" the right way to spoke Sarven buggy and wagon hubs, or the hub with rivets in it. I have trouble with the spokes coming loose.

I surely enjoy reading The American Blacksmith, Auto & Tractor Shop. I am paying more attention to the blacksmith end of the business than I am to the auto end, for I am getting just as much per hour for smith work. Nobody is learning the smithing trade in this country, as it seems as if everybody thinks there is nothing to work on but a car, so I just turn my attention to the neglected craft, and am getting more than I can do.

J. E. Winstead, North Carolina.

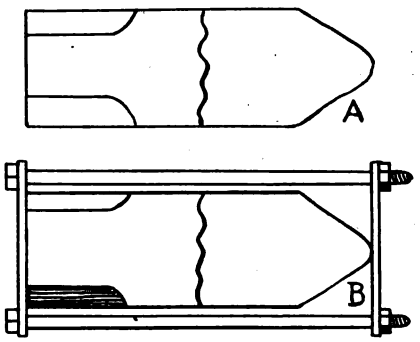
In Reply:—An article on filling and repairing Sarvein hubs will be found elsewhere in this issue. This work if done correctly will stand up as well as the new wheel. Subscriber's Service.

From a Charter Subcriber:—I am sending check to pay my subscription, and also to pay for one year for a new subscriber for which kindly extend my time six months as per your offer.

I have taken and read every issue of the American Blacksmith, as your records will show since Vol. 1 No. 1. I could not suggest anything to make it better. I have been working at the trade over 40 years, and I have received many times the price of the paper. I will write you a description of my outfit some of these days. We get good prices for all work here as blacksmiths are very scarce in this locality. You can hardly get a man who can do general farm blacksmithing, and no young fellows are learning at all. I sometimes wonder who will look after our business in a few years.

J. H. Keeney, Nebraska.

Editor's Note:—Here is another subscriber who has taken advantage of that six months free subscription. Mr. Keeney has been a subscriber of "Our Journal" ever since the beginning and seems to consider it a very necessary part of his equipment. We are proud of the great every issue" as Mr. peeney has.
every issue" as Mr. Keeney has.



WELDING A BROKEN SLEDGE

Seedy Toe:—This is a condition of the wall usually found at the toe, but not uncommon at the quarters. It is not common in hind feet, but occurs sometimes. When the shoe is removed, a separation is noticed between the sole and the wall, this sparation may extend up the wall nearly to the coronet. As a rule, the space so formed is a narrow one, but it may be wide enough to admit three fingers of a man's hand. Probably all seedy toes result from injury or disease of the coronany band, from which the wall grows and the first appearance is not a cavity, but a changed and softened horn, which may be dry and crumbly, or moist and cheesy. The diseased horn may be scraped out and the cavity filled with tar and tow. The wall bounding the cavity should be relieved of all pressure on the shoe, and if a radical cure is desired, all the unattached wall should be cut away. This however, should be done under veterinary guidance.

Ralph Jones, England.

An Iowa Shop and Prices:—This is the first time I have ever written and I want to tell you that I would not like to part with "Our Journal."

We are located in a town here in Iowa of about 1500 population. We have one competitor who likes to cut prices, but we do not pay much attention to him, as we set our own prices. We do all kinds of repair work in the line of wood work, plows, cultivators, mowers, binder repairing, and all kinds of auto repair and horseshoeing. The tools we have in our shop are two forges, two anvils, two grinding and polishing stands, a lawn mower, sharpener, a disc sharpener, a circle saw, a grindstone, a cold tire setter, an electric drill, a drill press, a power hammer, and a Smith's Oxy-Acetylene plant, which we installed a month ago. We like it first rate.

As I was reading in "Our Journal", I see that Mr. Bartischu of Arkansas, would like to know how to harden plow shares. We use the soft center plow shares here and to harden them, we heat to a cherry red, then take some salt and sprinkle on the share. We then dip in a barrel of soft water with point downward, and we get the best results. Here is a list of some of our prices:

Shoeing, new, each	$1.00
Shoeing, resetting, each	.40
Reaches, each	1.25
Axels	8.00
Tire setting, Wagon or Buggy	3.00
Sharpen Plow Shares	.90
Plow shares Pointed	2.50
Sharpen disc, each	.22
Sharpen coulters	.75

Othr work at 75c per hour.

H. C. De Groat, Iowa.

Wants Prices for Spring Work:—Can some of the boys tell me how I can temper auto springs in the blacksmith shop. Now all I have to heat the spring with is charcoal, but would like to know how to temper them, and what the boys charge for this work.

Herman Lambrecht, Illinois.

Editor's Note:—Will some of "Our Folks" who are doing automobile spring work send their ideas to the Editor. Spring work is a most important diversion with the great majority of our readers and while a number of articles have already appeared in our columns on the subject, we would like to publish a composite article by readers on their experiences and with reference to prices. Jot down your price list now with your spring work ideas and send them in for publication.

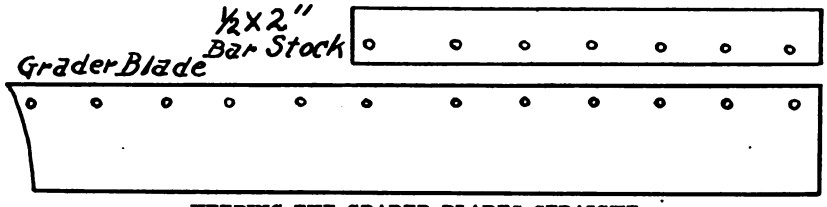
To Keep Grader Blades Straight:—I thought I would drop you a line to let you know that I still read the paper and am glad of it. Business is good this spring. There has been more repair work this pring than I have seen in nine years.

In last month's paper some brother asked how to keep grader blades from warping. I have had quite a lot of that kind of work to do and this is how I keep them straight.

Take a piece of ½by 2-inch flat stock cut it so it will be a little longer than half the blade. The blades are different engths, so be sure you have the stock long enough for the longest blade yau handle and it will work for all of them. After you cut the stock the ength you want it, lay it on the back of the blade and for every hole in the blade, put one in the bar the size of the holes in the blade, and then bolt your bar to the back of the blade and tight and your blades will not warp to amount to anything.

When you sharpen half the blade, let it cool a while, and then take off your bar and put it on the other end and sharpen it the same way. I let the helper hold the blade on the anvil, and take a sledge and sharpen the blade. I get 75 cents per foot for sharpening them.

I remember some time ago a brother



KEEPING THE GRADER BLADES STRAIGHT

ing. I have had quite a lot of that kind up in the country wrote "Our Paper" about being called a "profiteer" for charging that price. Will say that during the fall of 1920, I was called everything from a sissy to a robber for the same thing, but still they would bring them just the same.

Clint Gilland, Arkansas.

Wants Prices on Automobile Work:—I am just getting into the automobile repair end and am feeling my way along. So far I am convinced that it means good money and profit for me, but as I find it rather difficult to get at the prices that are proper for this work I would like some of the brothers to help me.

For general time work I am charging 75 cents an hour exclusive of material of course. But some times a car owner wants a flat charge or price on a job. Of course new customers or transcients want a flat price. Generally I charge for the usual work on the following basis:—

Carbon burning (4 cylinders)	$3.00
6 cylinders	4.50
Oiling and greasing	2.00
Clean Drip pan	.50
Cleaning engine	.50

Grinding valves from $1.00 to $2.00 per cylinder depending upon amount of work.

How does this line up with the prices of other brothers in this branch of the trade? I am inclined to think that my prices are very fair. I don't think they are high—but I do want them right. On time work I of course charge more than 75 cents an hour when the work is done after regular shop hours, and if called away from shop.

Will some of the boys let me know what they think of these prices and what they are charging? J. G. H.—Illinois.

..**A Self-Made Smith:**—I am a new subscriber, and frankly speaking, am young at the trade. I like to read the splendid articles being printed in "Our Paper". I have only been following the trade for about 20 months, and love the work. I will say that I do not think a person should take up the trade by himself, until he has had at least five or six years experience at the forge. I speak from experience. I would not have been at the trade under my own name at the present time, if two other fellows had played fair with me. I decided that I wanted to learn the trade. A good smith, but a trader with it, induced me to buy a half interest with him, and I finally decided I would and did buy a half interest with him. I put my whole interest into my work, and learned fast. Then the smith seeing how fast I was learning decided that he would sell his half. I, not knowing who he might sell to, found another man whom I thought I could trust and I bought the whole thing. I then let the new man have half of the business.

I found out in a day or so, that the first partner I had did not want to quit at all as he told me he did, but that he only sold out to me thinking I would despair and when I got ready to quit he could buy back the tools and materials at about half what I had paid him for them. He had worked this same trick before, so people told me after it was too late and after I had gone into partnership with him. Partner number two prooved to be a drone and in April 1921 I took over the whole business. As I had by this time learned to make a good weld and to shoe the ordinary run of horses pretty well I moved to my present location. I have moved twice since the sad experience with my first partner and since coming here I have a good horseshoeing trade established, and can repair most anything that comes under common blacksmithiny. My work is giving good satisfaction and I am getting all the work I can do.

I attribute my success to putting my whole mind and strength into my work, not letting anything pass without trying my very best to repair it, have never failed yet, which is saying a good deal.

When I began, I had never welded a piece of iron, nor driven a horseshoe nail, but after I had decided on blacksmithing, and those other fellows treated me as they did, I determined that I would learn the trade. Therefore by determination, I have succeeded to a marked extent.

I have gotten to a point where I can repair wagons and buggies so they give satisfaction, do some auto work, handle kinds of repairs, so I think from sheer force of will, I have succeeded pretty well. But as I said before, I speak from experience. A man should not start out without five or six years experience, for if he does, he sure has a hard fight to make if he wants to give satisfaction and hold his trade. I surely would not have attempted success in the trade without experience if it hadn't been for the two men with whom I tied up. The second man I picked did not know any more than I had already learned and so I was compelled to start in without any more experience than I had, for mysef. I was afraid to try anyone else for fear they would be like the other two.

Geo. W. Townsend, Kentucky.

VOLUME 21 NUMBER 8

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

AUGUST, 1922

BUFFALO, N. Y., U. S. A.

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Correspondence solicited on all subjects connected with auto, truck and tractor work, blacksmithing and general repairing. Always give name and address when writing.

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There are many unauthorized agents and unscrupulous collectors representing themselves as agents, and collectors for American Blacksmith, Auto & Tractor Shop, and we warn every one of our readers against them. Under no circumstances give money to any agent who is unknown to you. It is a very simple matter to send money order, check or stamps direct to Buffalo, and it is always best to send your order and remittance direct.

Contents August 1922

The Spirit of Our Journal

Here is a letter from far away New Zealand that tells of the spirit of "Our Journal" better than any collection of words that could be gleaned from the pen of even a master of language:

"I am going to drop you a few lines for the first time, and I hope that the reading of them will give you as much pleasure as the writing does me. I have often received letters from you and I have appreciated them. We live a long way apart but through the medium of our valuable paper I feel as if I were a friend of yours.

"I am sending you a money order to pay my subscription for a considerable period and also for two new subscribers. I am glad to be able to send you these new friends and think I can locate another one or two."

This is a true demonstration of "The Spirit of Our Journal". It is an accurate picture of just how we want "Our Folks" to feel about "Our Journal". It is the spirit that we want "Our Folks" to display towards us. We want to feel that we are friends of theirs. We want to co-operate—to help and to work together with "Our Folks".

And—then we want "Our Folks" to co-operate with us in making the craft a better craft—in making the men in it better men—in helping to raise and to elevate the craft to an ever higher plane.

And so we want you to read and re-read the above letter from David Williams of New Zealand—Get the spirit of this letter—if you haven't the spirit now.

LOOK ON YOUR WRAPPER

It has taken some time to complete the system but you will now find the expiration date of your subscription printed on your wrapper. This is another effort to save time, trouble and inconvenience for "Our Folks". No longer is it necessary for any member of the "Family" to write in to ask about his subscription. Just "Look on your Wrapper." We're going to make that one of the mottos of the „Family", and in our present campaign to have every member of the "Family" paid-up in advance it will help if you will "Look on Your Wrapper."

And speaking of members paying up in advance reminds us to tell of a recent happening. Some of "Our Folks" had forgotten their subscriptions had expired and so we sent them a reminder. The other morning, when we made the test forty-eight of them sent in their renewals and of that forty-eight ten sent in remitances of two dollars each, seven sent three dollars each and four sent five dollars each. AND—here is the point—everyone of them had been sent memorandums for but one dollar.

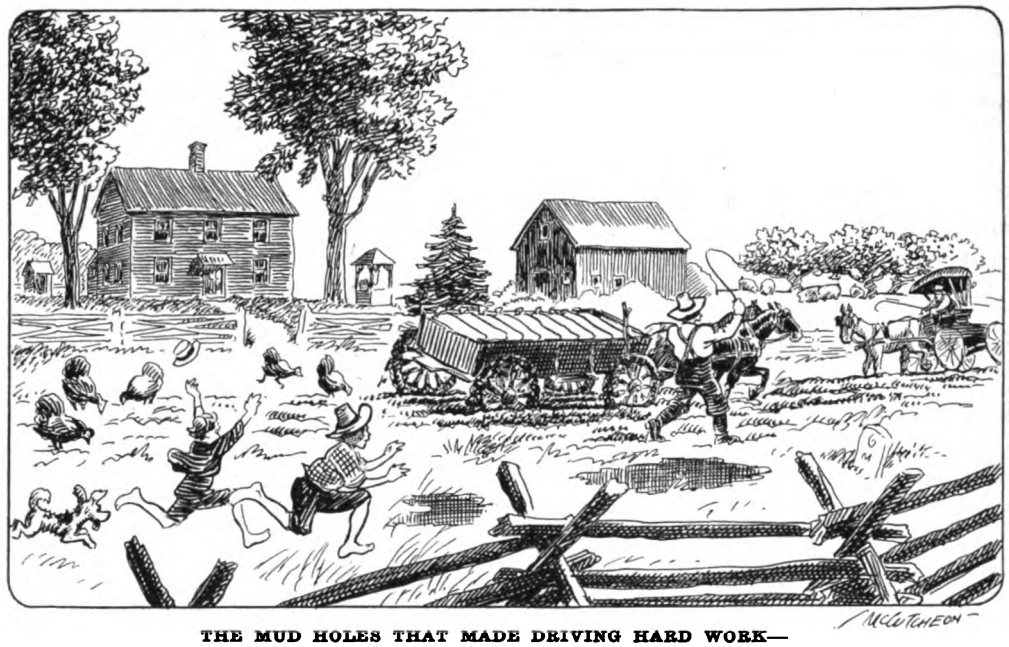
Isn't that a pretty good demonstration of how readers value "Our Journal?" Could anyone give you a more convincing proof that "Our Journal" is filling the bill? Seems to us it tells more convincingly what "Our Folks" think of "Our Journal" than anything they could possibly say.

WATCH OUT FOLKS!

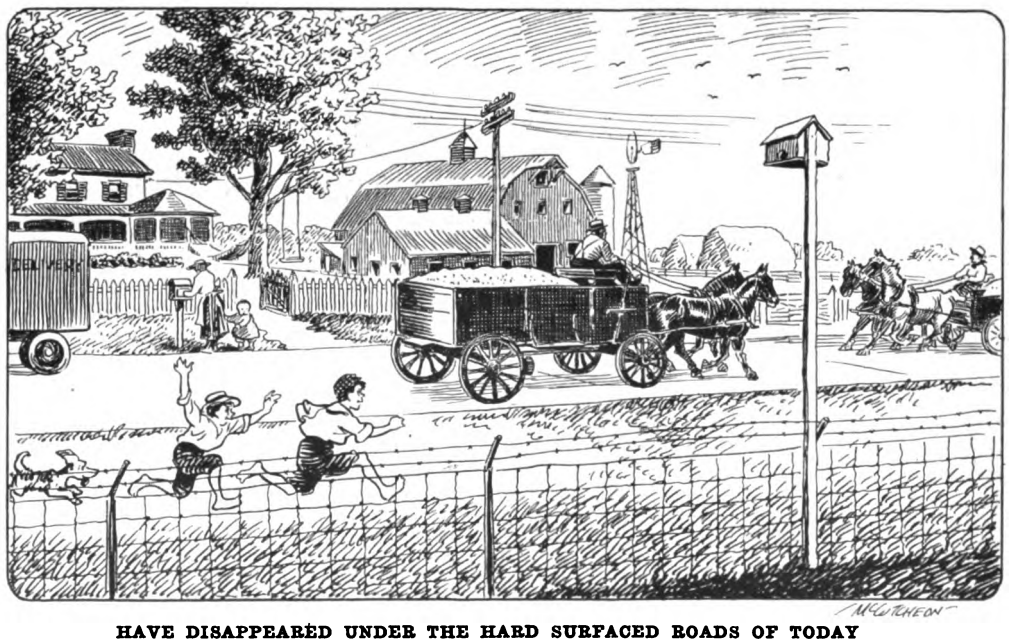
The "Subscription Fakers" are still busy. They usually work hard at their game during the summer and reports of their activities keep pouring in. Watch out for these smooth tongued individuals. Keep a tight grip on your wallet while they are about and then send your money direct to Buffalo. Don't give money to a stranger no matter what he tells you, or what "credentials" he shows. It is easy and best to send a money order, check or stamps direct to Buffalo.

"The Changing World"

By John T. McCutcheon



THE MUD HOLES THAT MADE DRIVING HARD WORK—



HAVE DISAPPEARED UNDER THE HARD SURFACED ROADS OF TODAY

This is the second of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

The Dollar Service of David Smith

LOUIS WELLER

David Smith was a "down and outer" on his own confession. His story reads like fiction. But the "David Smith" in Mr. Weller's tale is in actual life the owner and proprietor of a service shop in one of the Eastern States. Competition came very near to closing the doors of his shop. Active brain work enabled him to plan a service that put him on the road to success. The story of David Smith is filled with business building suggestions.

The first time I met David Smith was several summers ago while touring down through one of the East Coast states. Some little adjustment was necessary on the car I was driving and naturally I stopped at the first shop which appeared as offering possible help. It happened to be the shop of David Smith and as I attempt to tell the story of "Dollar Dave" I can still picture that old shop sign;—it read "David Smith, Blacksmith and General Repairing."

The shop appeared as though it had been built shortly after Noah landed. In fact, some of the wood which went to make up the shop appeared as though it may have been used in the original ark of long ago.

As I stopped at the shop the proprietor none other than our hero, David Smith did not appear overbusy as he sat in his well-worn armchair tilted at an easy angle against the frame of the doorway with Dave himself thoroughly at ease and at rest in the chair.

There was no effort upon Dave's part to start the conversation when we stopped, so we had to toot the horn several times before he finally woke up and asked us in a rather surprised way: "What do you want?"

When we responded that we desired a little service help if we could get it, the only response from the armchair was "What seems to be wrong with your bus?"

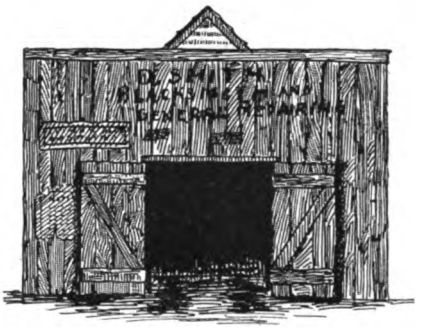
"We don't know. That's why we stopped here. Thought perhaps you would tell us. The motor is skipping, will you have a look at it?"

At this point, there was a grumbling from the direction of the armchair, and finally Dave shuffled over to our car, and lifted the hood over the engine.

Whatever may have been my thoughts in connection with my introduction to Dave Smith were quickly dispelled when I observed the speed, confidence and systematic thoroughness with which he went over the engine connections in order to determine just why that motor was skipping. It is immaterial this time just exactly what the trouble was but the fact remains that he quickly found the difficulty, and almost as quickly remedied the trouble.

My natural impulse was to get away and along on my trip as soon as possible but with the excuse of desiring a drink of water I alighted and entered the shop. He followed quickly after pocketing the small sum asked for his services, and while securing my drink, it was not difficult to get into conversation with the man.

I learned that he had been in business at this point for many years having taken over the business from his father, who while not getting rich had always been able to make sufficient money to properly take care of and bring up a big family of sturdy youngsters. Dave was the only one who took a liking to the blacksmith trade, and he continued on in the same shop. At first, as he told his story, how in order to take care of the fine trade he inherited from his father, he continued to employ the two men who had assisted his father for many years. During recent years however he found it impossible to keep them busy and for the past three or four seasons he had hardly made enough except through the busy spring and fall season to meet expenses.



"I CAN STILL PICTURE THAT OLD SHOP"

"I'm thinking most seriously of chucking the whole thing." He continued in telling me the story.—"There is hardly enough work during the great majority of the time, to keep me busy for more than a couple of hours a day."

"You see it's this way:—I have had a very thorough and practical training in blacksmith and horseshoeing. I worked with and for my father enough to have him teach me pretty near everything he possibly could in that line. Before the coming of the auto, I had the reputation of being the best blacksmith in this entire section of the state. When he turned the shop over to me, he turned it over with a good trade in both horseshoeing and general blacksmithing. I, with the help of the two men who had worked for him for many years, kept busy pretty much all of the time in taking care of all kinds of work. When the auto came and the horseshoeing dropped away, the wagon and carriage work also diminished in considerable volume. I attempted to do automobile repair work, but for some reason or other, never got enough of it to make up for the business in the other lines which had been lost. Business is falling away every day, and it has almost reached the point now where I will have to close shop, and hike for a job some where else or starve to death. There surely seems little likelyhood of my being able to make a go of it here, although I hate to meet defeat, I have pretty nearly made up my mind that the proposition here is absolutely hopeless."

I of course attempted to cheer the man as best as I could, but I had to admit that in the final analysis, it looked pretty dark for Dave Smith and his smithing shop. However, I did relieve myself of several warm remarks regarding any man who would give in to defeat so easily.

"Look here man, you don't appear to be sick, you haven't a

broken arm or leg. You haven't been gassed, you're lungs seem to be in good condition. You got broad shoulders, a strong back and good health is peeking out from all over your entire frame, and if I can read signs correctly, you have a good little wife who has all the faith in the world in you, perhaps there is a kiddie or two who looks eagerly for your coming at night.

"I SPIED AN OLD ODD SIGN DEAD AHEAD OVER A REPAIR SHOP AT A FAMILIAR CROSS ROADS"

What are they going to say when you lay down your hammer and sledge and raise the white flag? That isn't the kind of stuff that won the war. The boys that went to France didn't go pale in the gills when the first column of the enemy rushed across No-Man's Land. You got to fight man, and a fight to the last ditch is a solution to your problem, just as there is to every other problem that was ever put up to a man with health and his full faculties."

And I reeled off several yards of success bromides along the same general strain, and when I had to stop for breath, Dave broke in with "Yes, Yes, that is all very well. I have read the same books, I know all about the lines of chatter these success hounds hand out to their willing listeners. I tell you it is not a case for the preaching of a success hound whose motto or slogan is: "Successful thoughts are the key to success." This shop here, and the condition I am experiencing right now and have gone through for the last three seasons is an actual fact and not a story in a book or magazine. I cannot shoe the horses that have been taken off the farms around in this section. I can't repair the family carriages of the farmers who have replaced them with automobiles. Joe Rainey who runs the general store down the road, now has a little Ford truck—he used to have two horses. His little Ford truck comes in here once in a while for repairs of some kind, but that kind of work won't keep my youngsters in Sunday shoes. It is all very well to tell me what I ought to do, but until I get real suggestions—something that is actually going to work, and something that is actually going to solve the problem I am down and out. There is not a success slogan in all the books that were ever written that will turn trade to making a beaten path to this shop."

It is hardly necessary for me to say that this man was not in a very cheerful frame of mind, and I could not see that I could be of much help to him. But when I did go I departed with the remark—"Well, Dave, don't give up the fight."

* * *

The next time I came across Dave Smith, two summers and two winters had passed into eternity and I had almost forgotten the little incident related above. The season was early spring, and I was on my way on one of the well-known eastern auto trails when at a cross road that looked strangely familiar I spied an odd sign dead ahead and over a repair shop. It had an atmosphere of hustle and bustle about it. There were three or four cars in the parking space at one side and as I stopped a man evidently the proprietor hustled right out to the edge of the road to inquire if there was anything he could do for me. I was about to say no when I recognized Dave Smith of two years before.

"Hello! Dave" was my greeting upon recognizing my questioner "How is the old grouch today?" and I laughed as I opened the door to dismount.

"Fit as a fiddle", was Dave's cheerful and enthusiastic response. "How is the success hound"? and with this happy renewal of acquaintanceship we were soon in the depths of Dave's story, and this is just as he told it to me:—

"No, I am not simply working here as a helper" began Dave in telling his story. "I am the owner and proprietor and high mogul of the entire works. If you have time I'd like to tell you the whole story. It is about two years ago that you were here on this very spot, and found one of the most discouraged men in the entire world, and I was certainly sincerely discouraged. I did not suppose for one-half minute that there was any way out of my difficulty. I did not tell you so at the time but the shop was then laboring under so heavy a debt that it was falling apart. While I made some very cutting remarks regarding your chatter on success and similar topics, at the same time, your last remark in leaving, when you said 'Don't give up the fight' certainly set me on my feet and five minutes after you left here, I had closed up the shop, and was talking to the wife and laying the whole proposition before her. I had not taken her into my confidence regarding the way business was going, but she of course suspected that something was wrong. In an attempt to keep things going, I borrowed money on everything that I could possibly raise money on, and when I told her the whole story, she said:—just like the little brick that she proved to be; 'there must be some way out', the same as you said that same afternoon.

"I told her that I had thought over the proposition for a long time, and had corrugated my brow until it had the appearance of a sample of corrugated iron. However, she persisted in the way that is peculiar in some women and we went at that problem just as you read about the boys going over the top. Well, to make a long story short, she put on one of the finest feeds that we had had in a long time. She said something about feeding the inner man so he could use his brains to better advantage, and that night I went at that problem and figured out just exactly

what was necessary. Of course, it wasn't solved that night, nor the next night, nor several nights after—it was some weeks before we hit upon what has since become the life-saver of this business. Since that time, I have been able to steadily build up a trade here.

"The sign that you see up there on the shop is the key to the whole solution; that sign and the idea behind it.

"The idea was this:—As things were going along in the business when you were here two years ago I knew that I would soon have to seek the poorhouse. Therefore it was either a matter of rejuvinating the business, or seek a job and work for someone else. The latter prospects did not appeal to me very strongly, although I was willing to do it if there was no other way out. As I looked at the problem it amounted to about the following:—If the business were to be rejuvinated, it was very necessary that I quickly hit upon something to either put the shop on the map, or find some other work to do. Several things that I had in my favor was that I was a thorough mechanic. I knew the mechanical end of the business. It was then a matter of placing my ability before the people who could make use of it, and to do it in such a way as to jar them into patronizing my shop. That is how we hit upon that dollar service idea. To decarbonize the engine, inspect the tires, and to grease and oil the running gear seemed a whole lot of service to give for a dollar as automobile service generally goes today. And it is a lot of service but I earn good money on the proposition if I have enough cars to service.

"I don't mean to say that there is money in de-carbonizing an engine with an oxygen torch on that dollar service rate, but I do not use the oxygen torch for that bargain service. Then too, the real idea of that bargain service proposition is the fact that it generally leads to other work, although I never insist upon doing anything more than my service job unless the car owner desires me to go ahead with the things I suggest is needed on his car.

"How can I afford to do all of this for a dollar? Well, it is a very simple proposition when you hear the whole story.

"In the first place you will note that the shop is located on a heavy traveled highway. This road was made one of the links in the national highway system, and that naturally put my shop on a road that would bring trade right to my door. This is a great big advantage for me. In fact, if this road had not been made a national highway, I would have moved to a new location.

"Then as you came along through the country, you evidently noticed my road-side signs at intervals of every mile for from 5 to 7 and 10 miles away. All of these signs are boosters for my "Dollar Service". Naturally when the motorist gets here, he will recognize this as the shop which the signs have been telling him about all along the road.

"Now as for the service—the actual work done for that little lone dollar.

"I decarbonize the engine by removing the spark plug from each cylinder and squirt a small quantity of denatured alcohol into each cylinder. I use a special plunger type oil gun for this, and the work is very quickly accomplished. As soon as the alcohol is inserted in each cylinder, the plug is immediately replaced. In order to make the operations effective, the alcohol is put into the cylinder when the cylinder is quite hot. In order to determine the proper temperature for this operation, the engine should be so hot that the hand can just be held comfortably on the radiator. The alcohol is allowed to remain in the engine about one hour or so and when then started up, it will blow the carbon out of the exhaust. The cost of this operation is very small. A half pint of alcohol is sufficient to clean a 4-cylinder engine. If alcohol is purchased by the gallon, a half pint should not cost more than five or six cents. And alcohol is the basis of a great many of the carbon removers now on the market.

"The next item of service is the oiling and greasing of the running gear. When I started this work, I obtained oiling and greasing charts from the manufacturers. These I mounted on heavy cards gave them a coat of white shellac and put them up on the wall for ready reference. These charts enable me to give the motor car owner exactly the proper service for his machine. And I have made it a point ever since starting this service, to supply only the best grade of oil and grease. Of course, I let the motor car owner know this fact.

"At first it was somewhat of a problem to remember all of the parts to be lubricated but we have now done so much of this work that the operation takes but a few minutes and without missing one single place for lubrication.

"For the springs, we use the oil drained from crank cases and with a small brush, the springs are quickly lubricated. A putty knife usually serves for quickly filling grease cups.

"The last item of this service is the tire inspection—for this I have an inspection card printed. This has spaces where a proper report can be made on each tire on the card including the spare tires and on the other side of the card is my advertisement.

"Of course, in order to make a

thorough and worth-while tire inspection it is necessary to know something about automobile tires. However, I quickly secured this information from a careful reading of tire catalogues and tire repair

"DAVID SMITH'S ROAD SIGNS BRING BUSINESS IN ON ALL ROADS"

instruction books. And after a man has looked at a few worn tires, it is very easy for him to tell that a bulge on the tire indicates separation of the fabric and rubber. And it is then a simple matter to report on the card in the proper place that this particular tire is "bulged; will blow". An open cut leaving a wound in the surface of the tire should be reported as "requires vulcanizing". And thus the entire tire equipment is gone over carefully, resulting in an accurate report on each tire.

"No, it doesn't take very long to do this work. Thirty minutes at the outside for the largest car that we have to deal with. You see we now know just how to proceed with this work. There is little or no lost motion.

"In completing the service the various details of the car are then gone over in a discussion with the owner or driver. If our work on the motor shows that there is something radically wrong, we make it a point to mention the fact suggesting such remedies and repairs as we can make right here The lubrication of the running gear also enables us to look at parts of the car which may need repairs, replacements and adjustments. Of course, any such things that we do we are paid for extra. We adhere strictly to the work outlined for that little dollar.

"And so with the tire report, if serious defects in the tire are shown through this tire inspection, we can take care of the work right here or can supply new tire and tubes if needed.

"If our customer is touring and dislikes awaiting the repair of a tire or tube, we agree to deliver it to any town within ten miles, free of charge. This service enables him to continue on his way without delay, get to his hotel or stopping place in the next town, and then one of the boys runs the tire out to him with the 'flivver".

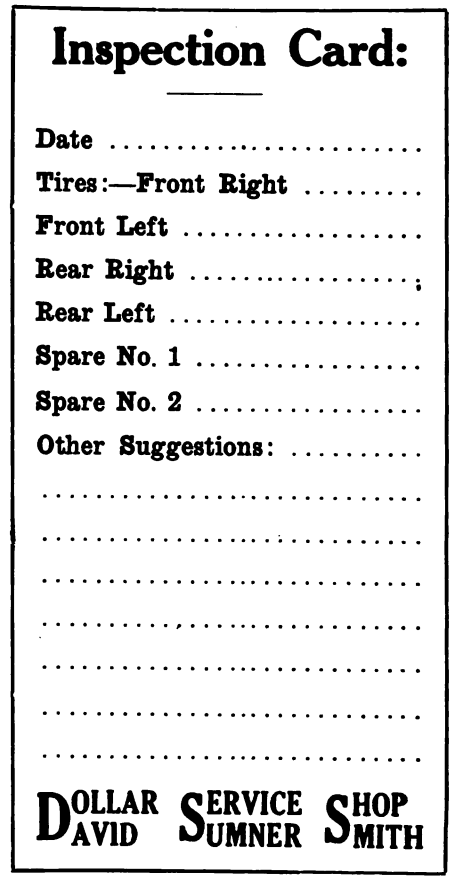
"But I could go on almost indefinitely telling the other opportunities for repair work, for the sale of accessories and supplies, and for other chances for additional profit which come to us through this dollar service idea. The main feature is the extra work which it brings us. I figure that the dollar service, adding in labor, time and material, costs us net about 50 to 60 cts, so that we do really make a small profit on the service as delivered, but I think you will realize from what I have told you that the biggest return by far, comes from the repair work, and from the sales of accessories which this service brings."

Oil on Car Prevents Mud Sticking to Surface

G. A. LUERS

Motorists hesitate before driving their cars on muddy roads, not so often because of difficulty in getting through as from the desire to avoid caked mud clinging to the body and chassis. Washing up after these runs is usually a long, disagreeable job, so much so that any suggestions to avoid these conditions are especially interesting.

We recently drove down about twenty miles into Virginia during a torrential downpour and stopped before a hotel. The car was saturated and reeking with mud. A fellow motorist drove up about fifteen minutes later with his car looking so remarkably clean that we out of curiosity and special interest because of the mud, inquired regarding the route he had come. You can well imagine our surprise when we learned that he had trailed us. In explanation of the clean condition of his car, the driver explained it was due to the use of oil over the car surface. To use his description, a paint brush and a bucket of reclaimed oil from the crankcase of the engine, is part of his rainy weather equipment. Befort leaving the garage in wet weather and for dirt road travel, the chassis, wheels, fenders and body is gone over with brush and oil leaving a thick and slick coating of oil on all surfaces. In consequence of this water and mud have very little attraction for the



"THE INSPECTION CARD CARRIES SOME ADVERTISING ON THE OTHER SIDE"

body virtually shedding as water does from the ducks back. We have since then tried out this method with almost astonishing results.

The keener the shopowner the slower he is to cut prices.

It is not expected that you do all of the business in your town—but are you sure you are doing all you can?

It's pretty hard to lose the money that belongs to you after you've been after your slow payer persistently and regularly—in fact its almost impossible.

Planned that vacation yet? Not too late if you hurry. Of course, the Missus and kiddies should be in on it.

"Save the oil and spoil the motor" is a pretty good slogan to tack up at the filling pump. It will act as a reminder to the chap who stops for gas and forgets about oil.

Using the Forge as a Preheater in Torch Welding

DAVID BAXTER

The General Repairman who has a good equipment of general tools in his shop will find it unnecessary to install a lot of new machines and equipment in order to efficiently follow modern torch-welding methods. Mr. Baxter tells how to utilize regular general shop equipment in this article.

The so called country blacksmith located in the small town can adopt the gas welding method and still use the tools and equipment already in his shop. That is, he need not purchase anything more in the way of tools and machinery than he already has.

Knowing the effects and reactions of heat upon metals as he does, the blacksmith knows that one of his troubles will be that of heating certain jobs to prevent distortion or contraction cracks. He realizes that he must have some sort of device for heating the jobs previous to applying the weld. But this is only at first, for after he is fairly started in the welding business his natural ingenuity comes to his rescue and he finds he can readily invent some device for every job that needs heating.

To be more specific; the blacksmith soon finds out it is merely a matter of devising ways and means of heating any kind of job previous to welding it. That is, he can nearly always manage to preheat without having to buy oil or gas burners or other special welding shop apparatus.

In fact he has a preheater already at hand in the shape of his forge. All he will need to do is to make arrangements for confining the heat to the job. And in many cases even this is not essential. For instance, many small jobs may be heated, welded, and cooled in the open without heat confinement.

But let us take a typical automobile welding job and see how it was handled with the blacksmith forge as the preheating agency.

In Figures 1 and 2 are shown the extent and nature of the damage to be repaired. In Fig. 1 it will be noted that the cross-shaped fracture divided the broken part into four pieces of almost identical shape and size; and that the pieces are slightly bulging outward. In the second picture is indicated the first step in a process of preparing ing the damaged cylinder head for welding. This consisted of prying the broken pieces of the casting out of the fracture in order to facilitate the forming of welding grooves along each division of the crack.

The parts were pried out and their edges were ground to a blunt wedge. And after replacing the

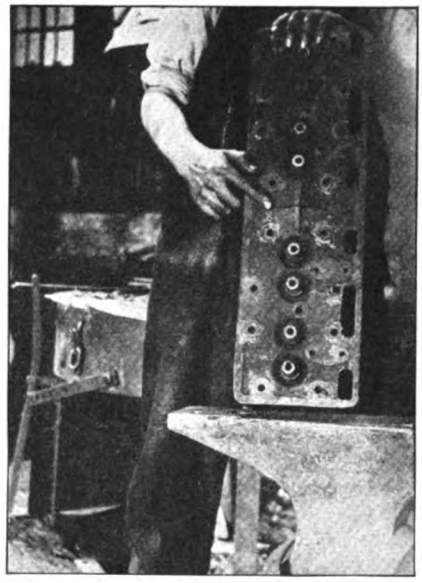


FIG. 1.—SHOWING LOCATION AND EXTENT OF THE CROSS-SHAPED FRACTURE

parts in the hole in the casting, these grooves presented the appearance of a cross in a circle. These grooves were almost the full depth of the metal thickness and were about twice as wide at the top as they were deep.

The edge of the fracture, on the casting, was beveled with a hammer and chisel. Then the paint and grease was removed from the surface of the casting in the immediate neighborhood of the proposed weld. This was accomplished by burning the substance to a cinder with the welding torch flame and then scraping the metal clean with a rasp.

After cleaning and grooving the broken parts, they were wedged in place with wire nails to hold them during the preheating and welding process. Which is indicated in Fig. 3. Here the job is in what might be termed the preheating position or the first position. It will be seen that the weight of the cylinder head casting is about evenly divided upon the four fire brick supports. These four bricks carry the weight approximately evenly balanced. This is for the purpose lessening the chance of distortion or sagging as the heat increases; particularly in event the job is accidentally over-heated. These bricks also serve to hold the casting sufficiently above the forge fire to lower the danger of melting or burning part of it. As is usually the case where the novice trys to heat the job by throwing it directly into the fire.

In fact this is probably the greatest drawback to employing the forge as a preheater. It is rather difficult to heat a good-sized casting all over, on account of the danger of burning or melting the part directly above the fire before the rest of the casting is hot enough to start welding. Some steps must be taken to diffuse the heat and spread it over a larger area of the entire job. Or at least to prevent it from being concentrated directly against one spot.

In this particular instance the bricks held the cylinder head high enough above the forge fire to permit a greater diffusion of the heat. And to prevent further danger of burning the casting, several pieces of fire brick were laid in the fire, between it and the casting. The cylinder head, as shown in the cut, was placed on edge to permit the heat to come up on all sides, thus facilitating the preheating, as well as protecting the metal from the intense heat. This was what is known as the preheating position. Which is quicker and safer than placing the job flat over the fire. This position was maintained until the job was ready to weld. Or until about half the job on each side of the fracture toward the ends was dull red all over.

In Fig. 4 is shown the welding

position. As soon as the casting was sufficiently hot, it was turned flat upon the bricks with the prepared fracture upward. Which placed the weld in a horizontal position and at the same time per-

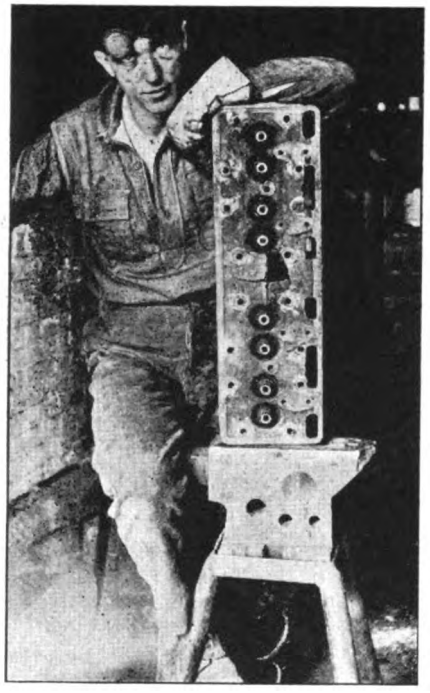


FIG. 2.—BROKEN PARTS WERE REMOVED AND BEVELED BEFORE PREHEATING

mitted the heat of the fire below to balance up the heat of the weld above, thus eliminating the chance of unequal contraction.

But let us consider the preheating process before we describe the welding. After the preheating position was attained as stated previously, the next step was to build a wall of fire brick around the entire job and forge fire. The bricks were laid loosely without mortar, to a height level with the top of the casting, and were for the purpose of confiining the forge heat and protecting the welder.

Walls of this nature are readily torn down for use on other jobs. They are probably the most convenient kind of preheating oven for the jobbing shop because they may be built to any shape or size to conform to different classes of work.

A sheet of asbestos paper was then placed over the top of this brick oven to farther confine the preheating and to protect the casting from accidental blasts or cold air. Then the fire was enlivened and the forge blower turned on.

The torch operator continually watched the fire and the slowly heating cylinder head. When the fire appeared to endanger the metal, the blower was cut off and its pressure decreased. The main idea being to heat the casting slowly and steadily and evenly throughout the central portion. When the fire seemed to be dying out it was replenished with wood chips, which are better than coal as the wood will immediatly ignite to prevent serious fluctuation in the temperature of the furnace interior.

The fire actually heated only about a good third of the whole casting but the conducted heat and that radiated to the inside of the brick enclosure supplied heat enough to the balance of the job to equalize the expansion of the whole job.

When the preheating cylinder head had attained the proper welding temperature a piece of the asbestos paper was removed from a sheet directly above the part to be welded. The the welding torch was lighted on the fire, and its flame regulated to the neutral condition so essential to the success of cast iron welding.

This neutral flame was then applied to the grooved fracture through the opening in the asbestos covering. Slowly at first and then centralized as the metal became bright red.

The circular weld was made first by melting the edges of the groove bottom together and then adding the cast iron filler metal a little at a time until the groove was filled. An inch or so of the groove bottom was flowed together before adding the filler metal, which was applied as fast as each section of the groove bottom was ready for it. And thus the whole weld was made in short sections entirely around the circle.

Then the four parts of the cross welds were welded one after the other until the whole cross was welded in the same manner as the circle weld. A liberal application of cast iron flux was used on all parts of the weld. Which was applied by dipping the heated end of the filler rod in a pot of the flux powder.

The whole job was welded as rapidly as possible. And, since no machining was needed on the finished weld, but little attention was granted to efforts to keep the weld soft, or rather, to keep it from being hard in spots. The welder was careful, however, to keep the weld free as possible from pin holes or porous spots since these were liable to cause the head to leak after it was put back in service. Whenever a bit of the blinding white hot slag appeared it was promptly scraped out of the weld with the filler rod assisted by the pressure of the welding flame.

Fig. 5 shows the preheating furnace complete with the welding in operation.

After all parts of the crack had been properly welded the asbestos cover was again drawn over the top of the weld. And the fire was permitted to cool down slowly. In fact, it could be said that the preheating arrangement forced the job to cool slowly to prevent unequal contraction from cracking some weaker part of the casting. Particularly in the vicinity of the weld. Because if the cylinder head were to cool and contracted before the weld cooled the latter would crack or pull away from the surrounding metal, or perhaps crack directly in the finished weld.

The slow cooling process was to force the weld to cool in unison with the rest of the casting. By holding back the heat of the whole casting, that of the weld would be slowly conducted to the surrounding metal, which in turn would radiate gradually to the interior of the preheater. Thus would the theory of slow cooling be complete. And thus would the whole casting contract uniformly.

The same arrangement of preheater was maintained during the cooling process as is shown in Fig. 5. The job was allowed to remain under cover until the casting was cold enough to permit handling

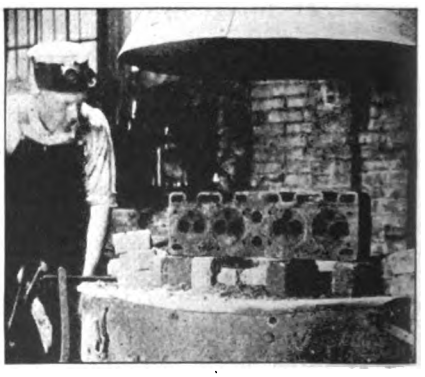


FIG. 3.—THE FIRST PREHEATING POSITION OF THE FRACTURED CYLINDER HEAD

without gloves. Then the rough spots of slag and the adhering balls of metal were removed with hammer and chisel, being careful not to crack the casting in the process. After which the cylinder head was ready for the customer.

Perhaps the worst feature of using the forge for preheating is

that it sometimes keeps the forge tied up for several hours when it could be used to an advantage for other work. However, it is not often necessary to carry out the entire cooling process on the forge. The usual run of small automobile castings may be removed from the preheater soon after the weld is finished by quickly and carefully wrapping the casting in asbestos paper. Several sheets must be used and the work done without permitting the job to lose its heat to any great extent. But the welded job should not be set aside directly in a draft or where it is likely to be unwrapped before it is cold.

Fundamentals for the Woodworker

W. J. HORNER
(WORK)

In most woodwork definite dimensions are necessary, and even where they are not the fitting together requires correspondence between sizes of parts The woodworker therefore commences work with a rule in his hand, and can seldom do much without it or without some equilavent means of verifying the sizes of the material he is operating on. He takes the rule first to assist in selecting the pieces of wood required, and it is afterwards used for marking out and for testing as the work proceeds.

For rough sawing, lines are marked with pencil. For accurate finishing, lines are cut in the surface with a gauge or marking awl, or pointed knife; or in the case of curved lines they may be scratched with tramel or compass points. The saw often has to be used for reducing to cut lines, but is kept to one side of the line so that planes or other cutting tools can finish the work exactly to the line. There are cases where the material can be reduced to size without having lines as a guide, but generally it involves danger of unequal reduction and sometimes loss of time in making more frequent measurements, It is a common practice in lathe work to reduce and measure alternately until the required size is reached, but in a good deal of lathe work lines cannot be marked and the only way is to make frequent tests with callipers or templates.

Measurements of length are often greater than the length of the rule and must be made by making pencil or knife marks and shifting the rule along until the total length is measured with sufficient accuracy. When accuracy is important, or when a considerable number of similar measurements have to be made, it is best to use a strip of wood instead of a rule for great lengths, and set a pair of dividers for short ones. The long strip may be either cut to the length or have a mark on it at the correct distance from one end. A length can thus be transferred quickly from one piece to a number of others with uniformity and no risk of mistakes, for mistakes can sometimes be made in rule measurement. Measurements are usually commenced from the left and travel to the right, just as the inches are marked on a rule.

Lines across the width of a board are always marked by using a square as a guide to the pencil. Longitudinal lines may be roughly gauged with a rule and pencil as in Fig. 1. The forefinger of the left hand bears against the edge of the wood, and the left hand keeps the pencil end of the rule at the correct distance. Rule and pencil are drawn lightly along and a line parallel with the edge is obtained. Another way is to rule with pencil and straight-edge, the edge of the latter being set to marks made by measurement.

In large and rough work, especially when the edges of the wood are not straight, a chalk line is used for marking straight lines of great length. The length of cord or string is rubbed with chalk and held at the required position at each end of the surface to be marked. It is strained sufficiently to be in a perfectly straight line from one end to the other and then, while still held securely at the ends, is lifted a few inches in the middle and allowed to spring back and transfer a faint chalk line to the surface. This gives a straight line for sawing.

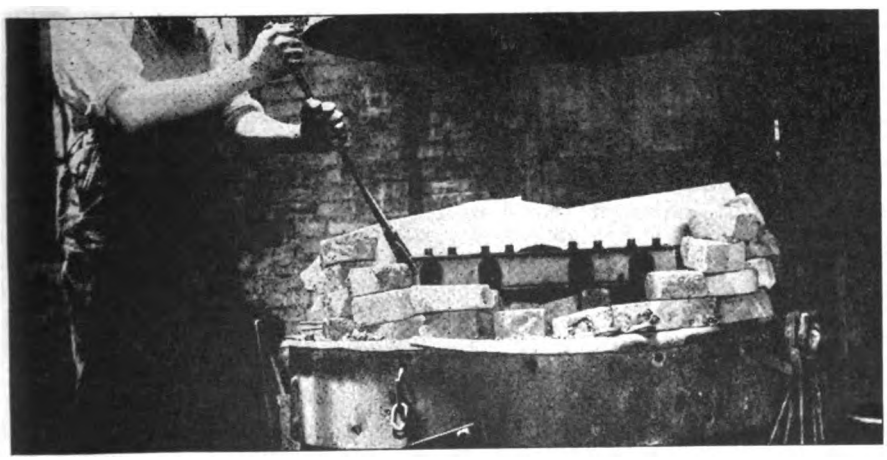


FIG. 4.—THE WELDING POSITION OF THE BLOCK WITH FRACTURE UPWARD

FIG. 5.—PREHEATING OVEN OF FIRE BRICK, WELDING IN PROCESS

Gauges for marking cut or incised lines are used only on pieces of wood that have been planed straight and true on the edge and face the gauge is used on. Gauges are generally used parallel with the grain, and lines across the grain are squared; but sometimes a gauge is used against planed end grain for marking lines parallel with the end. An ordinary gauge in use is shown in Fig. 2. Its advantage is not only that it can be set to cut a line parallel with an edge and at any distance required from the edge, but that it can be used repeatedly to mark lines at similar distances on other parts of the work, so ensuring uniformity and accuracy. In gauging a piece of board to a thickness, for instance, a line on one edge is not sufficient. The opposite edge must be marked similarly, and a gauge set to the thickness is the most simple and reliable way. In planing a narrow edge a line is gauged on one face only and a square is used to see that it is planed at right angles as well as to the line.

All the preceding remarks apply to ordinary hand-work. In shops where machinery is used, methods

are different. In sawing, a rule would be used to set saw-fences, and lines would not be drawn on the wood. In cutting to length a squared line would not be necessary, for either a cross-cut saw at the end of a pendulum arm would guarantee a cut at right angles, or in smaller work the fence on an ordinary saw-table would do it. In planing, widths and thicknesses would be reduced as required automatically without gauge lines on the wood for working.

Lines for working to are not always parallel with or at right angles to the grain. They may be at other angles or they may be curved, depending on the character of the work. A piece of wood of the shape shown by Fig. 3 is generally strongest with its grain parallel with the longest edge, as shown. It is a rule in practically all marking out that the grain should run the longest way of the piece. A number of such triangular pieces would be marked out as in Fig. 4, which makes less waste and less sawing than cutting separate rectangular pieces to triangular shape. To cut diagonally across a board almost invariably means that some of the part left over must be wasted, for it is not likely that a piece with a diagonal end could be used without cutting it square first. On the other hand, a diagonal cut on the piece unused may be better than a square cut to a shorter length, for it would give a greater length at reduced width.

It is usually essential to have pieces of wood the full length required, for satisfactory end-to-end joints cannot often be made or are not worth the time and trouble. Jointing in the other direction, to make a greater width of grain, is comparatively simple and has no tendency at all to reduce the strength of the structure. Therefore economy in the use of material demands care in deciding where to cut across grain. A mistake in length is more certain to mean waste than a mistake in width.

Diagonal lines are marked by measurement or with set-squares or protractors, or by a bevel set to the angle on a protractor. In every large work measurement and a straight-edge for ruling the lines is the only accurate way, the method usually being to strike a quarter or half circle, divide its curve, and rule a line from the centre to the bisection.

Pieces of curved outline should have their shape marked on the material so that as little as possible is wasted. If a number of pieces alike are wanted, and the shape is not easy to draw, it is generally best to make a template or pattern one first and mark the rest from that. An incidental advantage of this is that it makes it easier to scheme how to arrange them for cutting as many as possible from a given piece of material. Small curves are struck with compasses and large ones with trammels. A curve too flat for the trammels available is sometimes marked by bending a thin strip of wood or steel so that it serves as a guide for a pencil, a fairly uniform curve being obtained in this way if the strip is held so that it passes through points which the curve is required to follow. Lines parallel with and not more than an inch or two away from a curved edge can be penciled by hand as in Fig. 5, the principle being the same as that in the case of the rule and pencil in Fig. 1. In Fig. 5 the fingers are in contact with the curved edge and the pencil point is held at a fixed distance from it while being drawn along parallel. This is applicable both to convex and concave curves. An ordinary gauge can be used against curved edges if a special fitting is attached to it. These methods would generally be adopted only when the curve is very flat and either not struck from one centre or not struck from centres at all. If the line required can be struck from the same centre from which the curved edge was struck, then that method is usually better than gauging the line.

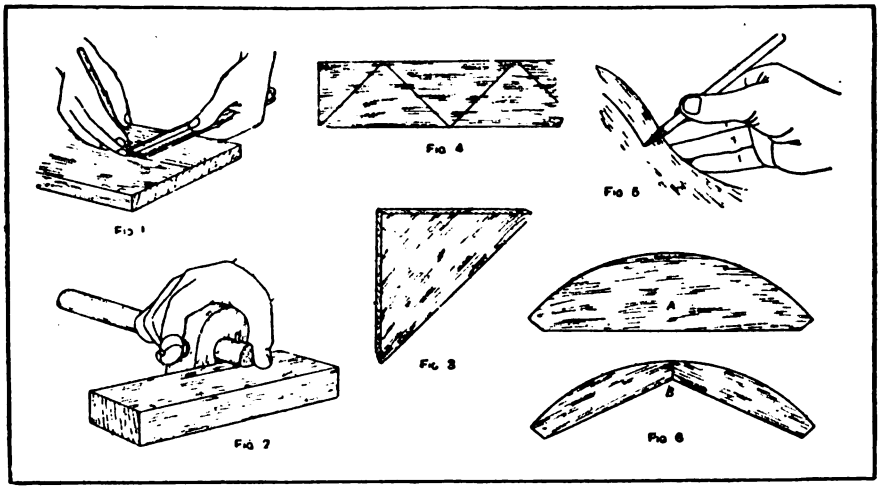


Fig. 1.—Marking Pencil Line Parallel with Edge. Fig. 2.—Using Gauge for Marking Line parallel with Edge Fig 3.—Piece Cut so that Grain Runs in Longest Direction. Fig. 4.—Marking Number of Triangular Pieces. Fig. 5.—Pencilling Line Parallel with Curved Edge. Fig. 6.—(A) Single Piece of Wood used to Give Curved Edge. (B) Two Pieces used to Obtain Same Curve.

Curves in woodwork always present some difficulty because the grain of wood is straight, and widths are limited and short grain is weak and must be avoided as far as possible. This often necessitates the use of more than one length of wood in order to change the direction of the grain to suit the curves. Fig. 6 is an example. At A one piece is used, and at B the same curve and length is obtained with two pieces. The first necessarily requires a much wider piece, more liable to warp and consuming more material, and also giving a greater variation in angle of grain at the curved edge. Its greater width would mean greater shrinkage with consequent flattening of the curve. In this particular instance the near approach to end grain on the curve does not cause weakness or short grain, but it would if the inner edge of the piece was curved like the outer instead of being straight. The method at B has the disadvantage of being jointed to make up the length, but often this is of no moment compared with advantages gained. Standing alone, as shown at B, it looks weaker than the single piece at A, but generally it would form only a part of a built-up structure, and if not, adequate means of holding the pieces together could be devised.

The professional woodworker is an expert in estimating sizes without measuring and in ability to see inaccuracy of surface or angle without testing. This saves him a great deal of time as compared with anyone whose eye is less trained in these respects. Practice too has made his calculations more rapid and infallible. He can deal with dimensions in eights and six-

teenths and double or halve or divide them as required with the facility which comes with constant practice.

That Better Polishing Wheel

In the April issue Mr. J. M. Gaza described a new means of attaching emery or alundum to polishing wheels and through typographical error that article stated that the medium used in place of glue was "Liquid Gloss". This should have been given as "Liquid Glass"—(The difference between an 'o' and an 'a' in the second word.)

In order that readers may be now correctly informed regarding Mr. Gaza's method of making polinshing wheels work with improved efficiency we are reprinting his article correctly.

The material which Mr. Gaza calls "Liquid Glass" is sodium silicate or "Water Glass" and can be obtained at practically any drug store. The house wife uses a solution of it for preserving eggs for the winter season.

Here is a new way of making polishing and buffing wheel which I learned about a year ago. As every practical craftsman and repair-shop man knows, the usual way of making polishing or buffing wheels is to apply glue to the cloth wheel and then to run or roll the glued wheel in powdered emery or alundum. This gluing method is a lot of trouble, and takes considerable time in order to allow the glue to dry. I therefore considered other means of holding the emery or alundum on the wheels, and in considering various materials, finally hit upon what is called liquid glass, instead of glue.

In order to do the job correctly, take your buffing wheel and suspend it in some handy manner. With a proper sized paint brush, put on a coat of liquid glass. Apply this just the same as paint and let it stand for a short time, until the liquid glass soaks into the cloth. When this has soaked into the cloth, apply another coat of liquid glass and then roll the wheel in the powdered emery, alundum, or other material that you are in the habit of using for your buffing and polishing wheels. Roll the wheel in the powder with a good pressure and as you proceed with the rolling, slap the powder with the flat of your hand to make it smooth and even. Now let the wheel set long enough so that you you can apply another coat of liquid glass without pulling the first coat off with the brush. After having applied the second coat, roll the wheel in the powder again the same as before, getting as much of the powder onto the wheel as possible, and applying it just as evenly as you can. Then set the wheel aside until it is dry.

This binder drys much faster than glue does and if you do the work properly you will save about half of our time in repairing wheels. Another good feature of the wheels made in this manner, is that they will last from three to four times longer than the ordinary glued wheels.

If you have many wheels to make at one time, it is an excellent idea to have a long shallow and narrow box to hold your emery powder or alundum. Of coure if you are only coating one or two wheels, all you need do is to place a large heavy sheet of paper on the smooth top of your bench, pour your emery or alundum on this and then roll your wheel in the powder.

Is the Blacksmith Coming Into His Own?

J. RAMMELL

It is well known that the young men of the past twelve or fifteen years have fought shy of the blacksmith trade, saying that is was too dirty, and too hard work. There appears at the present time a shortage of first-class all around blacksmiths. This city is quite a manufacturing city, having two large automobile factories, a large steel and wire plant, a stove and range works, a brass works foundry, a tool works, a spring works, a plate glass plant, a malleable iron works, and a five big general repair and horse shoeing shops all employing from one to five blacksmiths. And to say that they have experienced the surprise of their life in employing blacksmiths this year is putting it mildly. After the depression, they started to, or rather tried to hire smiths at pre-war prices or 30 and 35c per hour, but failed to get men of ability to apply for work. Today they are paying 50c to 60c per hour and not getting all the smiths they want at that price. So you see the day has come or is coming fast, when the boys that learned the trade are going to get paid for the time and study that they have put forth to uphold the trade by putting forth their best efforts.

I want to encourage the brothers in the trade to make a stronger effort in holding up their prices for all kinds of work. Don't get discouraged because you happen to have a competitor that picked up the trade, and is not capable of doing a mechanical job. I don't mean to say that all the men who are working at the trade and never served an apprenticeship are botches. For it's a fact that some of them are natural born mechanics, and by their persistent efforts have made a success.

This has been called the "Steel and Iron Age", but it is only in recent years that the average blacksmith has been called on to heat treat steel, temper and make auto springs, and get right up against work that is required to stand lots of wear.

Now Brothers, while you have done well in the past, you still have some things to learn about steel and I advise those that feel that they are still in the dark about the different steels that are on the market, to write the editor of "Our Paper", for a list of books on steel working, and study them. You will find it an interesting and profitable study. There are a lot of books published by men of life-time experience. All of them contain recipes for tempering, case hardening, and welding compounds any one of which is well worth the price of the book alone. The writer of this article will write up his experience with steel in the near future.)

Let everybody make an effort to boost the grand old trade back to what it was when the blacksmith was the King of Mechanics.

Benton's Receipe Book

A Body Poliah is asked for by H. J. L. of Ohio. There are, of course, all kinds of polishes on the market ready for use, but for the man who wants to make his own polish for auto and carriage bodies the following mixture will be found excellent. Take ½ gal. turpentine, ½ pt. paraffine oil, ¾ ounces oil of ceder and two ounces oil of citronella. These may be put in a suitable bottle and well shaken to mix them and then used in the regulation way by applying with clean soft pad and then rubbing to a lustre with a clean soft cloth.

In Grinding Twist Drills see that the two cutting edges are of exactly the same length and in the same position to the axis of the drill. This is in reply to L. R. D's. query on drill grinding. Of course, there is the clearance to the cutting edges to be considered also. The Angle for the cutting edges is usually about 60 degrees while the angle of clearance is from 12 to 15 degrees depending on the material to be drilled—the larger angle being for softer material.

Soldering is Best of course but for an emergency the leaks in a gasoline tank or pipe can be quickly and effectively stopped with glue. Glue is not affected by gasoline so a punctured tank can be quickly mended with an application of good glue and a patch of cloth or even paper. A glued strip of paper or cloth wrapped around the pipe leak will work as effectively.

One man we know has built up his very successful business on friendship. His plan as he explains it, is to make just as many friends as he possibly can and then make customers of them. And what's more he keeps them as friends too after they are customers.

The Bridge Builder

An old man traveling a lone highway,
Came at the evening cold and gray,
To a chasm deep and wide.
The old man crossed in a twilight dim,
For the sullen stream held no fear for him,
For he turned when he reached the other side,
And builed a bridge to span the tide.

"Old man," cried a fellow pilgrim near,
"You are wasting your strength with building here.
Your journey will end with the ending day
And you never again will pass this way.
You have crossed the chasm deep and wide
Why build a bridge at eventide?"

And the builder raised his old gray head,
"Good friend, on the path I have come," he said,
"There followeth after me today
A youth whose feet will pass this way.
This stream which has been naught to me,
To that fair-haired boy may a pitfall be.
He, too, must cross in the twilight dim,
Good friend, I am building this bridge for him."

Courtesy of *The Nation's Business*

High Spots

Ol' Timer asks: "D'ya 'member when they usta call the gas engin' an' Missouri mules by the same names?"

James J. Davis Secretary of Labor says "Just now, work is most important to us—and everybody can take a hand."

Some chap with a weakness for figures says that an acre of walnut trees will produce food each year equal to the food value of 2,500 pounds of beef.

The largest production of automobiles in the history of the machine was reached in May when the total of 252,000 auto and trucks was turned out.

Tis said that nearly a million people in the United States are paid to keep other folks from stealing goods or time. And yet most folks are fundamentally honest.

Generally the time the fire occurs is just after the policy has lapsed. Keep a sharp eye on the insurance contracts. It's best to know and feel safe, than to weep and feel sorry.

A radio phone has been installed at each of the seventy tables of a San Francisco hotel and diners can now eat while "listening-in" on the concerts that are broadcasted daily.

"You can't do anything with just money", says Henry Ford. "Along with money you must give something of yourself." Which to our notion of things is about 100 per cent O. K.

It seems almost necessary in these days of high taxes to tuck a little real business in between the strike talk and Bolshevik Bunk. For the s. t. and B. B. doesn't do very well as a provider and meal ticket.

Now that Old Man Business is recovering from his recent illness and is beginning to enjoy the clear weather and a calm sea some "durn fools" are again thinking of rocking the boat by calling strikes in several departments of industrial activity.

How long will it take you to write something for publication? Ever think that your brother readers are just as much interested in what you have to say as you are in their letters. Let the editor have a letter for publication for the next issue.

Of course you want to save money—then look on Your Wrapper and grab one of those long-time rate offers. They save you time, trouble and inconvenience as well. Better look up the saving you can make on a little investment in craft knowledge.

Dynamite is usually mentioned to express the superlative of explosive force but the proper mixture of gasoline and air when compressed has a force fourteen times that of dynamite. And this is the force that is so wonderfully controlled in the internal combustion engine.

Fighting insects with airplanes seems like a flight of the imagination but that is exactly what is being done. A poisonous powder is dusted over the trees to be treated, by means of airplanes and literally millions of insects are found dead on the ground after such treatment.

"Yes" ses Ol' Eck Perience, "circumstances hes a hull lot t' do with every man's life but—I notis' thet the fellers thet hev' managed the circumstances in their lives usually are the most successful. There's a difference between bein' a slave t' circumstances an' being' a master o' them."

Wireless and radio seem to have taken practically all of the civilized countries by storm. Over 200 French fishing schooners are now reported as having been equipped for wireless communication. Our own Uncle Sam is developing a service for farmers that will enable them to receive crop and weather reports.

Well' what do you think of it! We mean that new cover picture. Some of "Our Folks," have been so kind as to tell us its the best thing they ever saw on a trade journal. Of course, you may not think that, but let us know just what you do think. In our estimation our artist has caught the real idea of the modern repair man. Let us have your idea.

It is said that seven thousand people were killed at grade crossings last year. These represent some of the folks who do not believe in the safety first slogan. Seven thousand sacrifices to the "God of speed" are too many for intelligent human beings—yet it would seem unnecessary to have "Safety Weeks" and Safety Slogans" to get folks to protect their own lives.

"Member when the horse was said to be in the discard? Well, he ain't went yet and t' my notion it will be a long time 'fore he goes too." Says a hustling craft friend of ours as he hustles about shoeing horses, repairing plows, fixing autos and adjusting tractors. "I'm glad the autos here, and sure hope it stays. But man, I still love to talk to a horse and I can caress money out of both horse and motor drivers."

"Sum Fish swim up stream an' sum swim down" ses Ol' Bill Tarver the river guide. "O' course, all fish swim both up an' down or they wouldn't git very far—but y'll notice its usually the snappy fighters that are up stream fish an' its the wishy-washy kind that float with the stream. An' t' my way o' thinkin' its about the same with humans. The snappy chaps are the guys that air fightin' thare way along while the milk an' water chaps are just floating with the stream."

OUR HONOR ROLL

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F. Harding, Iowa ....Dec., 1926
H. Grimm, Utah ....Dec., 1926
J. Smith, Wash. ....Dec., 1926
C. Hall, Wash. ....Dec., 1926
H. Mokler, Ill. ....Dec., 1926
F. Bird, N. Y. ....Dec., 1926
R. Sherman, Maine ....Dec., 1926
C. Hardy, Mass. ....Dec., 1926
L. Cordes, Mo. ....Dec., 1926
R. Pogue & Son, Texas ....Dec., 1926
H. Rickley, N. J. ....Dec., 1926
A. Hallander, Calif. ....Dec., 1926

J. Griffiths, Iowa ....Dec., 1926
W. Swetnam, Ky. ....Dec., 1926
F. Hoopengarnder, Md. ....Dec., 1926
L. Turner, Kans. ....Dec., 1926
W. Matthews, England ....Dec. 1926
J. W. Lawson, Idaho, ...Nov. 1926
W. N. Scofield, Mo. ....Oct., 1927
Z. Damur, Sask., Can....Oct., 1926
W. Branch, N. C. ....Oct., 1926
Hanson & Marvin, Cal. ....Oct., 1926
W. Branch, N. C. ....Oct., 1926
F. Mataocks, Ark. ....Sept., 1926
E. Jones, Wise....Sept., 1926
Inglis & Son, Neb....Aug., 1926
J. Clark, Jr., Vict. Aust....Aug., 1926
L. Wesley, Ariz. ....July, 1926
J. Buchner, Mich. ....July, 1926
J. Dambach, N. J....July, 1926
H. Mitchell, N. Y. ....July, 1926
I. Boles, Ohio ....July, 1926
F. Vavasour, New Zealand....July, 1926
L. H. Miller, N. Mex. ....June, 1926
S. Butler & Son, Mich. ....June, 1926
A. Schmitt, Nebr. ....June, 1926
M. Broton, N. D....June, 1926
J. Campbell, Oregon ....June, 1926
F. Over, Pa. ....June, 1926
A. Clark, Jr., Cict, Aust....June, 1926
C. Sager, N. Y. ....May, 1926
H. Pirret, Oregon ....May, 1926
P. Sowa, Oregon....May, 1926
D. Ackland & Son, Man. ....May, 1926
J. Sinclair, W. Aust. ....May, 1926
M. A. Towner, Ohio ....Apr., 1926
David Williams, N. Zealand...Apr., 1926
C Sex, England ....Apr., 1926
P. Peterson, Iowa ....Apr., 1926
G. Bowers, Okla. ....Apr., 1926
E. Dignan, South Aust. ....Apr., 1926
W. F. Tippey, Mich. ....Mar., 1926
J. Carswell, Ark. ....Mar, 1926
C. Burton, Mass ....Mar., 1926
W. Pochelu, Oregon....Mar., 1926
A. Bowman, Va. ....Mar., 1926
W. Widger, N. Y....Mar. 1926
W. Glenn, Colo ....Mar. 1926
T. Moore, Vict., August....Mar. 1926
H. Brown, Va. ....Mar. 1926
H. Barnes, Va. ....Mar., 1926
G. Iller, N. S. W., Aust....Mar., 1926
E. Jones, New Zealand....Mar., 1926
B. E. Campbell, Mass. ....Mar., 1926
Edwim Slee, N. Y. ....Feb., 1926
G. Torrey, Calif. ....Feb., 1926
E. Schaupppner, Nebr....Feb., 1926
F. Trogdon, N. C. ....Feb., 1926
A. Garver, Ohio ....Feb., 1926
C. Jones, Pa. ....Feb., 1926
J. Fox, Kans. ....Feb. 1926
R. Dean, Texas ....Feb., 1926
J. S. Rush, Ohio ....Jan., 1926
J. Murphy, Calif. ....Jan., 1926
O. Temple, Idaho ....Jan., 1926
F. Kearns, Ill. ....Jan., 1926
J. Murphy, Nevada ....Jan., 1926
W. Post, N. Y. ....Jan., 1926
J. McIntire, Pa. ....Jan., 1926
N. Karolewicz, S. D. ....Jan., 1926
L. Messersmith, Idaho ....Jan. 1926
J. Merritt, Calif....?....Jan. 1926
J. Hess, Ohio ....Jan. 1926
W. Pederson, Ill. ....Jan. 1926
Powell Bros. & Whitaker, Eng. .Jan., 1926
H. White, N. Z. ....Jan., 1926
D. S. Kistlers, Mo. ....Dec., 1925
Alfred Rasmussen, Wisc. ....Dec., 1925
E. A. Pierson, Okla. ....Dec., 1925
Nick Schumaher, Iowa ....Dec., 1925
Geo. Jones, Ore. ....Dec., 1925
H. E. Hiers, S. C. ....Dec., 1925
M. Rawlins, Calif. ....Dec., 1925
J. Hulvey, Ill. ....Dec., 1925
P. Nelson, Minn. ....Dec., 1925
J. Devine, N. J. ....Dec., 1925
S. Wright, N. Y. ....Dec., 1925
E. Lain, N. Y....Dec., 1925
W. Jones, Texas ....Dec., 1925
Williams & Turner, W. Va. ...Dec., 1925
A. Spence, B. C. ....Dec., 1925
N. Buchanan, Ont. ....Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ....Dec., 1925
W. Snyder, N. Y. ....Dec., 1925
J. Skiff, Pa. ....Dec., 1925
F. Cronk, N. Y. ....Dec., 1925
J. Singer, N. Y. ....Dec., 1925
H. Edwards & Sons, N. Y. ..Dec., 1925
G. Strait, N. Y. ....Dec., 1925
E. Monroe, N. Y. ....Dec., 1925
L. Luch, N. Y. ....Dec., 1925
L. Rajewsky, Minn ....Dec., 1925
W. Bolle, Ill. ....Dec., 1925
F. Carlson, Ill. ....Dec., 1925
W. Seamans, Ky. ....Dec., 1925
J. Wrley, Mo. ....Dec., 1925
J. Mallay, N. J. ....Dec., 1925
S. Haslett, Ohio ....Dec., 1925
C. Seidles, Pa. ....Dec., 1925
W. Robertson, S. C. ....Dec., 1925
H. Collins, Ohio ....Dec., 1925
G. Hanshaw, Okla. ....Dec., 1925
W. Bate, Conn. ....Dec., 1925

R. Shipley, Iowa ....Dec., 1925
W. Nattress, N. M. ....Dec., 1925
J. Sammerlee, N. Y. ....Dec., 1925
D. Rhymes, Texas ....Dec., 1925
L. Heath, Calif. ....Dec., 1926
E. Wright, Ill. ....Dec., 1925
C. Frazier, Ky. ....Dec., 1925
G. Leutz, Ohio ....Dec., 1925
J. Sebesta, S. D. ....Dec., 1925
P. Oram, England ....Dec., 1925
F. Wortell, Calif. ....Dec., 1925
E. Thomas, N. Y. ....Dec., 1925
H. Miller, Wash. ....Dec., 1925
M. Bates, N. Y. ....Dec., 1925
J. Woods, Oregon ....Dec., 1925
W. Areford, Pa. ....Dec., 1925
J. Howell, Mo. ....Dec., 1925
J. Morrow, Pa. ....Dec., 1925
A. Darling, Sr., N. Y.....Dec., 1925
J. Goebel, Kans. ....Dec., 1925
C. Rausch, Ohio ....Dec., 1925
R. Noble, Jr., Ont. ....Dec., 1925
C. Lynch, Oregon ....Dec., 1925
H. Clauson, Pa. ....Dec., 1925
Neles, Bros., Calif. ....Dec., 1925
H. Lefler, Mich ....Dec., 1925
D. Bullinger, Mo. ....Dec., 1925
A. Potter, Conn. ....Dec., 1925
R. McMains, Calif. ....Dec., 1925
W. Jordan, Maine ....Dec., 1925
R. Fisher, Pa. ....Dec., 1925
P. Kaimuloa, T. H. ....Dec., 1925
H. Hesse, Kansas ....Dec., 1925
F. Hinkey, Ohio ....Dec. 1925
N. La Duke, N. Y....Dec., 1925
G. C. Ironside, B. C. Cand. ..Nov., 1925
A. Wassmuth, Idaho ....Nov., 1925
G. Illsley, Mass. ....Nov., 1925
A. Speir, Ohio ....Nov., 1925
W. Clepper, Texas ....Nov., 1925
J. Mallett, Queensland, Aust...Nov., 1925
J. Dribble, South Aust....Nov., 1925
W. Schaid, Wis. ....Nov., 1925
J. W. Lawson, Idaho ....Nov., 1926
Peter Vondenbosch, Ill. ....Oct., 1925
D. Frazer, N. J. ....Oct. 1925
L. Krause, Ind. ....Oct. 1925
Peter Weise, Iowa ....Sept., 1925
E. P. Gates, Mass., ...Sept., 1925
John K. Hawn, N. J. ....Sept., 1925
Nugent-Covey Wagon Co., Calif. Sept., 1925
M. Pople, N. S. W., Aust. ..Sept., 1925
J. Wilkinson, Queens, Aust ..Sept., 1925
C. Williams, Victoria, Aust. ..Sept., 1925
Reynolds Bros., Pa. ....Sept., 1925
F. Krenz, Calif. ....Aug., 1925
D. Allen, Mont. ....Aug., 1925
G. Fisher, & Bro., Ohio ....Aug., 1925
W. Dixon, Ohio ....Aug., 1925
F. Shupe, Pa. ....Aug., 1925
W. Wright, Va. ....Aug., 1925
J. H. Beck, Mass....July, 1925
H. Knowes, Ill. ....July., 1925
A. Veit, Mass. ....July, 1925
J. Stadler, Calif. ....July, 1925
Sligo Iron Co., Mo. ....July, 1925
G. Hogoboom, N. Y. ....July, 1925
H. Schriber, Pa. ....July, 1925
Torris Fortune, S. D. ....July, 1925
Wm. Loveless, Mo. ....June, 1925
C. H. Fries, Mich. ....June, 1925
V. E. Oliver, Iowa ....June, 1925
J. H. Cook, Ga. ....June, 1925
Gladstone Holway, Ohio ....June, 1925
N. H. Black, N. Y. ....June, 1925
C. H. Fakenstein, W. Va. ....June, 1925
Chas. L. Earnhardt, N. C....June, 1925
John Lear, Mont. ....June, 1925
H. O. Warren, Wisc. ....June, 1925
Alonzo Forbush, Utah ....June, 1925
W. J. Shibley, No. Dak. ....June, 1925
B. F. Fortner, Tenn. ....June, 1925
G. M. Manigole, N. D. ....June, 1925
L. A. Johnson, N. Y....June, 1925
Peter Zepp, Ohio....June 1925
N. A. McArthur, Calif....June 1925
C. E. Goss, Ohio....June 1925
Jos. S. Schmidt, S. D....June 1925
P. N. Kimes, Iowa ....June 1925
A. K. Wadley, Miss. ....June 1925
Harry Kreitser, Pa. ....June 1925
W. H. Hopper, Calif. ....June 1925
Mitchell Bros. Wash....June 1925
Geo. J. Truckey, Mich....June 1925
James E. Parker, Ind....June 1925
A. Bradley, Calif. ....June 1925
Frank Harsen, Mich. ....June 1925
Hans Passig, Iowa ....June 1925
F. O. Pifer, Ill. ....June 1925
Thos. W. Miller, Pa. ....June 1925
H. Fast, Manitoba ....June, 1925
G. Brougnan, N. Y. ....June, 1925
A. Nordstrom, Iowa ....June, 1925
C. Holton, Okla. ....June, 1925
D. Conillard, Vt. ....June, 1925
Jos. Fraswa, Ore. ....May 1925
Rasmussen & Baasch, Nebr. ...May, 1925
J. O'Rourke, N. Y. ....May, 1925
A. Spangberg, Oregon ....May, 1925
C. DeVore, Pa. ....May, 1925
Halvorson, Bros. ....May, 1925
A. Lemmon, Utah ....May, 1925

Collecting Money by Mail

It is sometimes necessary to have U. Samuel's mail man act as your collector. His success depends upon the message you give him. Here are several money-bringing suggestions for collection letters.

A great deal of money and a great many accounts are of course collected by mail in these days. However, the postage stamp has many limitations as a bill collector, and it is not well to rely upon it too much. A letter cannot of course compare with the force of a personal interview in securing the cash. There are times however, when a personal call upon the delinquent debtor is impossible, and it then becomes necessary for the practical business man to know just exactly how to write a letter which will bring the necessary cash.

What has been said with regard to courtesy, persistence, and firmness in attempts to make collections personally applies with equal force to the written letter. When you ask for money through the medium of the written page use courteous language. Don't threaten the customer until a threat is absoltuely necessary in order to get the money. Bear in mind that there is a chance for more business where you once did business before, and when you come right down to the brass tacks of business, a slow payer's money is just as good as the cash customer's. But then, that is no reason why you should allow the slow payer to impose upon you. Insistence upon payment when an account is due will go far toward teaching your customers to treat you properly and to take care of their bills and accounts promptly.

A couple of letters used very effectively by a Michigan State shop owner which carry out the dunning and more business idea very well are as follows:—

Dear Sir:—When you opened your charge account, you promised to pay the first of each month. Of course, I have accordingly allowed you anywhere between the first and the tenth to settle your bill.

But here it is, the fifteenth, and I haven't yet heard from you. Is there anything wrong? Is there any error in my statement of your account? I would like very much to hear from you.

Are you interested in machinery? If you are I think you'll want to see the two new machines, which I recently put in. Why not stop in a few minutes when you come past? I will be glad to explain anything that interests you.

This letter is right to the point, lets the customer know that you want your money, and also that you will be glad to get his future trade.

If the customer doesn't write or explain in person, a second letter is mailed to him which reads as follows:—

Dear Sir:—You know from my letter of several days ago that your account is considerably past the usual limit. I feel that our very pleasant business relations deserve an answer.

If there is anything wrong with our work for you or with my statement, won't you kindly tell me about it? I shall await your reply with interest.

If the customer doesn't make some arrangement for paying his account after the second letter has gone to him, this shop man makes a personal call upon his debtor which usually ends in his getting the money, a note or a definite promise to pay at some future date. And he always makes demand on that date to the day.

Bidding for the Money and More Business

A man who runs a large general repair establishment in a western town, expresses himself as follows on the subject of collections and business:—

"Success in any business doesn't merely mean goods sold, services in demand, and time well occupied. It means customers satisfied; it means complaints handled satisfactorily; it means bills paid outside of court. It is one thing to do work for a man or to sell him something, but it is quite another thing to get him to give up something that he wants. The man who wishes to be successbill next week, not because you are he must do both of them well. He must first get the work to do, and then the cash for which he did it.

"In trying to get the money after the work is done, it is well always to bear one thing in mind. It is this: The debt is a just one, a strict business obligation and you are justly entitled to the money—not because you need the money, not because you must meet a big hardup, but because you did the work and you are entitled to your pay."

This smith makes use of both letters and personal calls in collecting his accounts. He describes his use of a recent series of letters as follows:—

"First of course, I send a bill of statement to the customer. This I send to him on the first of the month succeeding the delivery of the job or work done. If the customer doesn't come in by the tenth or fifteenth at the very latest, I drop him a line. Certainly, unless some definite arrangement has been made for longer credit, the customer should either pay by the fifteenth or explain why he cannot pay at that time. A courteous note, mailed not later than the sixteenth of the month, calls attention to his account and that it is due. Incidently, in my letters, particularly the first one and those going to men who have proven themselves to be good customers, I call attention to some new machines, some new men or some new stock that I have just received. I invite him to call and endeavor to show him that I consider him a friend of the business. Here is how letter No. 1, is worded:—

Dear Sir:—In the rush of harvest hurry I trust that you have not overlooked my bill. I know that you have been busy, but I feel too, that all you need is a little reminder. Kindly come in and see me—or if you will not be in town this week, send me a check.

When you do come to town, I want you to be sure and see my new cylinder grinder, I have just installed it. If you come in soon, we'll probably have some cylinders on hand to show you just how good a job it turns out. This grinder has been busy almost every minute since we have set it up. Better come in and see it operate.

"The second letter, if no reply is received to the first one, is of course a little more urgent. If the customer is generally considered good, I write him something along this line:—

Dear Sir:—I am quite surprised not to have heard from you before this with reference to my bill. It is now considerably past the usual limit, and I feel that I deserve some word from you in regard to this account.

I haven't seen you in the shop lately—isn't it near time to shoe one of your good horses? It isn't well to let them go too long without a resetting.

"This second letter usually follows the first one after about ten days. However, if the customer's record shows that he is ignoring your request for payment, I write him along this line.

Dear Sir:—I haven't had the pleasure of receiving even a post-acrd in reply to my letter of the sixteenth. This bill is now considerably overdue, kindly send me a check. My price on the work was done on the basis of payment being made when due. I trust that you see the advisability of giving this matter your immediate attention.

"After the second letter it is best to devote all attention to the bill, without reference to the shop or new equipment, and it is well also to remember that a long winded, a long drawn out request for payment loses strength with every additional letter sent to the customer, so it is best to make your third and fourth letter courteous and to the point.

"Here is a third letter that has brought in many a dollar that the first two failed to touch at all:—

Dear Sir:—When I do work of any kind, I do it as well as I can and at a price consistent with the work and prompt payment. I have already sent you two requests for payment of my bill which is now long overdue. I must insist upon this account being paid not later than.....
.....

"The fourth letter, when necessary, must usually be followed by a trip to a lawyer. For I find that the average account that runs until the fourth letter is necessary is usually a bill that the lawyer will have to collect for me.

Here is letter No. 4 of the series, and is written just before the account is turned over the lawyer.

Dear Sir:—I have made three requests for payment of the inclosed bill. Up to the present time I have failed to receive either a payment or an explanation for not receiving payment from you. Under the circumstances, can conclude otherwise than that you desire to ignore my request?

I cannot carry this bill any longer. If it is not paid by.....it will be necessary to place it in the hands of my lawyer without further notice.

"From this stage the account had best be turned over to a lawyer and such steps taken as seem necessary in order to get the money that rightly belongs to you."

A Credit Man's Scheme

Slow and bad accounts cost the average business man much annoyance and loss, and are often the direct cause of bankruptcy. It therefore follows that any method of handling this class of accounts that shows a maximum of efficiency and a minimum of effort and fraction, is worthy of serious consideration.

The following scheme is one suggested by an attorney and credit man who has had years of experience in the collection of slow and bad accounts and who recommended the scheme as especially suitable for use in a medium sized or large sized repair shop business. The idea is that a business man can in most instances handle his own collections to better advantage than by turning them over to a professional collection agent. This credit man says that the average successful collection scheme is based on persistence and courtesy, and not bluff and threat. His scheme consists of a series of courteous letters and a number of post-card reminders. The letters are of course written on regular letterheads, while the cards are regular government post-cards. Of course, if the smith has ready access to a typewritter, he will find his letter much more presentable when written with a machine, than if he attempts to get them out in long-hand. However, the writing machine is not absolutely necessary especially if the smith writes a fairly good hand which is easily read. In fact the hand written letter, has more the appearance of a personal communication in these days of imitation typewritten letters, and none of the letters are so long as to make the matter of following up the account burdensome.

When intending to use this scheme on a certain number of accounts, it is best to make an alphabetical list of them on a long sheet of paper noting the name and address and the amount of the last item. Leave an inch of blank space after each account in which to note the date of mailing. When an account is paid or satisfactory arrangement is made for its payment, it should be crossed off the list. Then you will always have a correct list for the next mailing.

Dear Sir:—In looking over our books today, we find a past due balance against you to the amount of ..... running back to.....

Will you kindly mail us your check for this amount or advise us at once if you find the balance incorrect?

Thanking you in advance, we remain.

Dear Sir:—We wrote you on..... ....regarding a past due balance on your account of .....running back to .....and so far have received no reply.

Please let us hear from you at once, so that we will know whether you consider the balance correct and when we may expect your check.

Letter No. 3

Dear Sir:—Our letters of..... and of .....regarding the past due balance of ..... on your account, remain unanswered.

It certainly seems to us that you might at least grant us the courtesy of an answer, even if it is inconvenient for you to send your check just as this time.

Kindly favor us in this regard, and oblige,

Letter No. 4

Dear Sir:—We are much surprised at your failure to answer any of our letters regarding your past due account. Our letters have certainly been courteous and we feel that we have treated you fairly in every way.

You know of course that unless we hear from you we will be compelled to adopt other means of collection, which we very much dislike to do.

It will save both of us useless expense and annoyance if you will let us hear from you at once, stating just what you propose to do.

The writer will hold your account on his desk until the morning of ....., and will depend upon hearing from you at that time.

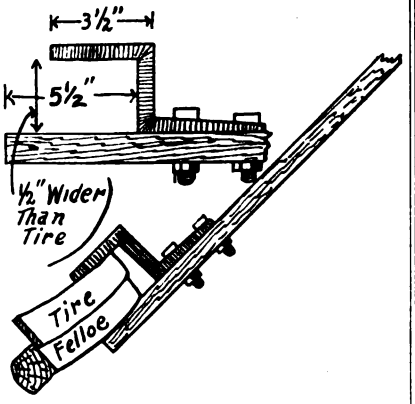
Letter No. 5

Dear Sir:—As we did not hear from you this morning, we have fully decided to

A Device for Putting on Metal Tires

JAMES BALDWIN

The device shown in the accompanying engraving simplifies the operation of pulling on tires when setting them. As shown in the illustration, the tire is placed on the wheel, gripped at one side by the bent part of the device, the ends of the lever placed under the felloe, and a pull at the handle



end of the lever forces it on the outside edge of the felloe.

In making the device use bolts long enough so that the tool will take all sizes of tires. The hook or angle is made adjustable by putting washers under the bent iron piece. As shown, the space under the bent part (where the tire goes) should be 1½ inches wider than the tire. If made to work on a 1½ inch tire, it can then be adjusted as mentioned with washers. The iron stock suitable for the bent end part may be 1½ by 1½ inch or heavier if desired.

take other steps to enforce settlement of that past due account.

However, a business acquaintance advises us that he believes you to be prompt and reliable, and we have therefore decided to wait a few days longer.

You must certainly realize that your credit standing depends on your fair dealing, and fair dealing certainly requires you to answer our letters. Of course, we realize that it is entirely possible that you have neither received nor read our previous letters personally. In view of the statement referred to above, will expect to hear from you at once.

The postal card form should read exactly as follows, putting in the proper place, the date upon which the five letters were mailed to the delinquent:—

"Dear Mr. Editor:—

"We wrote you on (put here dates upon which letters were mailed), but received no reply. Why? It is important that we hear from you at once."

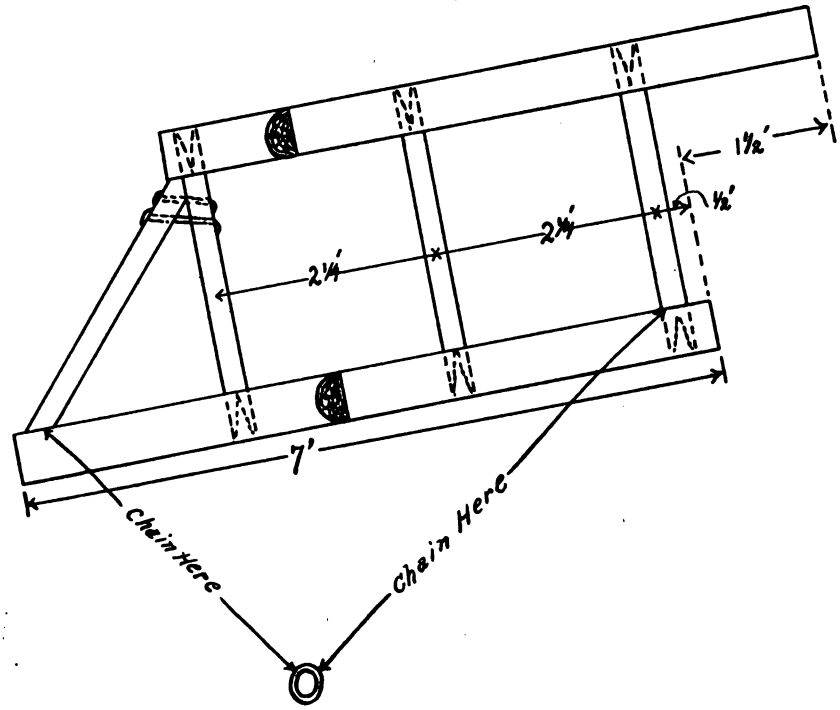
The letters should be mailed regularly a week apart, when a postal card is sent three days after the mailing of letter No. 5, and then a post-card every second day for twenty days. The card should read exactly the same in each instance, and nothing should be added to the wording as given above, except the signature. It is important that the post card be worded just exactly as given here.

It will be noticed that the first three letters of this series are extremely short, yet they say all that is necessary or advisable to say at this stage of the correspondence. It all asks a question that demands an answer whether the debtor is able to pay at that time or not. These letters are also very mild in talk so that they can be sent without giving offense to perfectly good but slow debtors and yet they form effective basis for letters that follow the slower and more doubtful debtors.

The fourth letter takes the place of the usual threat-to-sue letter, and is fully as effective without committing the writer to any definite action whatever, but leaves the matter open so that he can effectively continue his mail campaign. The fifth letter is a reversal of the threat to let other business men know of the indebtedness. It is even more effective without being offensive. It flatters instead of threatens, and winds up by giving the debtor an excuse for his past failures to respond to the letters that have been sent to him.

But some men do not read letters, and it does not much matter what you write them. Here is where the postal-cards come in. While they say nothing whatever, about an account, and are consequently perfectly legal to write on a post card, yet they furnish an inexpensive form of persistency that certainly does get results.

This system cannot of course get money from a man who has none, nor secure impossible results. It will, however, bring in a great deal of money that would remain uncollected by ordinary methods, and it had the added advantage of involving the user in little expense and in no unnecessary and useless litigation.



THE SPLIT LOG DRAG IS EASILY MADE AND IS A VERY EFFECTIVE MEANS OF IMPROVING A ROAD.

Construction of a Simple Split Log Drag

G. A. LUERS

The split log drag is one of the simplest and most effective means for the improvement of roads. The use of a drag is for the purpose of crowning the dirt in the center of a road, where water will flow off rapidly leaving the road hard and dry. The construction of a simple log drag which is suitable to be used with either, truck, tractor or horses is given in the accompanying engraving. In this a log, of oak or pine, seven feet long and ten or twelve inches in diameter is split into equal parts.

These log sections are then bored with holes two inches in size for three cross supports made of saplings about the size of the holes. Wedges are driven into the ends of the cross pieces to hold them firmly in place. A brace across the ditch end made of a two by four or a another length of a sapling is held in place with spikes. About ten feet of chain forms the hitch which is secured at opposite ends to the forward section of the drag. For use in soft road the weight of the logs will be sufficient without anything added, however for hard dry earth, the addition of several lengths of planking across the top will permit of loading with rock ballast or permit of the operator standing on top of these.

One shop owner we know made a road drag of this kind and uses it for a considerable distance up and down the road in front of his shop and has many fine compliments and much business advertising as a result of the better road past his place of business.

"If the Dad's not interested in the interests of the Boy, how can you expect the Boy to be interested in the business of the Dad?" Asks Uncle Barlow.

Replace the obsolete machines with new ones gradually. No need to attempt making over the entire equipment at once. Weed out the non-producers and profit eaters. That's the way to run a Shop Improvement Association all your own.

An automatic device for sending S. O. S. or distress signals at sea has been developed. A most important feature of this automatic system is that it's signals do not interfere with the regular radio signals and that it rings an alarm bell on ships in the immediate vicinity of the vessel in distress.

Tales of Trips and Tours

BY

"WANDERER"

The tales here related are the experiences of a traveller through the highways and by-ways of the country districts. In his wanderings about he meets many members of the craft, stops at many shops and has many experiences. The tales of his experiences are interesting and carry with them many practical suggestions. They run the entire range of craft activities as will be noted as you follow his tales month after month. The experiences he relates are Facts not Fancy.

The other day I had a very interesting demonstration on how to sell supplies and accessories. I am going to tell "the Family" about it.

I had been down in the country about 80 miles, and in coming home, the motor began to act "ornery", as motors will sometimes do, especially when one is in a particular hurry and I was on this occasion. Upon examination, I found that the key which held the generator pulley to its shaft had become loosened and had dropped out. Of course, the motor could be driven without that key, but I did not care to go very far without my generator working, and the battery was low as well. As I had no spare keys to fit this particular key-way, it was necessary to make the nearest garage. We were not far from a small town, and soon found a repair shop where a very accommodating owner soon had if fixed up.

Replacing the key was one of those jobs that was not very difficult but one that makes you wish for two or three extra hands. The working space was small and cramped, and it was necessary that I give the repairman some help. This naturally resulted in four hands getting extremely dirty and greasy. And here is where the selling ability of the shop owner demonstrated itself.

As I was attempting to wipe my hands on the rag I usually keep in the door pocket for just such purposes, the shop owner said:—

"Wait a minute, I have something that will fix you up right". And with that he disappeared into the shop only to reappear a few seconds later bearing a can and a towel.

"Here you are" he said, "just try some of this on your hands, and you will be all cleaned up in a jiffy and on your way".

And with that he opened the can and held it as I took a gob of the stuff and proceeded to clean up.

"You don't need any water with that" said he, "and don't be afraid of it. I've used it for several months, and sell lots of it, and folks come back for more,—seems everybody likes it".

In the meantime, I had begun to rub the lard-like or salve-like material into my hands in an effort to remove the grease and dirt, and it did not take very long for me to discover that the soap or whatever substance it was, was doing its work very thoroughly. It was not long before I reached for the towel to wipe the grease from my hands.

"This seems to be pretty good stuff" said I "Wonder what it is made of?"

"I don't know what's in it". said the shop-owner, "but I do know that it does its work very thoroughly, and although I have used it for quite a number of months, I cannot see that it has injured my hands any at all. With this he held up his now clean hands which appeared smooth and well-kept, except for the callouses which were displayed prominently upon all parts of the palm and fingers. Then continuing he said—"I have sold several cases of the soap already, and I did not get it till quite late, but it is so thoroughly good that a man needs to use it but once in order to find out what a real good thing it is for the average car owner, and driver and for the mechanic. I always keep a can on hand ready for use, not only in the shop for the shop men, but also for customers. And there is seldom a customer who uses it that does not buy at least a can or two of it.

"Just the other day, a big party came through here on their way to the lake. They stopped here for gas and had one or two little things fixed up, in which one of the men had to help, because we were very busy at the time. Of course he got his hands all smeared up just as you have done, and I gave him some some of this soap and they took a half-dozen cans with them, fearing that they would not be able to come across anything like it again in their travel."

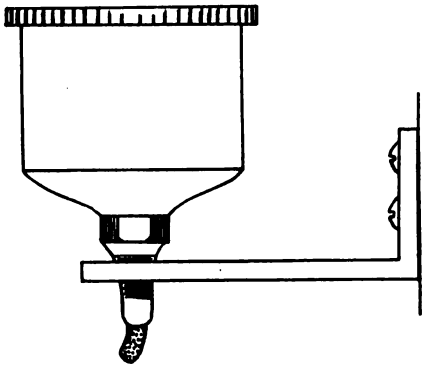
At this point, in the conversation, I naturally asked how much the cans were, and almost before I had time to wink an eye, he had three different sized cans out of the case, explaining that he had three sizes, to sell. I of course purchased a dollar can for the garage and "washup" shelf, and a 50c can to put under the seat in the car. Then having completed my purchase and paid the shop man for his services, I told him frankly, that I was very much interested in the way he went at his work, and also in his demonstration of how to sell accessories.

"Do you work the same scheme with everyone that comes up to the shop?", said I in leading up to the questions that were in my mind.

"Well, they do not always work out just as this sale has worked out", said the shop owner—"but I usually bring the conversation around to the use of soap when there isn't something else to sell the car owner that stops here. In fact, seeing that you are interested in the subject, I want to confess to you right here and now, that there is seldom a car owner who stops here that does not purchase something more than what he originally stopped for. If he comes for my services such as you have he usually ends up by getting all the service he wants and also purchasing at least some needed article for his comfort or the better running of his car.

"As you can readily see, I was the village blacksmith and horseshoer, though still a very comparatively young man, I had considerable experience along the blacksmithing line. When the auto put a crimp in the shoeing business, I was not slow in taking up some automobile work. At first, I had very much of the attitude of the great majority of blacksmiths at that time; feeling that the automobile had intruded. However, I have since come round to the thought that it is really the salvation of the country blacksmith—the sooner he takes up automobile work, the better it will be for him. Of course, in the blacksmith and horseshoer line I always sold wagon

jacks, axle grease, and a number of other items, and when the auto came along, I soon found that I could sell spark plugs, piston rings, timers, and similar accessories and parts. I also soon learned that it required a different line of talk to sell these items, and I also soon learned that the more of these



A HANDY SOAP DISPENSER EASILY MADE

items I sold, the more profit would I make and the less would be my percentage of overhead.

'I then determined that I would endeavor to sell extra parts, accessories, or items to every car owner or driver that stopped at the shop. I fully realized that this would have to be done very carefully, or I would soon have the reputation of being a 'money-grabber', and endeavoring to do people for the limit every time they stopped here. This of course was farthest from my thoughts, but what I did want to get across was a reputation for real service, and with that thought in mind, I adhered strictly to the idea of suggesting only such items and equipment as I really thought the automobile owner or driver needs. And I have kept that idea in mind at all times.

"For example:—It would be inconsistent for me to have you stop at the pump there for gas or oil and then as you were paying me to suggest that you buy a can of soap. Or if after fixing a tire for you I asked if you did not need some new spark plugs or a new timer. In other words, I sold you an item that your own experience right here has proven to you that you need. You are glad that I suggested it. I knowing the quality of the soap I sold you, know you will be well pleased, and the next time you come through here, and need anything in my line you are going to stop here.

Of course I try to have everyone that stops here buy something—but I am not overinsistent, and I do not press the purchase of anything unless I see that the prospective purchaser is really interested. On the otherhand, I do not even suggest the purchase of something, if I see that the individual whom I am serving is inclined toward grouchiness, or is that type of individual who will resent any suggestions I might make for new equipment or attachments.

"Now take the subject of tires for example:—Had you stopped here to have a tire repaired or to have one removed and a spare put on. My talk would naturally be to the subject of tires, extra tubes and spare shoes. That would naturally give me a chance to talk about the three different lines which I am handling. You take that cord tire for example:(I don't make a practice of stocking up with a lot of seconds or anything of that kind. Once in a while I do have a good opportunity to make a good purchase of seconds, but I usually close these out to the local residents and farmers in this part of the country, advertising by means of letters and circulars, and thus getting rid of them quickly, making a small profit, and thus turning my capital without delay.)

"But as I was saying—take that cord tire for example". And the shop owner mentioned a cord tire of prominent make. "I only keep a few of those on hand. When I do repair work of any kind on a big car and there is need for an extra on their cars it is very seldom that they get away without buying one of those cord tires, because when I talk that particular tire I know just exactly what I am talking about. I can put all of my enthusiasm into that make, and I know I won't have to take back one single word I say.

"And I try to feel the same about everything else I handle—except the bargain goods which I usually sell by putting on a cut-price sale. All the other supplies and accessories that I handle, I can talk just as enthusiastic as I want to, knowing that the purchaser will be well-pleased, and that instead of their being a come-back on the goods I sell there will be a come-back of that particular customer, the next time he comes through this way.

"But here I am talking shop, telling you a lot of stuff which you are probably not interested in at all. You better be on your way with your soap."

Handy Soap Saver for the Shop

G. A. LUERS

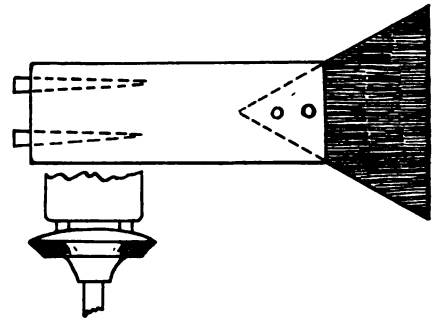
The small tins of soap or hand cleaner, which are commonly used around the shop will dry up when the lid is left off and are very unhandy to open when the hands are greasy or oily. An improved method of using this soap is that shown in the accompanying engraving. This consists of a large grease cup as used for truck lubrication. This is mounted on a small metal bracket above the wash-up faucet. One of these large cups will hold about a half can of soap and due to the small orifice does not dry up.

A simple turn of the cup forces out enough soap for a satisfactory wash-up. The saving of soap and time justifies the installation of this handy dispenser or any similar device.

Combined Valve Grinder and Carbon Scraper

G. A. LUERS

The attached sketch illustrates a simple shop-made tool which combines a valve grinding tool with a carbon scraper into a compact unit with a convenient wood handle. A four-inch length of round wood



A COMBINED VALVE AND CARBON TOOL.

such as a broom handle is slotted at one end and into this a triangular piece of steel is riveted. Into the opposite end two hard wire nails are driven and the heads cut off leaving only enough protruding to engage the small holes in the head of the valves. In use the tool is rotated between the palms of the hands, grinding the valves rapidly with a reciprocating motion. The scraper end in addition to use as a carbon scraper is of advantage for removing paint and tar or for cleaning drip pans of grease and dirt accumulations.

Cylinder Regrinding as A Business for the General Repair Shop*

Here is another article that points the way to added profits. It tells you how to size-up your location for cylinder regrinding work, the profits to be made and how best to do the work.

A new line of business which has recently come to the front is that of regrinding worn or scored cylinders. It has never been properly recognized in certain localities, and the possibilities at the present time are unusually promising.

Proper education of the motor owners who have never fully appreciated the value or necessity of having their cylinders reground, will open up a field of which, at the present time, there seems to be no end.

Whereas this business has been going on for a number of years, it was not until after the war that it received proper recognition. Analysis proved that here was a field that had hardly been touched and which a great many small shops could readily go with only a small investment, since often they were fully equipped with the exception of a grinder and a stock of pistons and rings.

This was also taken up by the larger automobile repair shops, so that they could do an entire overhauling job under one roof. It fitted in nicely with torch welding work, as in practically all cases cylinders when welded had to be reground afterwards.

Numerical Possibilities

Nothing shows the possibilities of regrinding so much as the registration figures in various states and localities. The number of cars registered in the United States is close to ten millions and a half. When one realizes it only takes three 4-enbloc cylinders a day to give a two-man company excellent profits, it is easy to see the possibilities of this field.

These millions of automobiles, trucks, tractors, and motorcycles which will sooner or later have to have their engines overhauled and cylinders reground. Truck and tractor cylinders, on an average, will require attention once a year. Passenger cars should be overhauled at least every two or three years; and in the makes where the cylinders were not originally ground, they will require grinding much sooner, it often being economy for an owner of such a car to have the cylinders reground after the car has run 5,000 miles or less.

Distribution of Regrinding Concerns

There are hundreds of sections in this country where there are no shops in a position to handle this work, although the possibilities in that locality are ideal. It is a fact that the percentage of grinding concerns in relation to the registrations is greater in the far West and East than in the other states. This is due to two reasons. One is that these sections are the farthest from the manufacturers from whom, in many cases, it would be necessary to get new blocks if they could not be reground. Secondly, is the missionary work that has been done by the sales organizations in these sections, as well as the publicity put out by the regrinding concerns themselves.

It has been found that the largest and most satisfactory business in cylinder regrinding is being accomplished in those sections where the most machines are installed.

Localities Where Cars Are Owned

The general feeling is that, in order to run a successful regrinding shop, one must be located in the heart of a city. Analysis of the field, however, proves that the largest number of registrations of cars is in the country.

Look at the chart on page 180 and you will find that only a small percentage of the automobiles registered in the United States are located in the larger cities. The greater bulk of cars are in the small cities, towns and villages.

There are hundreds of these places located at strategic points from which a firm could draw a very fine business from the surrounding territory. Profits in such locations would also be more attractive, since the overhead, labor, and running expenses will be far less than those located in a city or manufacturing district.

Profits From Cylinder Regrinding

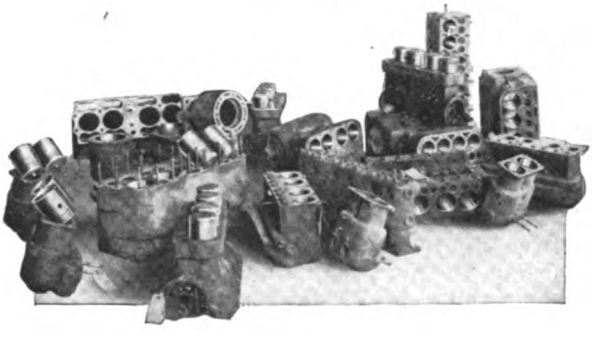
In regard to the profits which may be expected from the cylinder regrinding business, we can say that the prices on this class of work have a considerable range, depending on the locality. These prices in different sections of the country have been taken up in detail and tabulated. They will be found in a later installment in these articles.

As a general average, the prices in New England are as low as anywhere. Therefore, we will use these prices for an example to serve as a basis on which profits may be figured. We will also figure on the regrinding of a Dodge block, which, due to its design, cannot be handled quite as rapidly as some of the other 4-enbloc cylinders.

After going over these figures, we suggest that the reader make investigations in the territory in which he is located, checking up with what is prevalent in his section. There will be, no doubt, some little variation, but the percentage of profit, we are confident, as shown by our figures, will be found reasonably conservative.

Now, taking the case of this Dodge 4-enbloc, you will find that a fair operator can regrind the four holes of an average block in two hours, including putting the work on the machine and removing it

REGRINDING CYLINDERS IS ANOTHER OPPORTUNITY FOR ADDED PROFITS



*This article is copyrighted by the Heald Machine Company.

after grinding. An hourly wage of 75 cents would be liberal for this section; but to make it even more conservative, we will figure an hourly rate of 80 cents per hour. The labor for grinding would therefore amount to $1.60. The oversize pistons can be purchased from specialty manufactures who make oversized pistons of all different kinds in quantities. The price of these pistons will be about $1.75, or $7.00 for four. We will figure on twelve rings, and only a high-grade ring should be used. Rings, at about 30 cents each, figure $3.60 for twelve. We will also figure on the fitting up of these various parts; that is, assembling these parts in the engine will require about two hours, or $1.60 in wages. On the labor charges there should be added a certain amount for overhead; that is, to cover the cost of rent, light, heat, power, office expense, etc. For the small shop this should not exceed perhaps 30%, but to make it more conservative, we will figure 50% overhead on the labor costs.

We summarize the cost of the job as follows:

Two hours labor, grinding cylinder block, at 80 cents per hour	$ 1.60
Two hours labor, fitting pistons, rings, and pins, at 80 cents per hour	1.60
Charge off for overhead, 50% of the labor cost	1.60
Four oversize pistons at $1.75 each	7.00
Twelve piston rings at 30 cents each	3.60
Four wrist pins at 40 cents	1.60
Possible expense involved, covering expressage on piston cartage charges, or any other miscellaneous expenses connected with the job	2.80
Total cost of the job	$20.00

The charge in this section for this job would be about $40.00. We will figure on a selling price of $32.00 to $40.00, depending on whether there was a 20% for the garage or not, which will show a net profit on the job of from $18.00 to $20.00.

A two-man firm can easily handle three of these blocks, or similar blocks, per day. This is a conservative figure. With three blocks per day, the net profit would be approximately $48.00 to $60.00 per day.

Low-Priced Cars Equally Profitable

Many are under the impression that they must be located in a territory where there are large number of high-class cars, to make grinding a profitable business. The reverse is true. Ask any one who is doing this class of work, and he will tell you that he would like to have all of the Ford blocks he could do at his special price.

Not a Seasonable Business

Some have the idea that regrinding is a seasonable business. This is not true, for while, no doubt, the bulk of the work for tractors and passenger cars comes in the fall and spring, commercial vehicles are overhauled and put in shape throughout the year.

Where Cars Are Owned

In Towns of 1000 or under	33%
1,000 to 5,000	22%
5,000 to 50,000	20%
50,000 to 500,000	16%
500,000 or Over	9%

ANALYSIS OF PRESENT OWNERSHIP OF REGISTERED AUTOMOBILES

In fact, it is the general practice to drive a motor truck as long as it will pull, when it has to be rejuvenated to use it at all.

Established grinding concerns have found the volume of work to average up fairly equal throughout the year.

Shows Best Adapted for Regrinding

Regrinding dovetails into several different allied lines in a very convenient manner. We refer to automobile repair shops, machine shops, and welding concerns, which are ideal for this particular business.

Already located, with tools, equipment, and personnel, it does not call for any extra overhead or require a great deal of additional investment to considerably increase the profits.

Automobile Repair Shops

It is a decided advantage to be able to say to an automobile owner, "We do the whole job right here under one roof."

Every motor has to be pulled down to be reground; therefore nine times out of ten you will be called on to start the job. You save your customer time and can give him individual service by being able to jig the cylinder up, regrind, fit new pistons and rings without having to send it outside. You can carefully watch and inspect every operation and then be sure, when it is assembled, that everything will go right.

Many an overhauling job you now do, in a short time proves unsatisfactory, because you attempted to cure the troubles by putting in new rings when it really needed regrinding. Ninety per cent. of the motor troubles are cured by regrinding the cylinders and fitting new pistons and rings. It will not only give you added profits on the job, but you will have satisfied customers who will come back.

Welding Shops

Here is an opportunity to not only make a profit on the welding of broken and scored cylinders, but also in grinding them. Every welding concern has had cylinders brought them with a corner or flange broken off, which, when welded on, is as good as new, except at the end near the crank case the welding has left a fin or rough place that must be ground out to allow the piston and rings to enter.

Scores also have to be filled; and, after doing this, why not be in a position to regrind and do a complete job? It will fill in during those dull times when no one seems to want welding done.

Where to Get Work, Garages and Repair Shops

The most logical and best sources to get work from are the various garages and repair shops in your locality who are not large enough to warrant their putting in equipment to do it themselves, but who, from time to time, have blocks that should be ground. Unless you are fully equipped to take down and reassemble, nearly all jobs must start in either one or the other of these places. They are in a position to offer advice to the owner as to whether it should be done or not. Therefore, sell the regrinding proposition to them, and they will be your best customers.

Individual Owners

As cylinder regrinding is an educational proposition in practically all territories, circularize the motor owners and convince them of its advantages, many of whom will personally bring in blocks.

Fleet Owners

Fleet owners are excellent prospects, for in many cases, even though they are large enough to

maintain a machine themselves, they will prefer to send out the work to one who specializes and has the stock and equipment to give them service.

A fleet of fair size will practically keep one machine busy; and as the cars are usually all alike in each fleet, similar work will not only increase production and therefore profits, but it will require fewer styles of pistons and rings to stock.

Welding Concerns

Every cylinder that is welded has to be reground. No other method will possibly finish the hole to its original size and shape. Therefore, every welding concern is a prospect for you.

Make Inquiries Before You Start

We advise in all cases that, before starting in, you visit the various sources of business and inquire what the prospects are and how much regrinding they believe they can turn your way. We venture to say that nearly every one (provided they are acquainted with its advantages) will in one way or another offer to furnish you work.

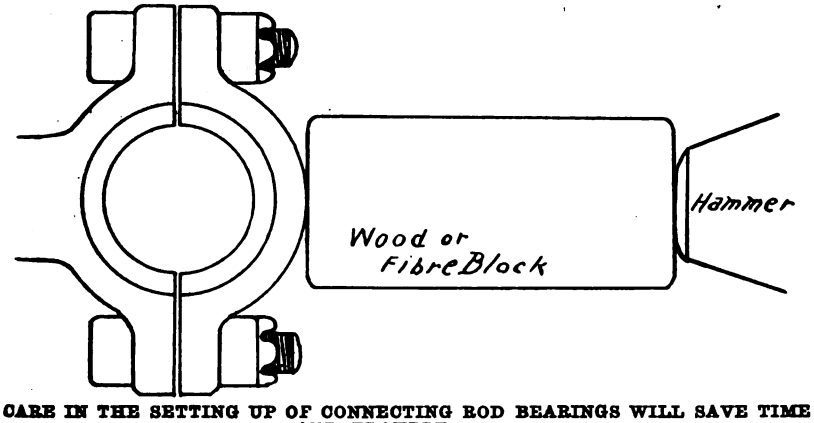
When Connecting Rod Bearing Caps are Set up

G. A. LUKES

After spending possibly a day to take down a crankcase, tighten up the connecting rod bearing cap and replace the crankcase of an engine, it is annoying to find that one or more of the caps are still loose and the repair work must be repeated. This trouble can be prevented by taking precautions to make the bolts and cap tight when they are set up.

As a small piece of grit or steel under the babbit or under the bolt head will hold the bolt or cap out, and this will flatten down after the engine is run, a small amount of play will exist and the pounding indicative of play will result. Instead of putting in the bolt and trusting it is tight, either a lead hammer or a block of wood and hammer should be used to pound against each cap and bolt, to flatten out any burrs or particles of grit after which, the nuts should again be set up solidly.

Another precaution is that of locking these bolts with split cotter pins. Where lock washers are used it has been found on occasion that these will break in two and drop out, thus leaving the cap loose. Avoid this possibility by using cotters in places when the necessity of tight bolts is vital as in connecting rod parts.

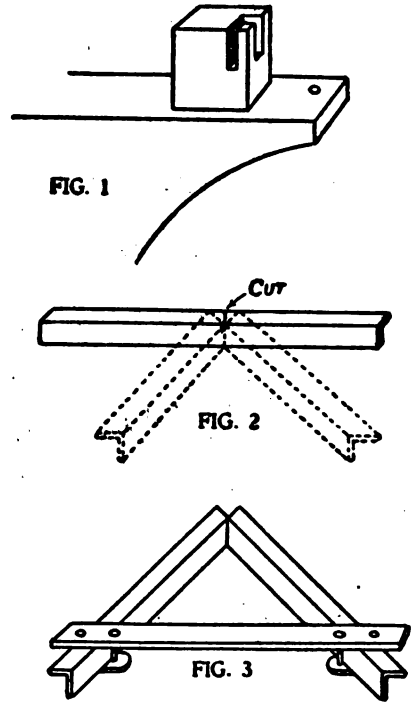


CARE IN THE SETTING UP OF CONNECTING ROD BEARINGS WILL SAVE TIME AND TROUBLE

Forging Angle Irons to a Square Corner

In response to a question on how best to make square corners in heavy angle iron frames when the flange is on the outside, a writer in "Work" describes the following method which will interest readers who do angle iron work. Reference in the item to "glut" is evidently the English smith's word for what is popularly known in U. S. as a "Dutchman."

To forge corners in angle iron a bottom tool as shown by Fig. 1 will be required, and the method of procedure is as follows: Thicken up the angle iron a little at the point where the corners are to be formed, cut through the top flange as shown by Fig. 2 and bend as shown by the dotted lines, but do not work up the inside flange to a square point but leave it slightly rounding. Place it in the tool and scarf down the edges where cut. Then prepare a glut of a size that will just fill up the gap that was made in the top flange by bending, scarf the edges to correspond to those made on the angle iron, take a welding heat on the two parts, pass the angle iron in the tool, place the glut in position and weld in together. Cut off the superfluous iron formed by welding in the glut, but before finishing the flange to proper size work up the rounded



HOW SQUARE CORNERS ARE FORGED IN ANGLE IRON

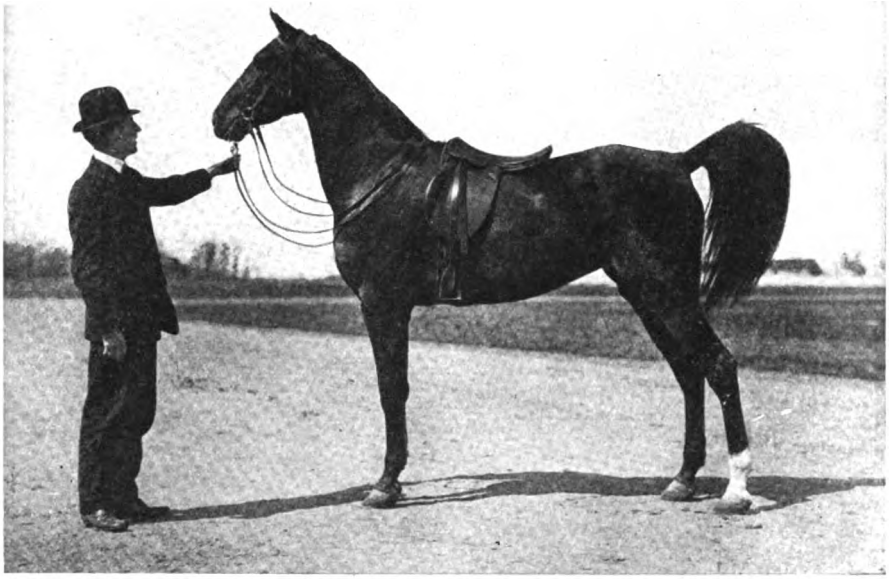
corner of the inside flange to a square point if so desired. Another method of making frames of angle iron is by dovetailing and brazing the corners. This method is usually adopted in the making of casements, and casement frames, sash and skylight frames and similar work. Notes on the foreging: (1) If the glut is made on a light porter bar a better welding heat can be obtained, and ensures a sound weld being made. (2) If a frame is being made with more than one corner, bend all the corners and weld up the ends of the inside flange to the size required before welding in any of the gluts. Should the frame lengthen a little when welding in the gluts, it can be brought to the right size by working up the rounded corner square, as before mentioned. (3) If only one corner has to be made, a bar should be fixed across so that the corner can be kept in position whilst the glut is being welded in (see Fig. 3).

Some Observations on Shoeing

JOHN A. MUNROE
(New Zealand)

Those diagrams by Blue Nose" some months ago put me in mind of

some of the incidents that have happened to me in the trade bearing on this very subject. There was a farmer who had two draft horses, one of them with a forward growth and one of them with a downward growth of the foot. They were both shod the same day. When the horse with forward growth came back, the shoes were under the heels and the clinches were up. farmer was inclined to growl, as he said that the other horse was O. K. I looked up my records and found they had been shod five months before. When the other horse came in, the shoe was exactly where it had been put, and the clinches were O. K., but the horse had grown considerably taller in the meantime.



THE HORSESHOER MAY WELL BE PROUD OF HIS WORK ON SUCH AN ANIMAL AS THIS

Another case which I recall was of a horse that had developed seedy toe in the front feet. I rasped off all of the forward projection, and the owner was so well pleased at the improved appearance, that the next horse he brought, which happened to have feet with a down growth, he suggested that I shoe the animal the same way.

Another case in this connection, was that of an aged horse which had developed a lot of forward growth in the feet and the shoer who had shod him had taken it off. The animal had cast his front shoes and had travelled some miles unshod. The owner sent me a diagram instructing me to take about one inch off the bottom of the wall at the toe, and nothing off the front. The owner also said that the former shoe had "messed up" the animals feet considerably, and I am sure he did for I could still see rasp marks on the wall of the foot up as far up as the hair. There was not enough on the bottom of the wall when this horse came to me to get a level bearing to say nothing about taking an inch off the bottom.

I have many years ago, discarded the idea of shoeing all horses to the standard foot, for the simple reason that they are not all standard horses. The forward growth belongs to the fast horse with sloping shoulders and is put there by nature to meet the wear as the toe reaches the ground first. This is proven by the unshod foot in its wear without the shoe. The foot with the down growth belongs to the slower horse with a higher action, and accompanies a steeper shoulder. And in like manner, this growth is there to meet the wear of a foot planted squarely on the ground. When we shoe these animals the growth accumulates instead of wearing off, so that this accumulation of growth must be removed with the knife.

Diagrams tell us something and are certainly of value when you take the two extremes of growth. It may be said when discussing the subject, that you take nothing off the heels of the foot with the forward growth, but you may take some horn off the circle from the toe to the nailing point as well as off the bottom at the toe. However, with the foot of down growth, you take nothing off the circle, confining the paring of the horn to the bottom of the wall.

However, after all is said and done, this old saying still holds good:—"First show me the horse and I will tell you how he should be shod."

Describing the shoeing of the medium foot only and not detailing the exceptions, leads the young shoer and the inexperienced man astray. They are very likely to reverse the correct way of trimming the feet as detailed above and thus create an incorrect position of the foot bones and the bones of the limb above them.

Queries Answers Notes

Wants To Solder Aluminum:—I haven't been able to find successful method of soldering aluminum. If there is any brother craftsmen that can give me any useful information on the subject. I would like to hear from him in the next month's issue. J. N Pool, Tekas.

Trouble With Ford:—I have a Ford car with which I am having magneto trouble. The magneto and field both seem to be all right. It starts easily with quarter turn of crank, runs nice at slow speed, but as motor attains speed it starts to miss until it is hitting one cylinder only and then finally stops with no current whatever.

Lights burn at low speed but as motor speeds up lights die down until finally go out all together.

Car has just been overhauled, wiring looked over and new timer installed. Magneto was dead before overhauling. Magneto properly set with no end play in crank shaft. Have tested magneto post, and it is O. K.

Engine runs good off batteries and runs same from both coil terminals. Have never had it wired so magneto could take current from batteries.

W. B. Hooper, Kansas.

Are you Interested in Glass Working?—Would it be possible to have an article on plate glass cutting and beveling in "Our Journal"? We are contemplating taking up wind shield and closed car window work in connection with our other leins. L. F. S., Ohio.

Editor's Note:—Here is a new suggestion for "Our Folks" Are any other readerds interested in this subject? The Editor would like to hear from every reader who is doing plate glass work on autos. Of course, if its of interest we want to answer questions and publish articles on this work. Write the Editor now if you do any glass work as mentioned by L. F. S.

The Right Idea:—Am sending money order for subscription to be sent to a brother who has just opened a shop. We told him if he wanted to keep up with the craft to get in line and get "Our Journal." Inglis & Son, Nebraska.

North Carolina Shoeing Prices:—I am getting but $1.50 for shoeing all-around, and some of the shops here are getting but $1.00. I have been shoeing about five years. I am twenty-five years old, and have the reputation of being the best horseshoer in the community.

C. C. Stone, North Carolina.

Wants Information on Steel Work and Channel Iron:—I would be very much interested in any information on the tempering of steel, such as punches, dies, taps, etc., and also the bending of structural steel such an angles, channels, and similar shapes.

Wm. Vandervort, Pennsylvania.

Wants Torch Welding Prices:—I would like to see the prices that the different boys get on dicerent jobs of torch welding, such as gears, blocks, frames and other parts. I'd like to know whether they are the same the country over.

Herman Lambrecht, Illinois.

Several Plow Lay Questions:—What can I put in my quench water to make lays hard so they will scour? What will I put lays in to keep them straight when I harden? When putting them in water they get crooked. What kind of frame will I use to keep them straight?

W. Olsen, South Dakota.

A Torch Welder in Sask:—I don't want to miss any of the copies as I find it most helpful in my business especially the article dealing with oxy-acetylene welding. I am no expert with the torch, having only recently added one to my business, but with the help of such articles as you print from time to time, I hope some day to be able to weld with the best of them. Wm. Shippman, Sask, Canada.

From A General Ohio Smith:—I am still a young man, but have had some bad luck, but I am not kicking about it. I have had 24 years at horseshoeing, and country blacksmithing, and about 7 years in a big hammer shop, but I got hurt with a big drop forge hammer about three years ago, so I went back to the country, but the work has changed in this location. My work is everything. I can handle most any kind of work except the electric systems on some of the large cars. Thos. G. Allspach, Ohio.

Wants to Repair Auto Wheels:—I would like some information in regard to the building of auto wheels, and putting rims on spiders, without spoiling them. I have filled lots of wagon wheels and rimmed them, but never tried auto wheels but once, and that cost me "a day's wages". I see some wheels are built up without being dove tailed, but the spiders are dove tailed, and glued together. Do they have a press or form to hold them in while putting the rim on? I can get a lot of of that work to do if I could do it, and do a good job. Perhaps some of "Our Journal" readers could give me the information. Some may have different ways of doing the work, and I am a smith not a wheelwright.

I. N. Bowen, Washington.

Wants to Know Journeymens Wages:—All articles have been fine so far, especially the Questions and Answers. I have a large trade and do a good business, but the past year has been a corker.

I would like to see an article on the average wage for a journey workman. It appears to have eaten most of the profit the past twelve months. We pay on an average of $5.00 per day for nine hours, and get good prices for most of our work.

The day of the old "hardshell-roughsmith" has past. Let us all be modern and get out of the rut. I get my price regardless of the cheap shop though we have them here too.

C. M. Marrett, Illinois.

Wants to Make Special Machine:—I am working for a large lime plant which has 20 kilns for burning lime. I am now building bins for a big storage house, hydrauling plant, stone-crusher and pulverizer. I do horseshoeing, cart building truck building and steam drill work, also all kinds of machine work, repairing and babbitting—in fact all kinds of mending, except peoples ways, and there is lot of that to do, but I can't do it to give satisfaction.

"I am going to ask a favor of you. I am going to make a shanking machine for the hollow drill bits; a machine to stove a ring on the bit 3¼ inches from the end of the drill. If some one has a machine of that kind, I certainly will appreciate it if you will send a sketch of it to me.

W. C. Adams, Virginia.

Wants Information on Bullet Molding:—I would like to know whether or not there is a better flux for melting lead than I have used. I have used resin, tallow and bees-wax. My trouble is in molding bullets. I am troubled with air trapping in the mold. I have the lead hot enough to char a pine stick and sometimes hotter. The mold I heat hot enough so that the lead in the spruce does not set instantly. I use an ideal dipper, the best I know of, and yet I have to melt back from 25 to 75 per cent of the bullets I pour. This seems like work for nothing. My mold is all right and is capable of making good bullets and does. The bullets I have to discard are generally all right except a flaw on one of the bands caused by the air not getting out. My mold does not fit so close as not to allow the air to escape.

Is there any difference in the quality and nature of pig lead like plumbers use, and the bar lead, usually recommended for bullet making? I am using pig lead at present and mix one part tin to forty parts lead. Otto A. Wagner, Kansas.

Louisiana Prices—Welding—Price Cutting:—I give you a few of my prices as follows:— Horse Wagon axle front, $5.50 Rear, $5.00; Bolsters $2.50 and $3.50; Tongue $5.50; Tongue Hounds $6.00 per Pr.; Circle or Sq. Hounds $6.50; Back Hounds, $5.00 per Pr.; Spoking wheel $5.50; Filling wheel $7.50; Shoeing up to No. 3—Filling wheel $7.50; Shoeing up to $3.00 per hour for mill work.

With reference to welding—A clean fire, good coal, and a little experience will do any kind of welding from a car spring to a piece of rotten iron.

A few words along with W. M. Roprice that he has ever had, for he has barge of Michigan; I have some competitors that are slashing the price of our work on account of scarcity of work and money. I am however going to hold up my price as I consider the blacksmith has the best chance now to hold onto a fair never got enough for his work. If we only keep the weak-minded fellow from cutting the price, in three years, everything will be all O. K.

G. W. Edwards, Louisiana.

From A Charter Reader—A Wood Bending Hint:—I am sending you my check for five dollars to pay for my subscription. I think that will last as long as I need "Our Journal" because I am now going on 60 and it will soon be time for me to quit.

I have now read your Journal for almost twenty-two years. I just looked up the first issue I got—Volume 1, No. 2, November, 1901. Here I see a question and answer from Mr. Edward A. Stone about the best way to bore out a steam engine cylinder, also one from Mr. M. J. Morgan about the size of a pulley to run an emery wheel. I have most every issue from this down to last month's.

Now do I have to tell you how I like "Our Journal?"

I have been in busines here for 29 years and have worked out three competitors and am now starting on the fourth one. I am reading the American Blacksmith, Auto & Tractor when ever I get it.

Here is a hint I want to offer to those woodworkers who want to bend any small wood work such as small sleigh runners, ribs for boats or any such small wood stock. Just take a piece of pipe long enough to hold the material cap one end tight, put the tight end in the fire and slant the pipe so you can fill it half full of water. Pu your wood in the water filled pipe and keep the fire going until you get the wood as limber as you want it. If the water gets low, fill in more so as to not burn the wood.

Onton Olson, Minnesota.

An Illinois Letter—I don't want to miss a single copy so am enclosing check for $3.00 to pay for several years more.

I like the oxy-acetylene and horseshoeing information I get out of "Our Journal". I am the only one in this city with a welder. I have a Rego Model L, ten tip machine, and I can handle almost any job that comes my way. I have a 3-horse motor; a Canedy-Otto double emery stands; a little Wonder disc sharpener; a Champion Electric Blower, and about all the tools a smith needs. I do general work, also wagon wood work, and keep at it from 9 to 14 hours a day. But I still find time to read "Our Journal".

P. P. Vondenbosch, Illinois.

From A Veteran of the Craft:—In regard to just what class of articles I should most like to see written in "Our Journal—it is difficult to say. Formerly I was in the wagon and carriage business—followed it all my life. The auto however, put that class of work in the hole. I always did love to look at a good piece of carriage forging but it is now a thing of other days. I repaired autos for a time, and did a good deal of spring work, both new and repair jobs but I have now seen too many winters to follow auto work. They hang too close to the ground for any pliable limbs. I therefore have not much choice in what articles should be written in "Our Journal", as most of the old time anvil ringers—that is those that are able—are in the auto repair business. I presume articles on auto and tractor work, and also oxy-acetylene welding, will at this time interest the majority of readers.

J. G. Smith, California.

A Nebraska General Shop:—My shop is a "two-horse concern", that is, I work mostly with one helper. Our work consists of horseshoeing, plow and wagon work and oxy-acetylene welding.

We are getting good prices for our work, such as these:—New shoes Ns., each, $1.00; New shoes common, 90c; Resetting, 50; Sharpen Plow Lugs, $1.00; Cut down Wagon, $14.00; Labor by hour, $1.00.

I am enclosing photographs of my house and shop, which tell more of my doings that I can tell. I own in addition to these, 520 acres of good farm land in South Dakota. Fifteen years ago I came here with $240. and two strong arms and the art of blacksmith well learned.

Regarding "Our Journal", I want to say that the men at the head of it are sure doing their share.

E. G Schauppner, Nebraska.

THIS NEAT APPEARING SHOP IS RUN BY E. G. SCHAUPPNER OF NEBRASKA

THIS IS MR. SCHAUPPNER'S HOME WITH THE FAMILY IN THE FOREGROUND

An Interesting Kentucky Letter:—I am well satisfied with my investment in the paper, as I like it fine, and expect to read it as long as I stay in the blacksmith business. I have got lot of help from it, and am still getting help in every issue.

I have a real country shop am ten miles from any town in a good farming locality of old Kentucky. I have a nice business. My shop is 30 by 50, have a six horsepower Oil engine, Parke's Combination wood worker, power drill, emery wheel stand, rubber tiring machine, and other small tools to complete the equipment of a general repair shop.

I do all kinds of repair work on farm machinery and sell repairs for Deering and McCormick mowers. We are doing some auto work. I have a Ford car of my own and have been running it nearly three years, and have kept it up myself. My customers asked why I could't work on theirs if I could keep my own up and so I told them if they were ailing to risk me, I would do my best. I have had fine success on these jobs.

I am planning to do more auto work from time to time, so the more automobile dope "Our Journal" has the better I like it, as I have a lot to learn before I make an expert auto mechanic. I don't think I am too old to learn however, as I am only thirty-four.

I have worked at the blacksmith business for fifteen years, and have been in business for myself nine years. I like my work here, all except the shoeing. I don't like that as well as I once did.

A. J. Grubbs, Kentucky.

An Interesting Indiana Letter:—Regarding my shop and how it is run. It is a two-story structure covered with a mortgage, but I am getting it (the mortgage) about torn off. I turned over a new leaf two years ago, and nothing but cash or one trial at credit of 10 days goes with me. It is funny to see how some farmers act. They will run a bill with you and then when they receive your notice they will send their wife in. Now who in thunder could turn a woman away? The farmers knows this and that is the reason he has her bring the work. If there is anything that will melt the heart of a strong smith it is a woman. Am I not right? Well you tell her the time she can get it and she says: "Please hurry, I've got a nursing baby at home." Just to make you rush and you are thankful that a man hasn't the same excuse or you would tell him a headfull.

In the shop there is a 4-horse gasoline engine, a power drill, emery stone and an electric blower for the force. I do the blacksmithing and another man and myself do the wood working.

It is useless to give you the different prices, but I've got them to where I'm satisfied and the customers kick, so you know they are reasonable. I allow the Shop 70 cents an hour after deducting cost of material such as the iron and coal. On wood work I manage about the same giving the shop 70 cents a hour above expenses. Soon as I get the bill of goods, I mark the price and sort of hold my breath when I do it. On horseshoeing I am the highest and give them to understand that I'm satisfied at the price. A sign in the Shop reads, "If you are rated a credit of 10 days. Above all, Please Pay Cash."

J. Baldwin, Indianna.

Charging A Battery:—How can I charge a storage battery which is short a number of cells?—I have the care of 110-Volt or Cell Battery, which is ordinarily charged with a 3 K. W. 120-Volt generator. Now we have only 38 cells in the set which are in working order, and still we must charge with the 3 K. W. 120-Volt generator. Is there some way to do this without pushing the battery too hard or too fast?

W. C. Watt, Kansas.

In Reply:—The reader has not given detail enough in the paragraph to give a very definite answer. The question is somewhat misleading for it is impossible to charge a 56 cell battery on a 120 volt generator. We are assuming that this is a lead battery and not an Edison. A 56 cell battery on an open circuit with a normal reading of 2 2/10 volts per cell would give you 123 2/10 volts, your generator being 120 volt it would about float on the line. When a 56 cell battery is full it will read 2 5/10 and 2 6/10 volts per cell bringing your line voltage up to approximately 146 volts which in time would burn out your generator. Are you charging your battery in series or in multiples, Every generator should have a rheostat to regulate the output. Some are 5 to 20 amperes, the other 5 to 35 amperes. A 38 cell battery when fully charged will read about 96 volts with current flowing across the line and we fail to see where it would be of any service to you having 18 cells cut out as on open circuit you would only have approximately 78 volts. In regard to charging a battery of this kind, you can regulate your current by adjusting the voltage of the generator on a field rheostat, or by makin rheostat, take a two inch iron pipe 5 feet long covered with asbestos and wind with iron wire the kind they use for baling hay, have each winding about 1/16 of an inch apart and connect up to circuit or by taking a 40 gallon crock, fill 7/8 full of water and use two old battery plates for electrodes, add acid or salt to get the required amperage.

From the above, we believe any one that is at all familiar with a battery and the charging of batteries, would receive the desired information Of course, if this should be an Edison battery a part of what we have said would not apply. You can readily see that it would be easy enough to charge a battery with a lower voltage that the generator but the only thing that you would have to do is to pu in rhesat in the circuit as we have suggested, but when the voltage of the battery is greater than the voltage of the generator it would be impossible to charge it. However, this could be done by charging a part of the battery at a time for instance one half of the number of cells.

Wickey Battery Company, Illionois.

VOLUME 21 NUMBER 9

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

SEPTEMBER, 1922

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Contents September 1922

Price Cutting and Common Sense

Wanderer's Tale this month will interest every reader of "Our Journal." This story tells how one shop owner beat a price cutter at his own game. Do not fail to read that story in this month's issue.

Price cutting is an ever present evil in practically every line of business endeavor, and the general repair shop seems to be afflicted with the price-cutting bug, just about every so often.

To mention price-cutting in the same sentence with common sense, as we have done in the title to this editorial seems rather queer, because when common sense is present, price cutting is never considered at all. You can review the entire history of business endeavor and will not find one single case where the price-cutter has been able to point to any very material gain, either in profit or business that has been the result of price cutting. In looking at the question of price cutting, perhaps the most sensible and logical way to consider the subject is to look at it from your very own standpoint. Consider for the moment where you place your regular worth-while business. In other words, from whom do you buy regularly with the confidence that you will get just what you pay for, and that all things considered, it will be delivered according to specifications? That sort of business you are placing with a house from whom you know you will get just what you ordered. That sort of business you turn over to a firm where you know you are able to buy at the bottom price—that no one else is buying any cheaper than you are.

There is no question or argument about the fact that each and every one of us like to buy just as cheaply as we can. There is perhaps no member of the human family that can resist the temptation of bargains and bargaining, but the regular substantial and worth-while business in the business world, is transacted on the basis of one price to all.

When considering the matter of cutting prices, just review these several points on the subject and then you are not very likely to cut.

BETTER SHOP EQUIPMENT.

Second only to practical mechanical knowledge is the matter of equipment in the consideration of the necessary attributes to success in the general repair and service business.

There is of course no question whatever regarding the necessity for practical knowledge on the part of the shop man in order to make a success of his business. On the other hand, the general repair man may have a world of experience and practical ability for repairing implements and machinery of all kinds, and yet if he does not have the advantage of proper shop equipment he is compelled to depend upon makeshifts continually, and thus be forced to work under a continual handicap.

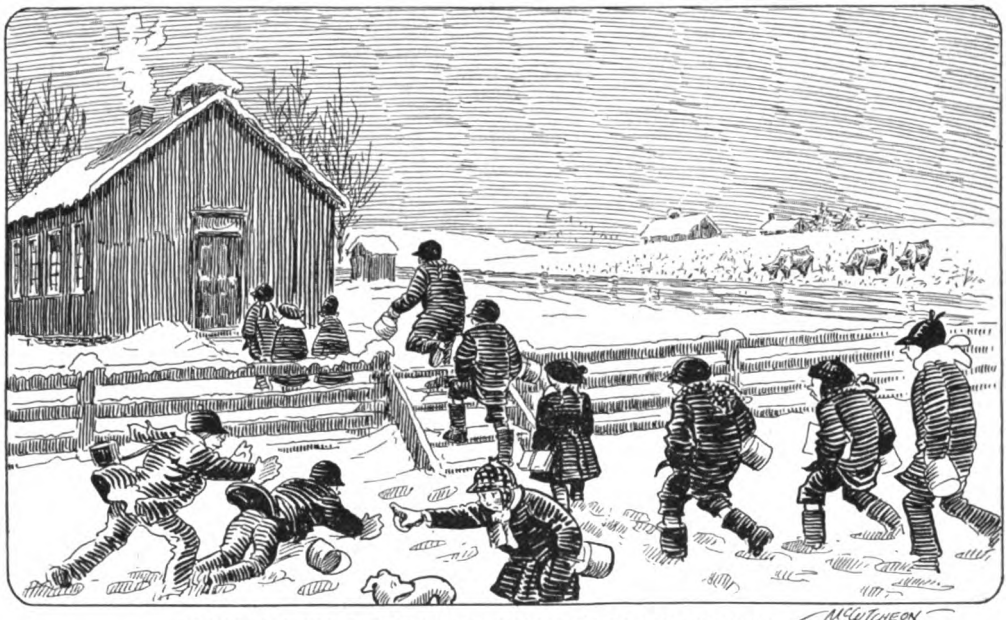
The item of shop equipment in the shape of machines and tools which are now to be found on the market, leaves little to be desired along these lines. There are in fact an almost unlimited number of tools and machines which the practical implement and automotive repair man can call to his aid.

Of course it can be argued from the other angle, that the best of shop equipment will not make a competent mechanic of a poor repair man.—However, a good mechanic is a better one, when he has good and proper shop equipment.

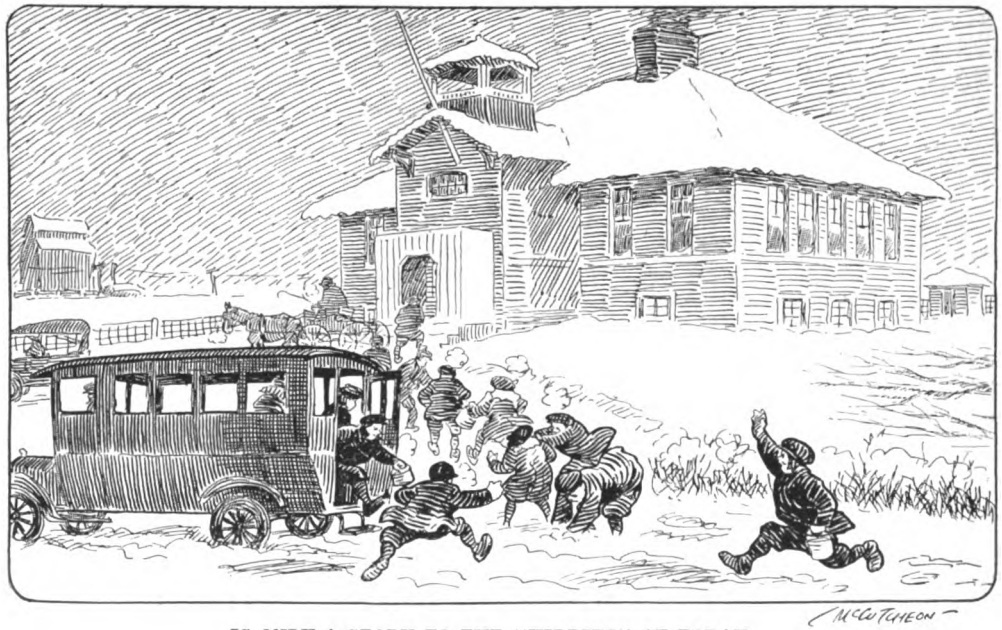
Good shop equipment is one of the most important things in delivering good service to your customer. The well equipped shop is an excellent advertisement in itself. And added to this, and when coupled with the resulting good service, it makes a combination that is almost impossible to beat.

"The Changing World"

BY JOHN T. McCUTCHEON



THE LONG COLD WALKS TO THE LITTLE RED SCHOOL—



IS ONLY A STORY TO THE "KIDDIES" OF TODAY

This is the third of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

How To Braze Cast Iron Machine Parts

GUSTAV H. RADEBAUGH

To do a good job of brazing it is necessary to build the right kind of a fire in the forge. Most of the difficulties met with in brazing castings are due to an improperly made fire.

One of the most important essentials in all forge work is a good fire. Many failures of brazing are caused, not by the kind of material used, as is commonly supposed, but by poor heating in a poor fire. Although not generally appreciated, mostly all the brazing difficulties that a beginner encounters are in the fire. The usual blacksmith fire is called an open fire, and it is used for general forging work. As noted in the operations, care must be exercised in building a good clean fire. The only way this can be accomplished is by removing all the old dead material and sorting all coke from the fire before discarding. Always save the coke, as no better material can be secured for use in a forge fire. The smith is sometimes wasteful with coke and it is discarded with the ashes, but every little piece should be saved. Clean coke is by many considered preferable to charcoal for brazing, because it makes a more even fire.

Coal that will coke must be the best grade of soft or bituminous coal. Good blacksmith coal will coke easily and is also free from sulphur. If much sulphur exists in the coal, it will make welding and brazing a difficult operation.

A good method to test coal for forge use is to break a lump. If it breaks easily, crumbling up into little grains and the newly fractured faces show up bright and not dull, it is in all probability good firing coal. The coal should crumble rather than split up into layers. Soft coal used for home firing is not good coal for forge use, because it makes a very dirty fire. A few bushels of regular blacksmith coal will last a long time. Good coal can be purchased from any local coal dealer.

In some brazing jobs a heavy scale may rise on the work when heating. This scale is called oxide and is caused by the air coming in contact with the job while heating. To prevent this, use a good thick fire, that is, have an abundance of firing material between the tuyere and the work.

The preparing of the fire bed is important. For the average fire for shop jobs a block 3½ by 3½ inches can be used for the fire block. This block is placed over the tuyere, as shown in Fig. 1. The blacksmith coal is then dampened down, this is called green coal. The green coal is now placed around the fire block, as snugly as possible. After this is done the block is removed. This hole keeps the fire together and holds in the heat.

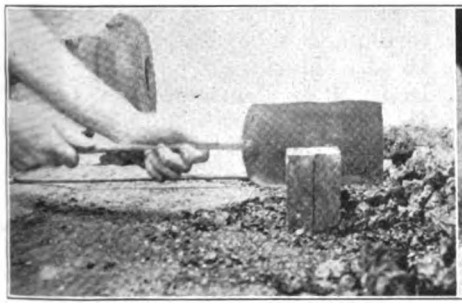


FIG. 1—THE BLOCK IS PLACED OVER THE TUYERE

FIG. 2—SHAVINGS AND OILY WASTE ARE FIRED IN THE HOLE

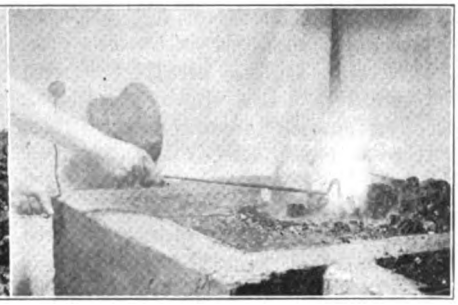


FIG. 3—THE COKE IS PUSHED INTO THE HOLE

Lighting the Fire

The fire is now ready to be started. Use shavings or oily rags. After lighting, as shown in Fig. 2, place them in the bottom of the fire hole and turn fan very slowly, this to prevent the firing material from going out. Break some of the pieces of coke that were placed to the rear of the hearth into small pieces. Place a few shovelsful on the newly lighted fire. Increase the air blast just a little after the coke has been placed.

After the firing material has burned for a few minutes, the fire hole will become hollow. The coke is pushed into the hole by using the rake, as shown in this Fig. 3.

How to Hold a Fire

When the coke is burning freely as in Fig. 4 it is good practice to mound up the fire a little with more coke before using the green coal. The green coal is now placed on each side of the fire and it is gradually worked into the fire. Sometimes it is desired to hold a fire for a short period. This is done by raking coke into a mound over the fire. It is then covered over with green coal. A good method to hold a fire for a long period is by thrusting a piece of hard wood down into the center of the fire before banking it.

After the fire is burning freely it is ready to use. A fire that is ready to receive the stock to be heated should not be giving off much smoke. In heating a job for brazing, too much blast should not be used. The coal requires a certain amount of air to burn thoroughly. If too much air is used the oxygen is not all burned out and this passes through and strikes the heated job forming an oxide or scale.

If forging jobs show this scale it indicates that the fire is not solid and thick enough to keep the air away from the steel. When placing the material to be heated in the fire always lay it level with the top of the forge, as shown in Fig. 5. If placed low in the fire oxide will form and also you cannot watch the amount of heat the material is receiving. In keeping a healthy fire for forge work always be sure that there is plenty of fuel between the tuyere and the work. Do not use a burned out fire; it

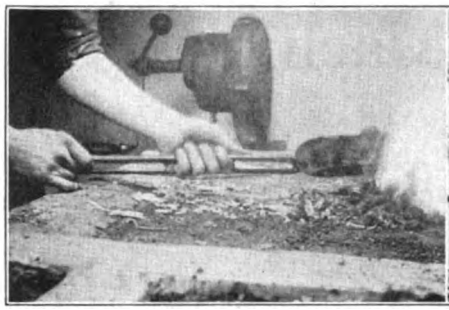


FIG. 4—WHEN COKE IS BURNING FREELY ADD FRESH COAL

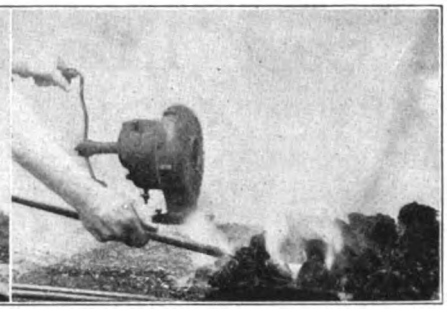


FIG. 5—THE WORK SHOULD BE PLACED HIGH IN THE FIRE

complicates the forge jobs and discourages the beginner.

Brazing a Broken Machine Casting

The repairing or replacing of broken castings on farm machinery sometimes leads to long and costly delays. However, the standardizing of part making has made it possible to secure repair parts through the district branch house without lengthy delays. But many times a repair is needed at once and even the time required to go to the city repair shop would be a costly delay.

The kind of material in the broken piece determines nearly in all cases the method of repair. If a steel strap, bolt, rod, or steel connection is broken, it is common knowledge among all that it can be welded. But in repairing a broken casting a somewhat different problem enters into the repair job.

Other Methods of Repairing

We find that the components of practically all machinery are made from malleable iron, cast gray iron, and steel castings. In the repairing of these casting there are several channels open for determining the best methods. The casting can be patched; that is, a steel strip or sheet can be placed on the piece with bolts or rivets. Sometimes it is necessary to forge or form the steel patch so that it will fit the shape of the casting. In malleable and steel castings, if their design permits the placing of such a patch, considerable time can be spent on the repair, as it probably would be impossible to get a new casting made in a local foundry. In cast iron repairing, however, it is sometimes advisable to have a new casting made, as the new part would be cheaper than the cost of the repair job. Foundries that cast gray iron are found in nearly all of our larger trading centers. The broken casting can, as a rule, be used for the pattern for making the casting. If a new pattern is required, the cost would be high and it would not be advisable, unless all other channels of repair had been investigated and this method to be the only solution of the problem.

Another method that is being used to guarantee success, especially when the mechanic doing the job understands the operation, is repairing the broken components by using the oxy-acetylene process. In this method a welding flame, which has an intensely high temperature, 6300 degrees F. maximum, is obtained by the combustion of acetyline and oxygen. The broken pieces are fused together when at a melting temperature.

Brazing Method

The brazing method of repairing broken castings has not been fully appreciated by the repair man as a method of repairing that he may employ. In using this method there is no reason why even the unexperienced man cannot familiarize himself with the process and perform the operation, with a little practice, the same as a repair man in the commercial shop. In brazing the only supplies needed are the brazing smelter or solder and flux. One good flux is the household powdered borax. The tools required are the file, hammer, pliers, wrench, forging tongs and a forge. With these few tools a good job of brazing can be done any one of the three castings named.

The brazing spelter consists of fifty per cent copper and zinc. This percentage may change some by makers of the spelter, but a mixture of about this proportion is generally used. This is cast into ingots and granulated into grades known as long, short, and fine grades. The short grade is usually used for broken casting repair work. This spelter can be purchased through any local implement dealer or general supply houses.

In brazing cast iron castings, in case the borax flux does not give results, a flux of the following formula can be used:—Boric acid, 16 oz.; chloride of potash (pulverized), 4 oz.; carbonate of iron, 3 oz. This mixture should be kept in a good tight jar, as moisture or long exposure to the air renders it less effective. This preparation is added to the smelter just before applying it to the casting.

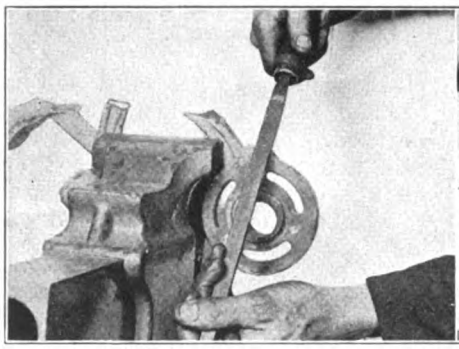


FIG. 6—THE CASTING MUST BE THOROUGHLY CLEANED

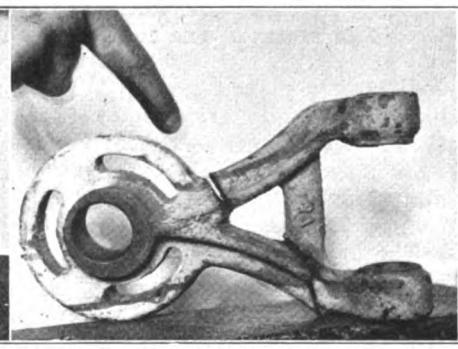


FIG. 7—THE BROKEN PARTS ARE FITTED TOGETHER AND ALIGNED

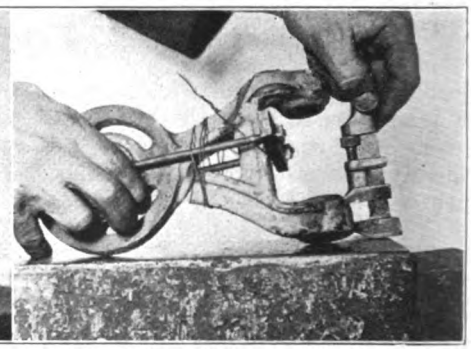


FIG. 8—THE PARTS ARE HELD TOGETHER BY ANY SUITABLE MEANS

In brazing, all the grease and dirt must be removed from the casting. This can be done by heating the casting to a dull red heat and then with a wire brush or old file remove any dirt particles left on the casting. The casting is then permitted to cool down. The broken edges of the parts are filed and are then clamped together by using bailing wire, strap clamps and bolts. Some

times a job is of such design that it can be bolted together. After the parts are joined together with this clamping arrangement, the job is then placed in the forge fire. This fire should be well coked and with a fairly deep bed. It is heated slowly until it gets to a bright yellow color. The flux is then applied separately or jointly with the spelter. This spelter and flux can be placed on the job with a rod which is flattened at the end. When brazing cast iron let it cool slowly, as sudden chilling may cause check cracks.

FIG. 9—THE FLUX IS FIRST APPLIED TO THE HEATED JOINTS

FIG. 10—AND THEN THE SPELTER IS PUT ON TO RUN INTO THE JOINTS

It is estimated that if a good job of brazing is done on a casting that it has within eighty percent of its original strength.

Preparing the Casting for Brazing

In this operation as shown in Fig. 6 the casting must be thoroughly cleaned, placed in the forge fire, and heated to a dull red heat. It is then taken from the fire and the dirt and scale are easily removed with a wire brush or an old file. The edge of the casting should be beveled as shown in this view. This is done to permit easy flow of the spelter when the brazing operation is being performed.

The broken casting in position to be clamped together is shown in Fig. 7. It should be fitted together and the clamping arrangement decided upon that will hold the casting rigidly and firmly. The alignment of holes must receive careful attention when clamping, as there is some possibility of trouble after the brazing is completed if any holes are out of alignment. Some mechanics have found that by placing the flux on the cracked surface of the job before placing them together that it causes the spelter to flow freely.

Clamping the Pieces

The clamping or fastening may be done by using screws, wires, bolts, or clamps as shown in Fig. 8. If it is at all possible, the pieces should be held in such a way that the job can be turned over during the brazing operation without the alignment. This is essential in order that the brazing flux and the spelter can be placed on all sides of the casting.

A good job of brazing cannot be done unless the pieces have been securely clamped together. It pays to spend considerable time on this operation, because you will encounter discouraging conditions when the job is in the fire if the pieces are not firmly held together.

Brazing the Casting

Malleable castings, grey iron castings, and steel casting can be brazed. The same brazing methods and materials are used on these castings.

After the pieces have been clamped, as shown in the engraving Fig. 8, a fire is built in the forge as already described. Heat the casting slowly until it shows bright yellow. With a flattened steel rod, as shown in Figs. 9 and 10, apply the flux and spelter. This must be done while the heat is maintained at the bright yellow temperature. The spelter should run freely at this temperature. Do not remove the casting from the fire when turning it over. When you are satisfied that the spelter has flown into the break, the casting is then permitted to cool down. When brazing a grey iron casting it is good practice to permit the casting to cool down with the forge fire. This will prevent check cracks from showing up.

The job is removed from the cooled down fire and, if still hot, it is placed in ashes. This, of course, is not necessary unless it is thought that the casting will crack by contraction strains coming on the weaker parts of the casting. After the job has cooled down so that it can be handled, the brazed seam as shown in Fig. 11 can be cleaned up with a file. The casting is now ready to place in service.

How Tom Howard Made 'Em-Stop and Buy

E. A. BLACK

Tom Howard was a general smith who had attempted to break into the automobile game for the past two seasons. He thought that about all he need do was to put up a new sign adding automobile repairing to his general blacksmithing and automobilists would come flocking into his door. It did not take him long, however, to realize that something more than this was necessary. True his automobile sign did bring some business his way; an occasional repair job from his farmer customers, and an occasional emergency repair job from a tourist. But this does not put any shop owner into the automobile repair business very strongly and he soon realized that something was necessary in order to make the owners of automobiles and trucks stop at his shop.

After considering the problem for some little time, he naturally asked himself the question;—How can I make them stop at my shop and give me a chance to do their repairs, make their adjustments, and sell them accessories! The most necessary item of automobile, truck and tractor operation is gasoline''—concluded Tom, and after reaching this conclusion, he was not long in having a gasoline tank and pump installed before his shop. Where he had previously had a cinder driveway leading up to the shop door, he now arranged a neat, cinder parking place, in the center of which he placed his gas service pump.

Tom figured that if he could stop only five cars out of every hundred which passed his establishment,—Tom's shop is located on one of the important state highways—he knew that he could make a neat profit on gas sales alone. And added to this was the opportunity for selling accessories and doing gen-

FIG. 11—AFTER COOLING THE CASTING IS CLEANED UP WITH A FILE

eral repair work. He knew that his automobile department would take a big jump.

And no sooner had this gas pump been placed in running order, when highway travelers soon turned in to his parking place for gas and oil. But still Tom was not satisfied—He was still looking for a larger proportion of stops at his place, and after again considering the problem, he concluded that about the best way to get anyone to stop an automobile is to ask them to stop, and that is just exactly what Tom did by erecting a large banner sign which he stretched overhead across the road in front of his shop. This was lettered on both sides. "By actual count", Tom says "about twenty-five out of every hundred automobiles that pass this place stop for gas or oil."

"ASK 'EM TO STOP" IS TOM'S SLOGAN

According to Tom Howard, the gas service pump is the real booster for the sale of accessories and the enlargement of repair shop service.

A Simple Small Muffle Furnace

W. S. ROGERS
(WORK)

A small muffle furnace is often desirable for the purpose of heating special work in heat treating and other operations and for occasional use the furnace here illustrated will be found to answer very well. As shown in the engraving this furnace is designed for use with an ordinary blow torch.

The furnace is built of sheet-iron as a rectangular box. Fig. 1 shows the furnace in sectional view complete with muffle in place and blowlamp, the flame of which is playing on the under surface of the muffle. A circular vent is cut in the top of the box, and a shelf is attached to the front, supported by two angle pieces riveted to the sides of the box. Below the shelf the box front is cut away in semicircular form to admit the flame. At the back of the box, inside, an inner ledge is fixed at the level of the base of the muffle to support it at that end, and a semicircular opening to fit the outside contour of the muffle is made at the front.

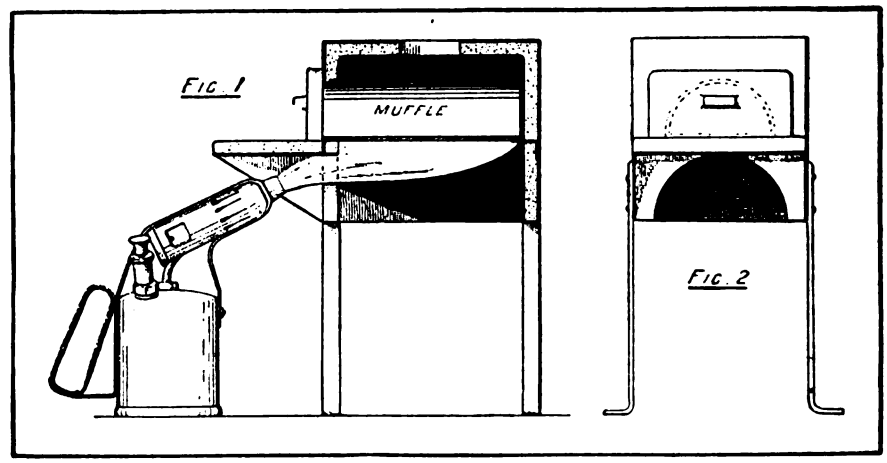
Before the muffle is inserted the box is lined with fireclay to a thickness, say, of ¾ in. The upper surface of the shelf in front is also covered with fireclay. It can be worked up into a plastic mass and spread over the iron surfaces to the necessary thickness. The blowlamp may then be made to play on it until it is baked hard. If no lid is supplied with the muffle, one can be made from the same material, the form being as shown in the two illustrations.

Legs of strip iron are riveted to the box as shown, their height being such that the blowlamp flame will take the angle indicated in Fig. 1, by which the flame is directed along the whole length of the muffle.

In use, the muffle must be brought to a bright orange-red heat before the work is put into it. Regulation of the heat may be effected by moving the blow lamp forwards or backwards, as circumstances dictate.

Fig. 2 is a front view of the furnace, in which the muffle end is indicated by dotted lines. The sheet-iron work being so simple in character no details of the jointing have been shown in the illustrations. The furnace fitted with a 2-in. muffle would measure overall about 13 in. high, 12 in. from back to front, including shelf, and 6 in. wide.

Even smaller dimensions would result if, for the fireclay lining, asbestos sheet were substituted; but it would be less satisfactory than the fire clay, the greater bulk of which serves better to retain the heat and to equalize it.



A SIMPLE MUFFLE FURNACE. FIG. 1—SECTIONAL SIDE VIEW WITH TORCH
FIG. 2—FRONT VIEW OF FURNACE

Cutting Your Electric Power Costs

Electric power is no less important in the repair shop than in the large manufacturing plants. Yet it has not, until recent years, been given the proper consideration. The number of motors in use has, within the last 7 years, increased from 343,000 to over 766,000 in industrial plants alone.

It has been common practice to consider a motor which has failed to give service, as being "worn out". If it seemed to have served a reasonable length of time the first thought was to replace it with a new motor.

The more recent necessity of cutting power costs has revealed some interesting facts to electrical engineers. Motor houses that specialize on rebuilt motors have found an ever-increasing demand for motor reconstruction. Out of over 1,200,000 electric motors now in use in the States, it has been estimated that over 400,000 have been completely rebuilt. Comparative tests made in industrial plants show that a properly reconstructed motor gives service equal to a new one.

Cylinder Regrinding as A Business for the General Repair Shop

To build up a trade in Cylinder Regrinding the shop owner must know something about the Advantages of Regrinding. In this article the Talking Points of Regrinding are detailed—This article tells you how to Sell Regrinding to your Customers.

To do grinding, fitting pistons, rings, and pins successfully one must have the proper equipment. We have listed below the machines and accessories that make up such a shop. Prices for these will vary, especially if second-hand tools are used. Therefore it is hard to state any given value. Jobbers and machinery dealers will be glad to fill these in, and the amount of capital required can be determined at that time.

Here is a list of machines that will be required. One or more of these may already be in shop so that this list may name several items of equipment that need not be purchased extra.

One Cylinder Grinder fully equipped.
One Small External Grinder.
One 14-inch Lathe.
One Sensitive Drill Press.
One 10 H. P. Motor.
Expanding Reamers sizes 5/8 to 1½ inches.
Shafting Hangers and Belts.
Benches and Tools.
Supply of Pistons, Rings, Pins.

This comprises a fully equipped shop planning to use semi-finished pistons. For any one just starting in, it is possible to do away with the external grinder by using finished pistons.

When thinking of putting in equipment to refinish cylinder bores, remember that the heart and success of a regrinding shop is the machine that is used for grinding the bores.

Many new regrinding machines have recently come into the market and it will pay you to make a careful investigation when you buy. It takes years to perfect any machine tool and also to build up an organization that will give you practical service and personal attention, which is of inestimable value.

Component Parts

For small concerns starting in the grinding business, it is by all odds more desirable at first to buy pistons, rings, and wrist pins in various sizes from the manufacturers of these parts, confining all the efforts to regrinding and fitting up the component parts. In this way, a large volume of business can be done with a very small organization and thus net a very tidy profit.

A certain amount of stock of all these parts should be carried, depending on the class of trade, distance from the source of supply, and the size of the shop.

Pistons

Pistons can be carried in three different stages of completion: rough, semi-finished, and finished, depending on whether the equipment of the shop will take care of the balance of the finishing operations.

Finished

Finished pistons are furnished finished complete, minus rings and pins; but these in many cases will be included, if so ordered. They usually come in oversizes of standard .003, .005, .010, .015, .020, .025, .030 and .040.

Semi-Finished

Semi-finished are finished with the exception of the outside diameter which is left large to be ground down to the required diameter, and the wrist pin hole, which is rough reamed and must be finished reamed

Rough

Rough pistons are simply castings as furnished from the foundry and must be entirely machined, requiring considerable equipment.

Some piston manufacturers will furnish them in all three stages, others in only one or two. Upon request the Subscriber's Service Bureau will give you the names of the nearest manufacturers and distributors who will furnish pistons as desired.

Piston Rings

There is such a diversity of opinion in the relative value of different styles and models of rings that it is impossible to advise the best style to use. Material, original castings, method of machining, style of cut, number of pieces, etc., all enter into the advantages as put forth by the various manufacturers. It is, however, poor economy to install cheap rings in a regrinding job, and in a very short time it reflects on the quality of regrinding and will give the customer all sorts of trouble.

If the trade in some particular locality demands it, it may be necessary to carry some of the higher priced several pieced rings, but the fewer styles carried allow a larger variety of sizes in the same style on a similar investment.

After all is said and done, the prime essential of any ring is to have sufficient tension and be round when seated in the hole.

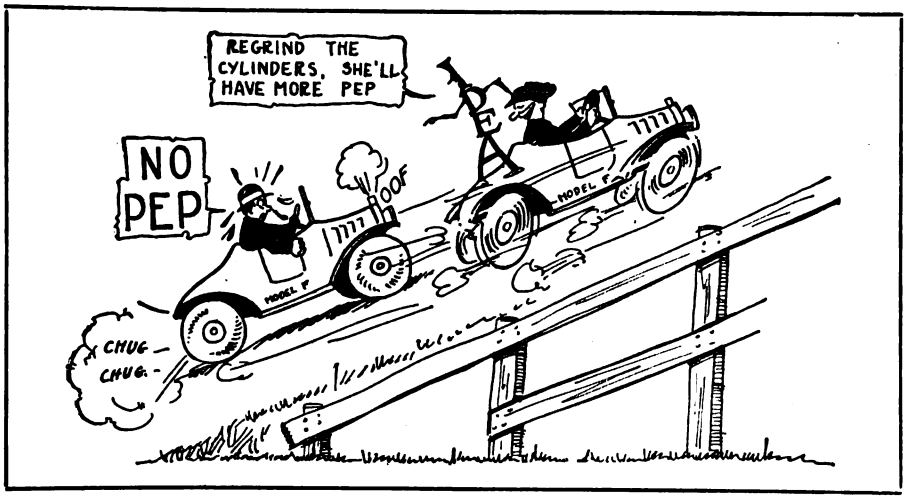
Rings from practically all manufacturers can be obtained in oversizes of .005, .010, .015, .020, .025, .030 and .040 and names will be furnished upon request.

Piston Pins

Piston pins are a very important

A FEW OF THE POSSIBILITIES IN THE BUILDING UP OF A REGRINDING BUSINESS

item and one that should be carefully considered. The pins should be made of the best of steel, hardened, carefully machined and ground to close limits. They should absolutely square with the base of the cylinders. Otherwise there will be a noticeable loss of power and pep, excessive use of gas and oil out of proportion to the service



WHEN THE OTHER CAR PASSES HIM ON A HILL TELL YOUR CUSTOMERS TO TRY HAVING THE CYLINDERS REGROUND

possess a hard outer surface and a tough non-brittle core. No small shops should attempt to make them, as they can be secured far more economically and of better quality from concerns of proper equipment who make it a business to manufacture them.

They can usually be furnished finished in oversizes of .003, .005, or .010 from stock on standard makes and models of cars. Specials will be made up on order.

Semi-finished pins can also be secured from many manufacturers. It is only necessary to grind down the outside diameter, which is usually .030 to .035 oversize.

Names of firms furnishing pins will be sent upon request.

Why Motors Should Be Reground

No one knows so little about cylinder regrinding as the average motor owner. The manufacturers have long since recognized regrinding as the best method of finishing cylinders. Many of the repair men advocate it; but to the owner it still means an unnecessary operation, only another way to add a few more dollars to his already overtopped garage and repair bill.

It is, however, so vitally important in helping the engine to function properly that careful thought and study should be given it by every automotive mechanic as well as driver.

It is essential, to have a motor run properly, that the cylinders be reground so that they do not vary more than a .001" as to roundness; and the hole must be straight and rendered, piston slap, continual fouling of the spark plugs, and general troubles of all kinds.

Compression

It is necessary that your cylinder bore be straight and round to obtain the proper compression. You cannot fit a ring and have it tightly seal a cylinder with an unround hole or one where it has been enlarged in the top, either by error or inaccurate machining. Compression means a live motor, and rings must fit the hole to have it.

Waste of Gas and Oil

When a motor has lost its compression, knocks on the hills, etc., the owner usually makes the mistake of trying to cure the trouble by enriching his mixture. While temporarily this will cure the trouble, an excess of raw gasoline in the cylinder, on the compression stroke, is forced past the rings, thinning the oil and destroying its lubricating qualities and possibly resulting in scored cylinders.

This gasoline eventually reaches the crank case, where it thins the oil to such a degree it is useless as a lubricant. Old and worn cylinders are not the only cases where this happens, it also occuring in many motors where the holes were not originally ground, but were inaccurately bored or reamed.

Thus not only is he using excess gas in proportion to the power secured, but a large share of his oil is going off in smoke, or is being rendered useless, requiring it to be constantly renewed.

Skipping

Ill-fitting rings not only allow leaking of gas, but on the suction stroke air is sucked up from the crank case, thinning the mixture and causing the motor to skip. This is particularly noticeable when travelling at idling speeds or starting on cold mornings.

Carbon

When the oil gets by the piston rings into the combustion chamber and is burned by ignition, it gives off a bluish smoke, leaving carbon formed on the head of the piston and in the combustion chamber.

Carbon holds heat and if the compression is high, it will often explode the mixture earlier than it should. This is called pre-ignition and very often results in a broken piston pin, bent connection rods, or a scored cylinder. Of course, burnt oil soots the spark plugs and requires constant cleaning to keep a hot spark.

Engine Knocks

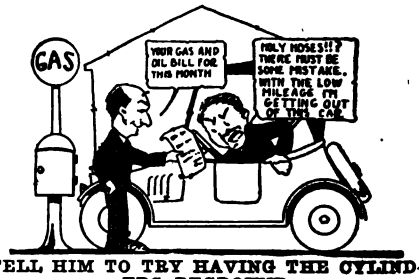
There is nothing more aggravating to the driver than to have his engine knock. Some motors have such a thick carbon deposit that the slightest pull will result in this annoying sound. This condition is all caused by oil leaking past the rings into the combustion chamber, where it is burnt by the ignition.

Method of Finishing Bores

The only way to cure these troubles is to finish the bore so that it is absolutely round and straight, and fitting it with new pistons and rings. It is possible to machine the hole by boring, reaming, lapping or grinding.

Boring is done by a steel cutting tool in the same manner as a lathe cuts .

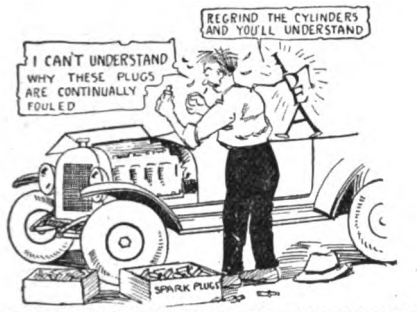
When a cylinder is rebored, the tool cuts into the cylinder wall and thus removes the metal in the same manner as is done when a lathe, cutting tool is used.



TELL HIM TO TRY HAVING THE CYLINDERS REGROUND

Reaming is similiar to boring, except that a number of tools are set into one head and these are used instead of a single tool.

Lapping cylinders that are badly worn will not make them round or straight, because the lapping process is not much more than a polishing operation. Even after hours of work but comparatively little material is cut away by this means.



CARBON FORMATION IN THE CYLINDERS WILL BE CORRECTED BY REGRINDING

A worn cylinder is always larger at the top than at the crank end, owing to the friction of the rings and also to greater heat and poorer lubrication.

Finishing by Grinding

In finishing a cylinder by grinding, an abrasive wheel held by an arm moving at high speed cuts away the metal of the cylinder walls. The feed of the wheel into the work can be adjusted so that it will remove the metal rapidly if a large amount is to be taken off, or so lightly it is practically immeasurable.

The grinding wheel must revolve in a perfectly true circle and cut away the iron until a round and straight hole is produced without either high or low spots and having a beautiful, smooth, and mirror-like surface throughout.

The work is held on an angle plate attached to the cross slide of the machine; the main table, travelling lengthwise, moves automatically. When a hole is finished, movement of the cross slide gives the proper position for the next hole.

The block remains set during the entire operation, insuring that the bores are absolutely paralled to each other and at right angles to the base.

The high-grade cylinder grinding machine produces a true, straight, accurate bore, the usual limits of accuracy being within one-thousandth of an inch. The bore is absolutely square with the flange, the surface produced is hard and glass-like, and the amount of stock taken out is only what is absolutely necessary in order to correct the imperfections of the bore.

New Rings Not a Permanent Help

A large share of repair shops are still advising new rings when an owner is confronted with mysterious motor troubles. He believes it is a cure, but it is only temporary, since in most cases the carbon has been cleaned out, valves ground, and motor generally tuned up. It therefore seems to have overcome ailment. It is not lasting, however, for no matter how expensive or complicated rings are used, a round ring will not fit an egg-shaped hole nor will new rings correct imperfections in the cylinder walls.

Thousands of strokes of the rings up and down the cylinder, while aided by road dust and other abrasives which are sucked into the cylinders with the mixture, will gradually wear down the cylinder wall.

This wear is greater on the two sides at right angles with the crankshaft. It is due to the pressure of the piston against one side of the cylinder wall on the compression stroke, and on the opposite side of the cylinder wall on the power stroke.

No ring will fit such a shaped hole, so there is bound to be a chance for gas escaping and a long time for the rings to wear in, if they ever do so.

Therefore, as the cylinders are only worn the length of the ring travel, it leaves the lower and upper ends smaller. To put a ring the proper oversize in the worn part through the smaller hole is impossible.

The only cure for a worn cylinder, and it takes but a few thousandths to show appreciative loss of power, is to have the cylinders reground and fitted with new pistons and rings.

Refinished Cylinders Better Than New

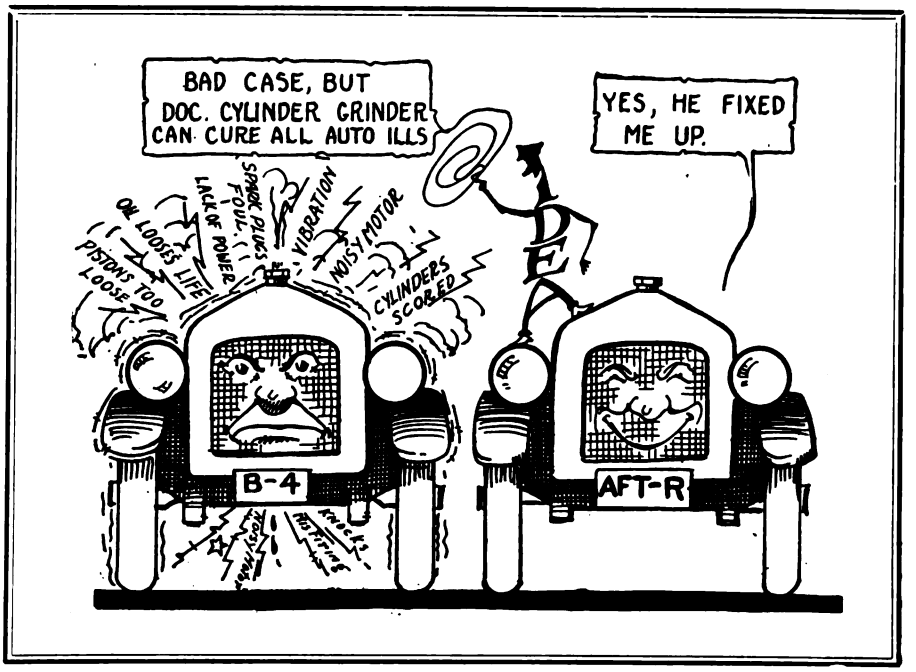
When the statement is made that a refinished motor which has been fitted with new pistons and rings is better than it was originally, few people understand why. It is a wellknown fact among those connected with the metal industry that castings change shape after they are cast. This is due to strains and stresses caused by the heavier walls of metal cooling last and shrinking from the already cooled lighter walls.

These strains can be relieved if the castings are seasoned for a long time, or by heat-treating processes.

Castings that are immediately machined and put to work in a car, change their shape more or less, due to the heating and cooling of the motor that acts as a heat-treating operation. Therefore, a motor which has been run several hundred miles is thoroughly seasoned and is in ideal condition to be reground and fitted up.

Once having been relieved of all the strains and stresses, the castings will retain their shape continuously after grinding, if properly machined and fitted up.

Actually, of course, a motor does



TWO OR THREE SATISFIED CUSTOMERS TO WHOM YOU CAN REFER WILL ENABLE YOU TO BUILD UP A GOOD REGRINDING BUSINESS

not have any more power after regrinding than that for which it was originally designed.

The fact, however, that the casting is seasoned and that each hole has had individual attention, often gives better results than a general-assembly proposition.

An owner with this assurance and equal or greater power to that he originally had, can readily feel the motor is giving better service, more satisfaction and is worth all it costs.

New Pistons and Rings Necessary

If the cylinder is reground new pistons and rings must be installed. The amount of stock necessary to remove to bring a bore back to a true round hole is usually at least .010 and, if scored or badly worn, will go from .030 to even .040. Such clearance would never allow the use of the old pistons.

Regrinding An Economy

Cylinder grinding is an economy to the customer; it is not an expense. A reground engine, when properly fitted with pistons and rings, will usually show a sufficient saving of gasoline and oil in addition to convenience and service to offset the expense of having the work done, the largest part of which is pulling down and reassembling the motor.

When to Grind

Cars that do not run right, that use excessive amount of gas or oil, lack power or pep, or smoke, need overhauling. A disagreeable piston slap is a sure sign of worn cylinders. This is usually heard on hills or when the engine is laboring hard.

After it is taken down, it can best be determined whether it needs to be reground or not. If found scored, out of round, or with excessive clearance between the piston rings and cylinders, they certainly need regrinding.

All cars that have been run two or three years should be pulled down, reground and fitted with new pistons and rings.

Makes of cars where the cylinders were not originally ground are subject to regrinding sooner than those with originally ground motors.

If the cylinders have been welded for any purpose, such as a score or a crack, it must be reground. Welding distorts and changes the shape in addition to leaving excess metal. Only by being reground can it be brought back to a true, round, smooth hole.

Commercial Cars

With commercial cars or tractors, the same reasons for regrinding hold true as with pleasure cars, except it should be at least once a year. They are usually worked constantly to their full capacity and are required to perform tasks which require every ounce of power.

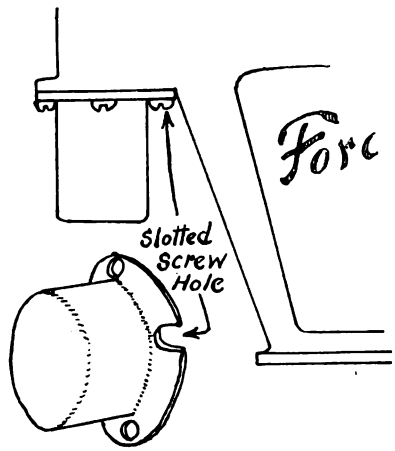
Reground cylinders will save money for the owner on all commercial motors.

Tractors, in particular, are subject to excessive wear, due to the conditions under which they must work and the dust and dirt working into the engine.

Slotted Screw Hole Facilities Replacing Cover

G. A. LUERS

The gear end of the starter motor on the Ford car requires removal of the cover secured to the crankcase when it is necessary to make repairs or replacements. Because of the narrow space between the side of the cover and the side of the crankcase, one screw is very awkward to replace. The space is too narrow for the hand or



fingers and some special means is required to hold the screw on the end of the screw driver to get it into position. When repairing these parts in one local repairshop the mechanics make a practice of cutting a slot from the hole through the edge of the cover when this cover is removed. The screw is then inserted before replacing this cover. When putting the cover on, the edge of the flange is simply slid under the screw head leaving only the work of tightening the screw to be done. Afterwards in the removal of the cover it is only necessary to loosen this screw.

Lead Welding and Battery Repair

FROM "SPARKS"
By Bastian-Blessing Co.

Service to customers is the rule of the day for the successful building of a profitable business. When such service not only attracts other business, but directly increases the profits of the plant, the advantage is obvious.

It is estimated that there are now 11,000,000 automobiles in use in this country. Repair of batteries for these cars is **profitable** service. No garage or repair shop can afford to be unprepared to take care of this work. Every welding shop should also be equipped for it. The investment for the garage or shop in the necessary equipment is small and the profits of a few months will more than return the initial investment.

There are a number of gases used for successfully doing the work; namely, acetylene mixed with oxygen, hydrogen mixed with oxygen, or city or natural gas mixed with oxygen. The acetylene, hydrogen and oxygen may be procured from local service stations in loaned cylinders at a low cost.

The beginner should first practice obtaining the proper flame adjustment. Instead of using the neutral flame ordinarily used in welding, a carbonizing flame with a slight excess of the fuel gas (acetylene, hydrogen or city gas) should be used.

After the flame adjustment is obtained the next step is to practice building up lead, obtaining a complete fusion and at the same time preventing the metal from running away. The melting point of lead is about 650 degrees and it will take some practice in the beginning, particularly with the oxy-acetylene flame, which is quite hot, for the operator to be able to hold the metal. After this is accomplished the actual work of battery repair and lead welding is a comparatively simple matter.

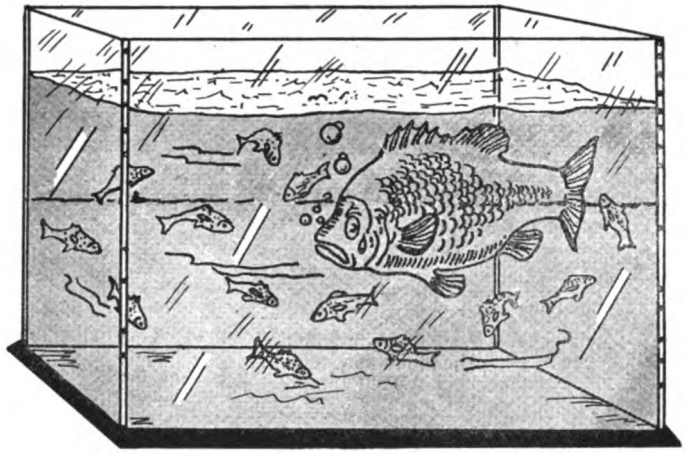
The most essential point to be kept in mind—always—is to be careful that there is no dirt on the metal to be welded, or between the layers of metal built up. All dirt and dust should be carefully removed by scraping or by brushing with a stiff wire brush. The presence of dirt on the surface being welded is liable to cause an insulated point which will prevent the proper functioning of the battery.

In replacing terminals the first thing to be done is to cut away and point the old post. The new terminal is then placed over the post; care being taken to set the terminal high enough from the cell top for wrench clearance. The flame is then applied to the terminal at the post top, melting this down to a round puddle. The terminal walls are melted before the puddle gets wide enough to reach the inside walls of the terminal and in widening the post puddle is melted or welded into the wall.

The first weld in the post is then allowed to cool. This is done to enable the welder to note how big the cavity is and to determine whether he has caught the walls of the terminal. The surface of the metal after cooling should be cleansed carefully with a stiff wire brush until it is bright and clean. More metal is then added by playing the torch first on the puddle and then on a lead stick held in the hand. It is essential that the lead stick and puddle in the cavity be kept at the same temperature in order to obtain complete fusion. The cavity is filled after adding in this manner several layers of lead. Enough lead is then added to round off the top and give the terminal a finished appearance. The work may then be tested by giving the terminal a sharp wrench with a pair of pliers and if the strap and element move with the impact it is an indication that the post and terminal are properly welded together.

Cell interconnectors are welded in the same way except that it is not necessary to keep the connectors as high above the cell or cover as in the case of terminals.

Besides battery repair there are many other uses in a service station for a lead welding outfit. Welding, soldering and brazing of sheet metal such as steel, copper and lead can be done as well as the fusing of wires.



Courtesy Jos. B. Thorson & Son

A Fish Story With a Moral

A naturalist divided an aquarium with a clear glass partition. He put a lusty, husky bass in one section and a lot of little minnows in the other.

Every time a minnow approached the glass partition the bass struck with characteristic fierceness. Every time the bass approached the glass partition the minnows scurried to the far corners of their section.

After three days of fruitless lunging, which netted him only bruises, the bass ceased his efforts and was satisfied with the food that was dropped in for him.

And after three days of what proved unnecessary scurrying to narrow corners, the minnows in turn became unafraid.

Then the naturalist removed the glass partition. The minnows swam all around the bass but he did not strike at a single one. **He was thoroughly convinced that business was bad.**

* * *

Business conditions and the very emphatic revival apparent during recent weeks makes the above story most appropriate at this time.

Take another shot at the "glass partition"—it isn't there now. Conditions have changed greatly in the past few weeks.

Just consider the crop prospects alone. They indicate a marked improvement in the purchasing power of the farmers, and that will naturally be reflected in all lines with the rural repair shops getting the full advantage of this favorable condition almost immediately.

So take another shot at the glass partition:—

Ask 'em to Repair it Now.

Ask 'em to Buy Now.

Ask 'em to Pay Now.

In other words get busy—go out in the highways and byways and ask your customers and those you want as customers, to get their repairing done now. When they are experiencing prosperity they are most likely to have needed repairs done.

And when they have the money in their pockets is the time to ask 'em to buy needed equipment and supplies.

And if you have unpaid accounts on your books, ask them to pay up now. Get out bills to all the delinquents —hit 'em now when they have the money.

The Mossy Wooden Watering-Trough

Stella Elizabeth Adams
in The Spokesman

There's a mossy wooden watering-trough
All in the restful shade,
Where soil is soft and moist and wet
Within a sheltered glade,
And where a happy little brook
Spends all the gladsome day,
A-dancing and a-playing o'er
The stones along its way.

And down the road a dusty horse
Turns in the restful shade,
And drinks there from the watering-trough
For thirsty horses made.
He shakes his happy, quivering sides,
The trough he tries to drain,
While little breezes play about
And fret his silky mane.

Oh! in the many years to come
Where you are standing now,
May some descendant watering-trough
A thirty horse allow
A cool, refreshing, sparkling drink
Beneath a shading bough
And make him feel that life is good
And men are kind, somehow.

High Spots

LOOK ON YOUR WRAPPER

No matter how good a tailor may be he can't do much for a man who won't shave regularly.

Tell us if you ever come across a man who does not think he drives the best automobile for the money in the world.

Did you ever stop to consider that most small businesses merely make a living for their proprietors and this too only because of the money that passes through their hands?

Wonder how many of "Our Folks" have "radios" in their homes or shops?. Of course, if you have a boy you know all about it and the marvel of taking words, music, information and entertainment from the air.

Ever notice that when a good thing is over in good style how there are usually a hundred people ready to take credit for it.—And when something falls flat its pretty blamed hard to find a single person to take the blame?

An ordinary wooden mallet with a felt-padded face and a block of maple will take a lot of dents out of fenders and hoods. The removal of dents is more an application of common sense than of special or complicated tools.

There are files and files—and both are most valuable tools for the progressive shop owner. Of course there's no need to say a word about the file as a cutting tool, but how about your other file—of catalogs, trade literature and catalogs, trade literature and craft books? It also is a valuable shop tool.

A little good advice that will save many a heartache and many a restless moment was passed along within our hearing to a young shop owner by an old veteran of the craft. The youngster was objecting to certain suggestions by the oldster by asking: "But what will people think" And this was the sound, sage and wise advice of the oldster: "Never mind what folks think, bub. They ain't a thinkin' 'bout you half as often as you think they do. And even if they did what good would it do you? Just decide that a certain line of action is correct and then go ahead. You can't stop 'em from thinking."

"See you have the radio bug too Tom!" was our greeting when we entered Friend Tardy's shop the other afternoon after noticing the coils of wire wound around his shop chimney. "seems to me you're getting quite up to date—where is your receiving set?" We then questioned. "What y' talkin' about—thur ain't no radio 'round this shop. Where d'y get that radio idea?" and Tom stopped his reading of a joke paper to look up from the depths of his old armchair. "Why, aren't those wires around your chimney out there above the roof, you're receiving wires?" But before we heard Tom's reply we had to dodge a couple of old spark plugs, a section of old inner tube and the shop broom. "Don't y' try to kid me young man—that thar chimney near fell on me the other day and I put them there wires around it to hold it together and to make it safe for life and limb here-a-bouts. Radio—huh—that's 'bout all y' smart alecks think about is new contraptions and thing-a-ma-jigs to go contrary to nature. Better git some sense and think about the conservation of present things a bit." And we were compelled to admit that as a "conserver of present things" and ancient things as well, Tom was surely a past master.

Service Sermons

Here are little stories of how the Subscribers Service Department has helped solve the problems of readers. They are based upon actual facts, (altho' names and locations are not given) and are told here with a moral.

The wife of a blacksmith realizing that her husband had gotten himself into a business tangle with a partner because of his failure to have the partnership agreement in writing, described his plight and circumstances. It was shown that her husband was very likely to lose the results of years of labor. The partnership agreement while apparently of an equitable nature proved upon an actual working basis to be very unfair. And, as is usually the case in unwritten contracts and agreements, the understanding and interpretation of the agreement was radically different in the minds of the individual partners.

This is so often the case that that observation alone should influence everyone to insist upon a written contract in arrangements or agreements that are of even minor importance.

Our Subscribers Service Bureau went into the various phases of the matter at considerable length and suggested the obvious remedy for the protection of the reader's interests.

MORAL: It is always best to insist upon agreements of all kinds in writing.

Soldering Scored Cylinders

DAVID BAXTER

Scored cylinders are undoubtedly best repaired by reboring but sometimes soldering the scores is necessary and the practical repair man should know how to do this work. David Baxter tells how in this article.

No doubt a scored auto or truck engine cylinder is best repaired by reboring and fitting with new pistons. And no doubt it is better welded with the oxy-acetylene torch if the work is properly done. These are probably the truly scientific ways to do such jobs. But there are many times when it is desirable to solder the scores. Sometimes it is even necessary to do so; in fact there are probably many reasons for so doing, especially for the last few years, since there are several metal compositions on the market for the purpose.

The item of cost is the chief argument in favor of soldering the scores. Sometimes it is the owners choice and sometimes it is because the cylinders will stand no more reboring.

Most cylinder scores are caused by loose piston pins. In which event there are usually two parallel grooves cut in the wall of the cylinder nearly the full length of the bore. Or the scores may be mere scratches due to carbon deposits. In either event the soldering process is practically the same.

For, as stated above there are several score-filling metals on the market today. Most of which are covered by patents and all of which are guaranteed satisfactorily if properly applied. Each manufacturer lays particular stress on some one part of the process but as a whole the methods are alike, so much so that the following instructions may be used for nearly all.

The first and perhaps the most essential factor is cleanliness; all insist on that. Not only must the part to be soldered be clean but also the tools and supplies. All dirt, oil, rust and carbon must be entirely removed from the scores and from the metal of the bore adjoining. The mechanic should even refrain from touching the parts with greasy gloves or bare fingers after the metal has been cleaned. Even bare fingers are liable to leave a greasy deposit that will prevent, the solder from adhering properly And not only should

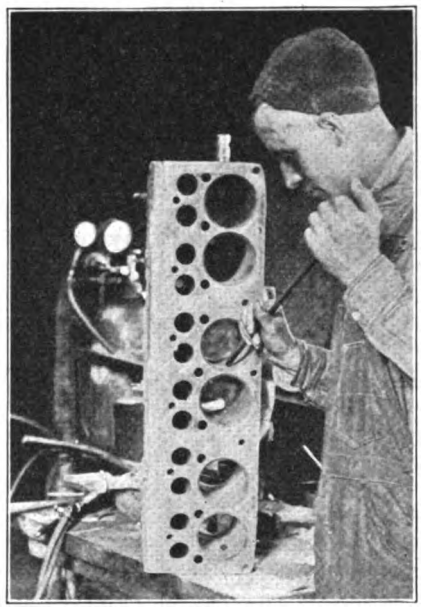


FIG. 1—SCARFING THE SCORES WITH A SHARP SCRAPER

the metal of the score and the surrounding metal be free from all non-metalic substances but the sides of the score grooves should be scraped or filed until the naked iron is exposed. The score should be bright and bare before the filling process starts.

Where one side of the score is deep the metal should be scraped down so the resultant groove will be the same on both sides; a wide groove makes a strong joint. It provides more adherence for the solder. And there is a better chance to tin the surface of the scores and apply the solder.

The first step in the process, then, is to wash the bore with gasoline. Not merely along the grooved portion but all the way around the cylinder bore. The whole surface is scrubbed clean with gasoline. Primarily, the reason for this part of the cleaning process is that a film of oil and carbon is almost certain to cover the interior of the cylinder, even though it is apparently bright and bare. The secondary reason for washing with gasoline is to prevent these invisible deposits from interfering with the adhesion of the solder. And the washing of the whole bore is to eliminate all chance for the oily film to melt and run or drip into the score when the hot soldering bit is applied. If the score only was washed the grease could easily drip from above to ruin the adhesion.

After thoroughly scrubbing the bore, the next step in the cleaning process is to scrape the scores, which is indicated in Fig. 1. This is done with a scraper that is easily made at home by pointing, bending and grinding a piece of tool steel about two feet. The point is bent down and out one inch and is sharpened on both edges. It is especially designed for the purpose. The scraping is with the idea of removing a skin of oxide which forms on the surface of all metals exposed to the air for any length of time. It is this oxide that causes more grief for the score solderer than any other one thing. This oxide, will cause poor adhesion or porous soldering metal, or both. Therefore all of the surfaces of the scores should be scraped bright and bare just prior to applying the filling metal.

To further insure the removal of all foreign matter, the score and its vicinity is cleaned with sand paper or emery cloth as indicated in Fig. 2. This stage of the process is accomplished quite readily by wrapping a piece of the paper around the sharp scraper and moving it back and forth along the groove. It removes any of the oxide that may have been missed by the scraper.

As shown by the cuts accompanying this discussion, the score soldering process is best accomplished when placing the cylinder block on end upon a welding table, where the operator may watch each part of the operation without trouble. Also, the grooves are filled better with the scores in a horizontal position.

When the score has been thoroughly cleaned and scraped the next part of the process is applying the soldering flux, or acid as it is called for. In other words, tinning the score. Some of the manufacturers of soldering metal furnish a special tinning fluid and

flux other than their special preparation. And it is no doubt best manufacturers direction explicitly, for the beginner to follow the especially where they forbid the use of acids.

First blow or brush with a clean brush all bits of metal or filings carefully out of the bore of the cylinder as a further insurance that

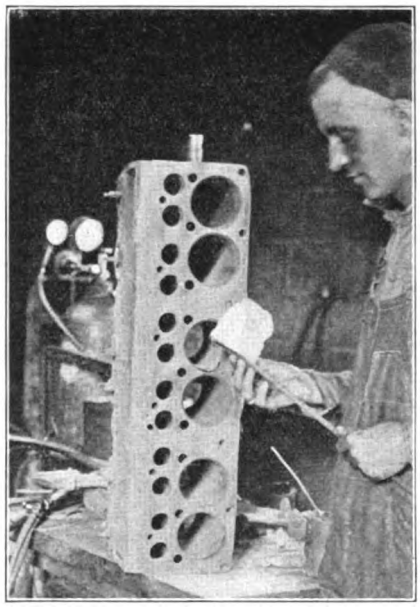


FIG. 2—CLEANING THE SCORES WITH SAND PAPER WRAPPED AROUND THE SCRAPER

nothing will interfer with the tinning.

Next heat the surface of the cylinder along the scores until it becomes hot enough that it will boil the fluxing fluid. This should be carefully done and care should be taken that the flames of the blow torch or other heater do not strike the grooves direct as particles of carbon may stick to it and cause poor adhesion. A special burner is furnished for the purpose which prevents this trouble. If this is used it may be placed inside of the cylinder where it will heat the soldering copper at the same time it heats the grooves.

If the blow torch is used it is well to clean the grooves again by rubbing them thoroughly with a steel scratch brush. At any rate the scores must be bright and clean when the tinning is applied. After brushing, the scores may be wiped out with dry waste if it is fresh and clean. No bits of thread or lint should be allowed to remain in the grooves.

In tinning the scores the solution is placed in the grooves when they are hot. A handy device for the purpose is a short piece of copper tubing with an inside diameter or a piece approximately six inches long will suffice. It is dipped into the fluid with one thumb held over the opposite end. Then when the thumb pressure is released a few drops of the solution will escape from the lower end of the tube. The solution may be thus applied without wasting any of it as just the right amount may be applied just where it is needed. The tube method also eliminates danger of foreign matter entering the clean scores.

When the tinning solution boils along the groove it is ready for the tinning metal, which is applied with either a special soldering copper made by the manufacturer of the filling metal or a special copper constructed as shown in the engraving at Fig. 3. This tool may be made at home from a rod of copper about a half-inch in diameter filed and ground to a sharp point as shown. The size and style of this construction is for the purpose of enabling the operator to reach all parts of the scores; a task almost impossible with an ordinary copper.

Tinning is perhaps the most important feature of the process for upon it depends the whole success of the adherence of the solder to the iron. The entire surface of the score must be coated with the tinning metal; no spot no matter how small should be missed. A soldering copper so small as this one soon looses its heat so that it must be heated frequently. Heating is most conveniently accomplished with a welding torch if one is available. However, the temperature should not be too high as there is danger of injuring the filling metal. This metal should be of such composition that it will expand and contract with the cylinder metal in order that it will not pull loose as the engine heats and cools. And it should also be of a nature that does not corrode easily as this will tend to loosen the filling.

If either of the soldering coppers have been used for solder other then score solder they should not be used for score filling. This should be done while the copper is hot. Heat the copper to a temperature that will melt solder freely but not to a red heat. Then file bright and clean to remove all of previous solder. If the copper is not cleaned some of the other metal is liable to interfer with the score soldering process. When the bare metal of the copper is exposed and while the tool is still hot the score solder is rubbed on it until the point is evenly coated.

The different parts of this process should be timed so they work in unison. And it is well to have the copper ready tinned before the flux is applied to the scores. Then the next step is to tin all parts of the grooves. Be sure the groves are hot and that the copper does not lose its heat. Then apply a small bit of the soldering metal to the groove and rub it back and forth with a sort of rotary motion, making certain to cover every portion of both sides of the groove. Every portion of the groove should be covered with an evenly spread coat of the solder.

Then a soldering copper with a curved three cornered bit is taken up; if the operator does not possess a regulation score filling copper. The curved copper is shown in Fig. 4. This bit should weigh four or five pounds in order to eliminate the necessity of reheating frequently. It also should be cleaned and re-tinned before using. The curved shape permits the operator to employ the lateral motion essential to an even application of the solder.

The curved copper is heated higher than for ordinary soldering, and the filler solder is melted to a thin fluid state. Although care

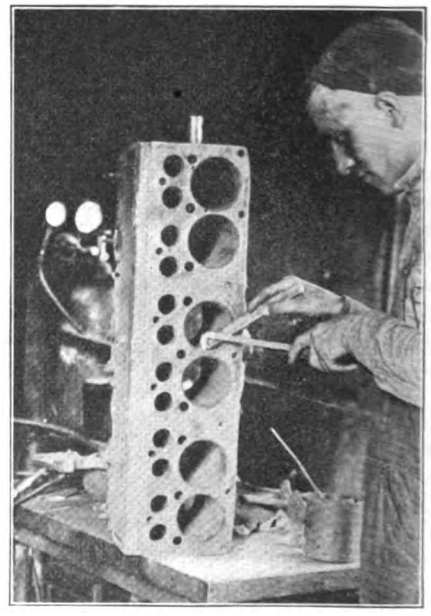


FIG. 3—TINNING THE SCORES WITH A SPECIAL SOLDERING COPPER

should be taken to not burn the metal or oxidize it as this causes a poor joint. On the other hand, the solder that is not melted well is not so easily rubbed into the grove.

A drop of solder is melted from the original bar. This is repeated at intervals along the score. Then the heavy copper is moved back and forth with a rolling movement until the score is entirely filled. A surplus of the metal is piled above

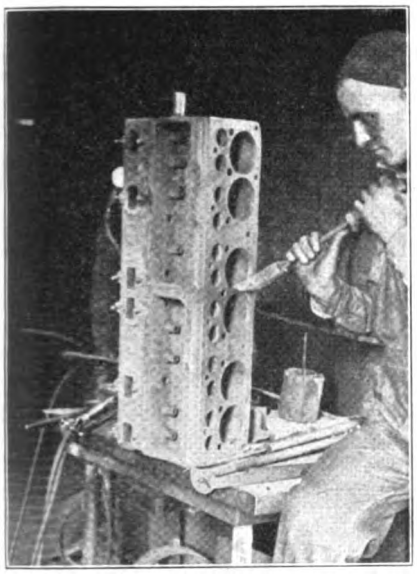


FIG. 4—RUBBING THE SOLDER IN WITH A SPECIAL CURVED COPPER

the bore on each side to provide stock for making the fill cylinder-size. Particular care at the ends of the groove is essential.

If there are two grooves they are filled one after the other as rapidly as possible. And in event both sides of the cylinder are scored all scores are soldered before leaving that particular cylinder.

When the solder is all in place the next step is to scrape the surplus metal down to correct size. This requires special tools, such as are shown in Fig. 5. The first, or round scraper is used to cut the roughness and most of the filling down to near the correct size. This scraper shown in operation in Fig. 5, is made of a grooved disc, or rather two disc, revolving on a common center therefore adjustable to the various bores. At the start it is not essential to be careful but the operator should endeavor to work the filler metal down evenly to avoid a slip later.

When this scraper chatters, or hits only the high spots, the work is made easier by changing to a scraper patterened after an ordinary bearing scraper. With this the surplus metal is again straightened and the round scraper is employed. Toward the last the solder is removed slowly and carefully until very nearly the right size bore is attained.

At this point it is well to test the filling with one of the original pistons. Frequently trials with the piston will enable the operator to attain a very close fit and it is better than taking a chance by not trying the piston.

When the piston fits and the score filling has been polished smooth the whole thing is washed thoroughly and all of the fluxing solution is washed out to prevent corrosion, especially along the edges of the filling. If any of it remains it may cause corrosion that will eventually eat under the solder and cause it to peel loose, or too crumble.

To further insure against corrosion the filled scores are swabbed with oil. Ordinary cylinder oil is used immediately after the scores have been washed and dried. It is for the purpose of preventing chemical action of the air later. If the oil is not applied for several hours the edges of the joint will start to rust and work adversely later.

Start A "Repair It Now" Movement

Right now, while you are in the midst of the busy fall season, is an excellent time to consider the starting of a movement to get your customers to bring in work when you are not busy.

After the Fall rush, is an excellent time to start your "Repair It Now" movement. Two or three neatly printed signs with "Repair It Now" on them, tacked up about the shop, and with perhaps one or two larger signs on the outside of the shop will act as reminders to your customers, and those whom you want as customers.

A letter, circular, or hand-bill mailed out to your regular customers are excellent means of reminding them about work which will eventually need to be repaired, and which they can just as well bring in during your slack time as later on when you are very likely to be too busy to give them the very exacting service which you much prefer to deliver, and which they of course, prefer to have.

It seems rather odd to consider a "Repair It Now" movement at this particular time when most shops are almost too busy and working overtime. However, this is just the time to lay plans for the slack season, and if you will lay those plans now, your slack time is not going to happen at all.

If you are favored by being located in a neighborhood where there are two, three or more shops, get together with your competitors on a movement of this kind. Co-operation along this line will go far toward impressing your customers and the entire community, with the advantages of repairing "Now," and properly worked out, such a movement will work to the great advantage of every co-operating shop owner.

The above of course, is merely a suggestion of the idea. Talking the question over with the shop help and other shop owners in your neighborhood, will bring out other ideas and suggestions that you will of course want to work up into concrete business-building plans.

One very successful idea that was worked out very efficiently by a group of repair shop owners in a certain little western town, was the tacking up of "Repair It Now" signs at all vantage points in and about town, and on the highways, and each of these cards, bore the names of the co-operating shops. This gave none of them an advantage over the other, and the card

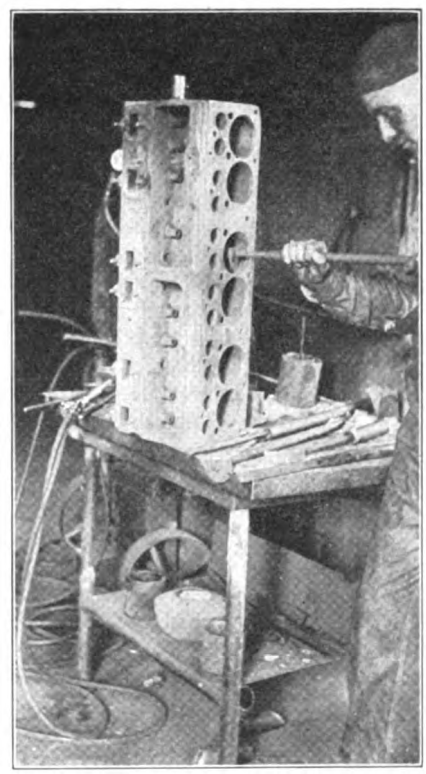


FIG. 5—REMOVING THE SURPLUS FILLING SOLDER WITH A SPECIAL SCRAPER

acted as a constant reminder to the merchants and residents of the town, as well as to the farmers and those residing in the neighborhood of the little business center.

For the benefit of any of our readers, who may be interested in starting a movement of this kind, the Subscriber's Service Bureau will be very glad to co-operate, and to prepare suggestions to meet individual needs and requirements.

Cotton Prices Control Mule Market

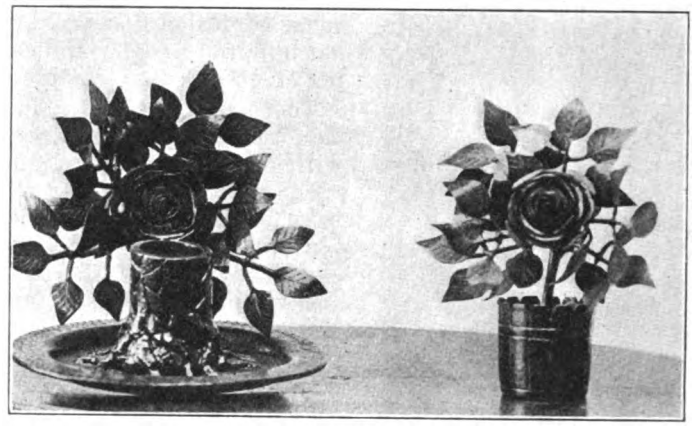
"When Eugene Mayer, Chairman of the war Finance Corporation, remarked last fall that in less than two weeks from the time cotton prices advanced in the southern states, the price of mules advanced to correspond,—he put the whole situation in a nutshell," said Dr. Reid, of Campell & Reid, at the National Stock Yards, East St. Louis. For forty years this firm has been selling horses and mules at this point,—more, undoubtedly, than any other firm in America. Hundreds of dealers in the southeast, and thousands of farmers, stockmen and ranchers in all sections of the country, are in communication with them. Speaking of the present horse and mule situation, Dr. Reid continued:

"The southeastern states need more work animals right now, but they have not had the money to pay for them, and, as a result, many of the farmers in the Carolinas, Georgia, Alabama, Mississippi, Louisiana and Arkansas are doing the work as best they can without enough work stock to handle it as well or as promptly as they would like. The rise in the price of cotton, however, has helped some, and if the men in these states get a fair crop and a higher price this fall, there will follow a decided improvement in demand for horses and mules."

J. J. Searcy, associated in the same firm of Campbell & Reid, was also interviewed by a representative of the Horse Association of America, and, after confirming what Dr. Reid had said, Mr. Searcy added, "The scarcity of yearlings and two year olds is very evident in Iowa and Illinois. I look for the better class of farmers to take hold of the matter strongly this year. In 1902 to 1907, there was a similar scarcity of young stuff, and a very profitable plan was tried out. These farmers in Iowa, Illinois, Missouri, etc., with plenty of grain for feed, in response to the demand for work stock shipped in good promising yearlings and two year olds from western ranches. They picked stuff carrying two crosses of draft blood, with possibilities for first class development, and on the abundant feed which corn belt farms provide, they grew out this young stuff into excellent horses of 1200 to 1600 pounds and more.

"Today there are yearlings and two year olds carrying three or four crosses of pure draft blood, available on western ranches, which farmers will probably be able to buy this fall very cheaply,—say $35 to $50. This is less than what they would have to spend to produce and rear colts to two years of age on corn belt farms. The supply of good young horses, is, of course, limited but many western ranchmen are hard pressed for money and must move some of their surplus stock. Farmers who buy such colts now and grow them out in good shape while doing farm work with them in their third and fourth year stages, will realize a substantial profit on such work stock by the time it is five years old. Horse and mule prices are going up. How rapidly they will advance depends entirely on how other farm products, which give farmers their purchasing power, rise in value."

If The Labels Come Off your iron and steel articles that you wish to mark try rubbing the metal surface with a cut onion before glueing the labels into place.



Two Hand Forged Rose Sprays

The two rose sprays shown above were hand forged from mild steel by Courtney N. Hillyer, son of Bert Hillyer whom readers will remember as a frequent and most interesting contributor to "Our Journal". The above engraving shows that Courtney is a worthy son of a master craftsman. We are glad to show Master Courtney's work and extend congratulations to both son Courtney and father Bert.

WHAT THE TRACTOR MEANS

We wonder if "Our Folks" have analyzed the tractor situation and realized just what the tractor means to them in the larger sense of its use on the farm? The tractor in itself does of course bring work to the general shop. It means added work ranging all the way from minor adjustments and repairs to complete overhauling, repairing of large broken parts and rebuilding. But in the larger sense its use on the farm means much more.

A survey of the sections where tractors have been used to marked extent and on farms using them for the past two or more years, shows that from two to six and sometimes more items of farm machinery follow where ever the tractor leads.

In other words—every tractor that is sold for farm use is followed by from two to six other farm machines.

This, of course, means more work for the general repairman and smithing crafter. It means that many more machines in his section that will need repairs, adjusting and fixing.

And so a broad view of the tractor situation shows a still widening field for the repairman. The tractor rather than decrease the work of the smith and repairman, is really increasing it and is bringing into his neighborhood more machines, larger machines and machines in greater variety.

Some general shop owners have been considering the tractor as responsible for decreased work in general repair lines but the reverse is the case as shop owners in tractor-using districts have learned. The tractor is really a business builder for the general repairman, it needs repairing and brings other machines that require the smith's services.

Help the tractor—it means more business and larger profits.

Tales of Trips and Tours

BY

"WANDERER"

The tales here related are the experiences of a traveller through the highways and by-ways of the country districts. In his wanderings about he meets many members of the craft, stops at many shops and has many experiences. The tales of his experiences are interesting and carry with them many practical suggestions. They run the entire range of craft activities as will be noted as you follow his tales month after month. The experiences he relates are Facts not Fancy.

How Closing Up Shop Beat Out A Price Cutter

I am not saying that every shop owner who comes into competition with a price cutter can solve his problem as this man did, but this experience and the manner in which it was met by this shop owner will prove interesting to the entire family I am sure.

For convenience I am going to call the shop owner in this tale Jim Norwood. That isn't his name, but he is located not over fifty miles from my home and as he told me his story himself I am not going to disclose his real name; though I am pretty sure there will be at least four members of "the family" who will know who I am talking about.

Jim Norwood's shop is located on one of the main roads down the state and in making that district twice a month as I did for several months I noticed some very peculiar things. Near Norwood's shop is another establishment of about the same calibre. Both have gas pumps, both sell accessories and both do a great deal of general repairing for the farmers nearby and both of them enjoy a fairly good tourist trade. Jim Norwood is a good all round mechanic, while the chap who ran the other place was more of a salesman. I think the other fellow sold more accessories than Jim did, but then Jim did more repair work so it was about an even break.

In my runs down that way I patronized both places—had no reason to prefer one to the other. But on one occasion I noticed a rather odd sign over the closed Norwood shop. It read: "Closed" in large letters and under this word I read: "For Financial Repairs." And this was signed "Jim Norwood —the Reliable Service Man."

Well, that seemed very odd and I naturally inquired at the other shop regarding the closed shop and the peculiar sign.

"Oh, I put that guy out of business" laughingly replied the owner of the other shop when I enquired regarding his competitor. "Y'see he was getting fresh and cutting prices so I just went him one better everytime, put him down and out and now I've got things my own way."

And I noticed as I paid for the gas he just put into the tank, that he charged me three cents more a gallon than the regular price all along the road.

I didn't get down that way again until my regular trip two weeks later, and still the Norwood place was closed. This time I filled up with gas before I reached that section but I was compelled to stop to have a miss in the motor looked after. I had to stop at the shop where the chap overcharged me for gas and while he had my motor fixed up in very short order —the fault was in a broken connection—he charged me what I considered a rather high rate for his services.

When I objected to the charge he said: "Well, if y' don't think that's fair why don't y' go to Norwood's."

Of course, this was a mild way of telling me that he "had me" because his was the only shop and I was lucky to get any service at all.

Needless to say, I paid him his price and went on my way.

The Norwood shop was closed on my next two trips but on the third run down that way I was overjoyed to see Norwood's shop open again and going full blast. Of course, I lost no time in making an excuse for stopping and in getting the story of his odd actions direct from Jim Norwood himself.

"Well, you see, it happened this way" Began Jim Norwood, after I described my experience with his competitor and asked him to explain his own queer actions and his still queerer sign.

"Originally I purchased this shop and business from my esteemed competitor—the same chap that you now see before the shop down the road aways. I worked for several of the shops down in town, had a fairly good general experience in practically all kinds of mechanics, and saved up a few dollars and finally bought this shop. Friend competitor offered it at that time at what I considered a very fair price. He said he was not a practical mechanic and therefore wanted to get out of the game.

"Well, I bought the place, paying part cash and part in notes. And you may be sure that I lost no time in making things hum. I solicited the work of the farmers all around here, as I had plenty of experience in general repair work on implements and farm machinery. I also knew the auto game pretty well so I was pretty well on the way toward building up a good business right here. I was beginning to feel pretty cocky over the way I had things coming my way (I had to employ two men to help me) when Friend Competitor opened up that place down the road.

"Well, this was like a knock-out blow to me. I had put all of my money into this place,—had paid off both my notes right on the dot —and I was not in position to stand a very long siege of competition. Of course, I had the trade coming my way. My gas and oil trade was building up to a point where it took care of my fixed overhead. Accessory trade was growing and my repair and general shop work was good. If I had been allowed to work another six months I would have been in fine shape for I was beginning to make some money. But my friend seemed to know just when to hit me and he opened up just at the right time, and he did it in the right way too.

"First, he threw out circulars and dodgers all over the country around here announcing the fact that he would again open up a shop and service station and that he would save money for his customers. He called his place "The Cut-Rate Shop."

"Well, he opened up and the fight was on. In my frantic effort to hold my business, I cut every time he did. He sold gas for two cents under me and I promptly

went two cents better. Finally, he announced a quart of oil free with each ten gallons of gas.

"On accessories he did the same. And in order to compete with me on repair work he hired a man to do this work. He never lost an opportunity to hit me a good wallop every chance he had by telling folks how he could save them money. When one of my regular customers had a job done he went out of his way to tell that customer he paid too much.

"Naturally this sort of thing worked fine for him and raised the devil with my trade, no matter what kind of customers a man may have or what kind of service a shop may give, trade cannot stand that sort of fighting. And my pocketbook went flat. I had two fine loyal chaps working for me, (and still have them)—one young fellow who looks after gas and oil service and is a general handy man about the place; the other a good general mechanic.

"We three had many a head scratching in attempting to solve the problem but never got any where, until I was simply forced to give up on account of lack of money. I was down, out and broke. I closed the shop, said good-bye to my men and arranged to go back to my old job in town.

"Old Tom Dickman owned the shop and he is one of the best friends I ever had. He didn't like the idea of my giving up the fight but he said; "you come in here for a while. I am pretty busy and need a little help and while you're here may be we can fix up to beat that chap at his own game."

"He suggested that sign that I tacked up on the shop and also told me to leave all my equipment just as it was but to board up the windows.

"I followed his instructions and went to work with not a great deal of pep you may be sure.

"Well, Dickman suggested several times that I go down to see how my competitor was making out, but I was too sick of the whole thing to even go near him. I did however, hear from an occasional customer that friend competitor was going strong, was doing a rushing business and that he was gradually boosting his prices.

"Hearing this on prices I made it a point to call on several of my old customers down that way and I learned that it was true.

"This set me to thinking and to figuring on the future again and in talking over matters with my friend Dickman, we doped out a plan that I think is going to work out to my advantage.

"I worked for Dickman for a little over two months, kept in touch with the doings of this competitor through some of my old customers. But I never told anyone of my plans—not even my two boys that had worked for me. They were both working in another town and I knew I could get them back almost any time I had need of them.

"Well, friend competitor, as you know from your experience began to run things rather independently when he closed me up, and he soon demonstrated his ability to charge all the traffic would bear.

"Then Dickman suggested that I open up my shop. He suggested the new sign calling the shop "The Honest Service Shop" and I went to it again. I've been open about three weeks now and am doing a fair amount of business. I have my two boys back with me again and from what my customers say I think I am here stronger and better than ever.

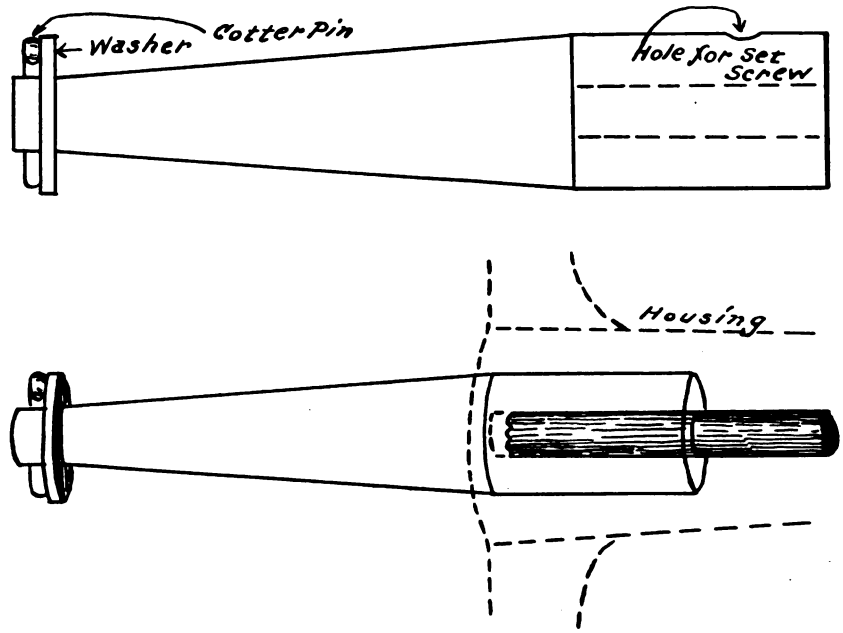
"Of course, if this competitor had not been a mean sort of chap he would not have practically killed his business by boosting his prices when I closed up. But of course that is just what made me stronger than ever when I came back.

"I understand from customers that he told every one the same story he told you about putting me out of business."

But the final chapter to this man's experience came when two weeks later I found the competitor's place closed up and the shop vacant.

"He's carted his tools and equipment over to a town some twenty miles down the pike where he's gone into business with one of the fellow's that worked for him." Explained Norwood.

And thus Jim Norwood demonstrated how to get rid of a price cutting competitor by closing up his own shop.



AN EMERGENCY FITTING FOR BROKEN AXLES

An Emergency Attachment In Case of Axle Breaking

JAMES BALDWIN

The device shown in the accompaning engraving is for use in emergency when the rear axle breaks. As will be seen, it is in reality an auxiliary axle or spindle for the wheel to run on.

In use, the roller bearings are removed, the attachment is slipped into the housing and onto the end of the broken axle. The oil cup is removed from the housing, and a set screw is inserted to take the place of the oil cup and to hold the attachment in place until the axle can be replaced or properly repaired.

It is hardly necessary to describe the making of this device as the automobile repairman will need to take his own measurements so that he can make it to fit the particular car upon which it is to fit. Any practical man can make them.

More Suggestions for Collecting Shop Accounts by Mail

Here are several more collection letters with a detailed explanation of how one firm put in a system of charging interest on overdue accounts. There are money making and collecting ideas in this article.

A collection letter used by a South Western Shop Owner, and which he says has proven very effective in getting the money without giving offense, is the following:

Dear Sir:—My books show that your account amounting to ..... is considerably overdue. I| know you want to meet your obligations promptly and that you dislike me to permit your account to run along in this manner. However, a rush of business has prevented my calling the matter to your attention before now, I trust that you will pardon me in this instance. With best regards,

The above letter is very effective in many instances, particularly where the customer is good pay, but somewhat slow. The letter implies that the fault for the account not being paid before, really rests on the shopman's shoulders, though of course, this may not be the case at all. However, it tickles the debtor to have the matter placed before him in this light though he may know very well that the case is not at all as presented to him by the writer of the letter.

To Get the Debtor's Attention

One repairman well known in his town for his ability to get money promptly and quickly from his debtors tells of one scheme that he uses very effectively.

After the second or third statement of account, as the case may warrant, he deliberately makes out a bill for an amount from five to fifteen dollars in excess of what the customer really owes. Naturally this brings the debtor into the shop "ripping mad" and with fight written in every line of his face. This is just the effect this man is looking for. It gives him a chance to take up the matter of the account in the proper way and enables him to apologize effectively and to show his willingness to be fair and square in his dealings, with the customer. After adjusting the account satisfactorily, it is the most natural thing in the world to lead the talk into the proper channel, and to make a good, big, strong effort to collect the amount that is really due.

It is of course, not a good idea to use this scheme too often, but an occasional use of it, as a case or two may warrant. helps to bring in money that would ordinarily be kept out of the shop owner's hands for a considerably longer period.

Getting At the Debtor Through His Employer

On occasion when an account is run by a wage earner, against whom all the regular methods have proven unsuccessful, it may be necessary to get at him through his employer. This will of course be classed as an extreme measure and should not be used unless circumstances demand. When it is necessary to carry out this idea, it is of course well to determine beforehand the relationship of employer and employee. If this relationship is such as to insure your success in collecting the account, then, and not until then, should you make the necessary threat to the debtor. On the other hand if a threat of this kind is likely to be ineffective, it would be better to not even suggest the matter, as it will make the collection of the account from the debtor still more difficult and you are not likely to make a big hit with the debtor's employer if you are forced to carry the matter to him. In the majority of cases however, all you will find necessary, is simply to advise the delinquent debtor that unless the bill is paid within a certain time, it will be necessary for you to take up the matter with his employer. As a rule, the man with any conscience whatever dislikes having matters of this kind to be brought to the attention of his employer and a notice such as suggested above is all that is necessary in order to bring in the money.

The growth of your business depends upon the amount of ready cash you have available for building up your trade, increasing your stock and installing labor-saving machinery. The customer who is slow in his payments who delays in paying his account is keeping money out of your pocket—is depriving you of money that really belongs to you and to your business. These slow payers must be trained to promptness if you are to use money that rightly belongs to you in building and improving your business. Slow pay therefore demands threatment in a systematic way because it grows worse every day of delay. It is necessary to hit the trail quickly after that elusive dollar. Promptness in getting on the trail quickly, persistency in following it and firmness and insistence upon being paid when payment is due, are the qualities that bring successful collections.

A Discount Scheme

The following idea worked out by a prominent Indiana shop owner is an excellent suggestion for promoting prompt and regular payments of the regular monthly statements sent out by the shop proprietor. This idea was worked out along the lines of the discount offered by the average jobber and wholesaler for the payment of accounts before the tenth of the month. Very naturally, of course, this man had to put into effect and print upon his statements that a discount was allowed on all accounts paid before the tenth of the month. In speaking of his method this smith says:

"One day, when looking over my bills payable and checking them up with the amount of cash on hand and then figuring how far one would go to pay for the other, I began to figure how much I would have saved had I taken the discount and paid these bills on the discount day. Business and business methods were at that time not exactly new to me, and I was familiar to a certain extent with discounts and similar matters, yet I was very much surprised at the very neat sum I could have made and saved had I paid more attention to the payment of bills before the tenth of the month. These thoughts very naturally lead on to the fact that to my recollection not one of the firms with whom I was doing business ever called my attention to the discount date. It then occur-

red to me to install the discount system for the payment of bills which were owing to me, and to add to this system what appeared to me would be a big advantage for my customers and call their attention to the discounts to which they were entitled if they paid the account before the tenth of the month. I took care of the details of this idea by ordering two rubber stamps. One of these explains about the discounts allowed if payment of the account is made before the tenth of the month, while the other was simply a reminder, which read:—"Don't forget your discount before the tenth of the month." The first of these two stamps or the one explaining the discount, was printed on all statements going out at the first of the month. About the seventh or eight the second statement was out, upon which the "don't forget" stamp was used.

Statements are sent MONTHLY to our customers for the following reasons:

Every jobber we do business with sends us a statement the first of each month. We use them to check up and see if there are any errors in their accounts, as the error is much easier rectified if the deal is fresh in the mind.

These STATEMENTS show us what we owe and have to pay in the next thirty days. We like this way of doing business and believe you will also.

If you owe us for goods over 30 days we charge 8 per cent interest and WE DO NOT WANT YOU TO PAY INTEREST. All we want is your money to pay our expenses and so We Will Not Have to Pay Interest on What We Owe.

WHAT LEWIS & SON PRINTED ON THE BOTTOM OF THEIR STATEMENT BLANKS

The idea has worked out very successfully, especially with those of my customers who are in some commercial line. The grocers, butchers, carting companies and similar concerns were quick to take advantage of this system, although it was very much of a surprise to me to find how quickly and willingly so called private customers in the residential sections fell in with the idea and took advantage of this saving which I offered them."

Charging Interest On Credit Accounts

This is how a progressive, up-to-date firm of general repairmen changed their credit and collection methods. Here are their letters, and just how they went about the matter. They also tell how the plan and entire campaign succeeded:—

E. R. Lewis & Son were having a considerable number of accounts run-up and saw that this method of doing business was out of date. They decided that if they must borrow money from the banks in order to accommodate their customers, that those who were thus accommodated should pay for the service. So they charged interest on all overdue accounts. This change was a radical one, especially with two live competitors in the town who continued on the same old basis. It was, indeed, a drastic measure and many merchants would have hesitated to take such a step.

To acquaint their customers and the public of their plan they sent the following letter printed on their letterhead:

Dear Sir:—Beginning July 1st, we will charge 8 per cent interest on all open book accounts carried over 30 days.

We have now accounts on our books that should have been paid long ago. We have borrowed money at the bank to carry these accounts. This we cannot afford to do

tI is a discrimination against the cash buyer.

One customer pays cash, another asks us for time. We want the trade of both customers and will gladly extend credit to a customer deserving it, but we must charge him the cost of carrying this account on our books when it runs over thirty days.

We can borrow money at 6 percent, but it takes an extra two percent to pay the bookkeeper, buy day-books, journals, ledgers and other items that make up the cost of carrying these accounts.

The above goes into effect July 1st. In other words, work charged June 1st and not paid for by July 1st will have an addition of 8 per cent. Interest per year charged on the account at that time.

To those customers who had accounts with the firm at the time, the following letter was sent out in May, so as to give the customers plenty of time to attend to their accounts:—

Dear Sir:—Beginning July 1st, we will charge 8 percent interest on all accounts, carried on our books over 30 days.

Your account now amounts to $.....

If this is paid by July 1, you pay the above named amount, but if it is not paid then, we will charge interest from June 1st. The reason for this is that the old method is a discrimination against the cash buyer.

We want all the trade we can get, both cash and credit. You are worthy of credit and we gladly extend it to you; but we must ask that you pay us 8 percent interest if you ask us to carry your account over 30 days. We pay 6 percent interest on money we have to borrow and it costs 2 percent of our credit sales to pay for bookkeeping and to buy the necessary office supplies incident to carrying on a credit business. Thus you see, in asking you to pay this interest, we put you on an equal basis with the cash customer. As it has been, the man who got his work charged received a better bargain than the man who paid cash, because he not only had the work done, but he had his money to use elsewhere Is this fair to the cash customer--is it fair to us? We buy our materials on 30 days' time and have to pay for them at that rate.

You now have two months to settle your account without interest as it now stands. Will you help us with a clean page on our ledger under your name on July 1st?

The hard part of the plan came, of course, during July and it is not improbable that E. Lewis & Son at times thought they had made a mistake, but they stuck bravely to their program. Mr. Lewis, in writing of the affairs, says:

"Our trade fell off heavily in June, that is, it was very much less than for June of the previous year. And it was the only time we know of that a lost customer helped our business, as the talk he made was the finest kind of advertising, and it sent more cash customers than those we had lost.. Our trade the rest of the year has been better than ever before, and it has come in as "Real Money" and not "Charge it."

Along in July when the trade began to pick up and people began to realize, the justice of the system, the firm sent out a booster circular letter, as follows:

We are now doing practically a cash business. You know that we buy cheaper for cash and, therefore, you can.

We extend credit to responsible people and we know you to be such but we ask you to pay for this service after the account runs 30 days. And we do this to put the cash customer and the credit customer on the same basis.

The letter concluded:

We have been doing business this way since June 1st, and the increased sales we have is proof that it satisfies our customers and for that reason they can afford to trade with us.

It is up to you to take advantage of these prices.

The firm makes two exceptions to the interest rule in order to properly care for all of its trade. The

first is in case of material and work performed for a contractor on building operations, such as structural or ornamental iron work, fences, etc. These accounts are considered due 30 days after the completion of the work. The second exception is to the man who wishes credit for an extended time and gives notes for the payment of the account. In this case the firm writes the notes for 7 per cent interest.

To show how this system has affected the bank account of the firm, we quote from Mr. Lewis' letter:

"On November 1st, we had considerably more cash than we did on May 1st. So now instead of paying interest at the bank as we have been for years, we are lending our money."

And this was accomplished in a rural community where farmers had had long credits for their whole lives. There is little doubt that this plan, if capably handled, will work in other places.

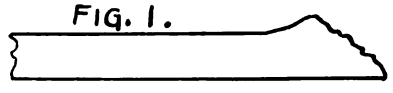
Practical Points on Blacksmithing for the Beginner

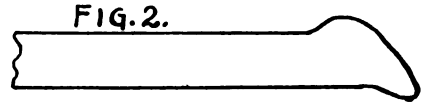
J. RAMMELL

The fuel used in smith work is soft or bituminous coal for small fires, and coke for large fires and furnaces. The soft coal used is called smithing coal. It should be clean and free from impurities. A lump of good coal breaks easily and with a crumbly looking fracture, and shows clean and bright on all surfaces. If the coal splits and shows dull looking streaks, it is poor coal. Good coal leaves very little clinker.

The fire should be carefully watched. It is very important that it should be in first class condition. A certain depth of fire is always necessary. If the fire is too shallow, the cold blast will penetrate the fire in spots, making it impossible to heat the metal properly. There should be three or four inches of fire beneath the metal that is heating for small work and enough fire on top to prevent the metal from losing heat to the outside air. The fire should be kept as small as possible, to heat the metal properly. As a general rule, the fire will follow the blast. If the fire is wanted larger, it may be made so by loosening the edges, allowing the blast to come through around the sides causing the fire to spread. If a small fire is wanted, the damp coal should be packed down around the sides and the center of the fire loosened slightly.

When TOO MUCH air is blown through the fire, all the oxygen is NOT burned out of the air. This attacks the iron, forming a heavy coat of oxide, or scale. This sort of a fire is called an oxidizing fire,





HOW TO PROPERLY SCARF PREPARATORY TO WELDING

and should not be used when it is possible to avoid it. When there is just enough air being admitted to keep the fire burning brightly and all of the oxygen is burned, the fire is in good condition for heating, very little scale is formed, and may even be turned back in the iron. This kind of a fire is called a Reducing Fire.

When heating metal to weld, care should be taken to get an even heat all the way through the metal. If the blast is too strong, the metal will come to a welding heat on the outside, while the inside will not be so hot. This will make a poor weld, if it welds at all. Heat the metal slowly till it is a good red heat all the way through, then add more blast from time to time till you have raised the metal to a good welding heat, which may be described as a creamy white.

Fluxes are used to lower the melting point of the scale. The flux is sprinkled on the surfaces to be joined just before the metal reaches a welding heat. The metal is then put back in the fire and raised to a welding heat, and the weld made as usual. The scale is acted on by the flux and melts at a lower heat than when no flux is used. As the flux melts, it spreads or runs over the hot metal forming a sort of a protecting cover, which by keeping out the air prevents to a large extent the formation of more scale. The flux in no way acts as a cement or glue to stick the pieces together, but merely helps to melt the scale and prevent the formation of more.

In scarfing pieces to weld, care should be taken to shape the ends of the pieces so as to make a smooth joint. Always "stove up" your metal (as in Fig. 1) on the end to allow for the metal that is sure to scale away when a welding heat is reached, and be sure that your scarf (as in Fig. 2) is higher in the middle than at the edges so that the metal will join in the center first, otherwise you will have a poor weld.

Tank Patching Experiences by a Torch Welder

J. D. B.

In the Summer of 1921 I was working for a western hog breeder located close to a city of 250,000. I was called upon to repair several large truck tanks that were used for hauling garbage to feed the 8,000 hogs on the ranch. The city officials had warned the rancher to have his truck tanks leak proof and as it was getting July and the smell of the dope that was dripping through the cracks in the tanks in driving through the City was anything but pleasant.

In spite of the tanks being very large 7 by 15 by 2 ft. high, they had the habit of overloading them and the jolting across the rough country road had caused some of the bottoms to give away. Cracks were forming all the way from 6 inches to two feet long, one of the tanks even giving out for a length of 9 feet. This latter failure however was mainly because the frame to which the tank was fastened was not rightly constructed. Some of the side walls of the tanks were coroded by the acid in the garbage and these required patches all the way from six inches to a foot square.

All these matters had been gradually developing, until finally the ranch owner was summoned to appear before the board of health and to explain his negligence.

Without a doubt he received a good "calling down" from the health officers for the next morning before he went looking over his stock as he usually did, (by the way he was living in the city) he drove up to the blacksmith shop at the further end of the ranch and in an excited way explained the situation. Things had been dragging so long now that something had to be done immediately.

After we talked it over, we found that it was out of the question to send the tanks to the City to a boiler shop as this would have taken too much time and a laying up of

the trucks for several days; some of them it was shown needed as many as seven to nine patches.

Our repair shop at the ranch was fairly well equipped, but I had often figured how much better it would be if we had an oxy-acetylene welding outfit, so here was my chance. At first I did not see my way clear to fix up these tanks with the outfit, knowing how sheet metal over one-eight inch thick will buckle when welded in the center of a sheet. What could be done with it, I didn't know until I had tried. I figured that if I could weld these patches on as fast as I could weld anything else, it wouldn't be much of a job to put the tanks in order. I didn't want to tell the boss it could be done before I surely knew, as I didn't want to make myself appear like "thirteen cents" in case it would be a failure, so I simply told him of the possibilities of the acetylene outfit. No sooner had I mentioned it and we were on our way to the city, where the rancher invested in a welding outfit.

When I had the outfit ready three hours later, the first thing I did was to cut up one of the poorest tanks to obtain some of the good pieces that were not corroded and which could be used as patches on the other tanks. This done, I took one of the smaller pieces measuring about one and one-half feet by one foot. After having picked out an easy spot in the bottom of one of the tanks I fastened the patch in a few places so as to hold it down. No sooner had I done this when just what I expected happened. The patch and the bottom were in terrible shape; in some places, I could put my fingers underneath the patch, it was that way to stay.

I fooled round a while with a couple of sledge hammers to bring the bottom to a level, until I finally hit upon the idea of using a jack. With a screw jack and a piece of flat steel measuring 4 by 6 by ½ inch on top of the same I braced the bottom to a level taking care to have the piece along side the edge of the weld to be made. This done, I cut four by four-inch beam just long enough to fit inside of the tank underneath the steel three by three inch angle irons which were rivited to the top edges of the sides for reinforcement. A screw jack was now placed on top of the other jack directly on the spot where the other one was placed, and with the beam as a bearing and without much effort I succeeded in bringing the sheet metal together.

I was careful to weld only where the two flat pieces were screwed to-gether one-half inch from the edges, and by replacing the jack underneath the tank and the one inside the tank and once in a while taking care to have the flat pieces to bear upon the side of the weld, I was able to put the bottoms in order without further trouble. Under the tank I could not get to every place, but in this case I had the weld wedged up from the bottom while the screw jack took care of this on the inside of the tank.

After we had the tank floors in order we now turned our attention to the sides. Here we encountered the same difficulty—the metal kept buckling both ways. I didn't have any trouble using the jack on the inside, as the opposite side of the tank afforded a good base with the aid of a few blocks. To get at the outside we ran the trucks along side a brick building and used the wall as a brace from which to screw the patch close to the main body.

This done, we tackled the rear ends. This had been built on an angle of 45 degrees, with the bottom so that anything in the tank would slide off when dumping. I could not very well see how any jacking could be done here, as the patch had to be kept close and tight to the main body and sticking the same in a few spots made things worse, so different means had to be resorted to. I took a heavy piece of ¾-inch steel four inches wide by six feet long and hammered down both ends on the side so I could drill and tap for a set screw. Then by taking a good heat in the center I made a U-shaped clamp and with this new tool, I was able to reach anywhere over the patch screwing the same down as we had worked it before.

For many months thereafter I had a chance to see how the patches acted and not one of them gave any trouble. The tank that had been patched up the most was the strongest because of being the most rigid. The patching served as a reinforcement to the tank.

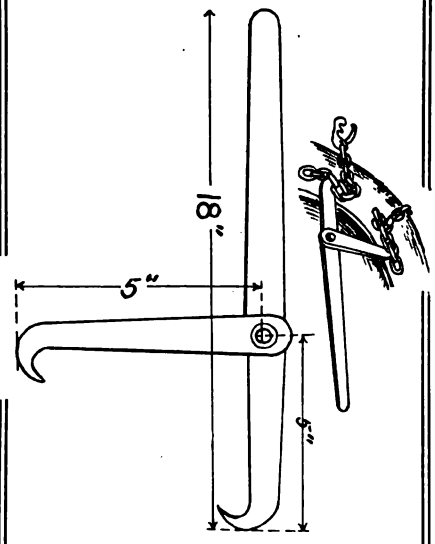
We finished the job in almost one-fifth of the time it would have taken by the riveting method. The boss considered the welding outfit a good investment, and I myself thought it was the best and quickest way we could fix that particular job.

Special Tool for Attaching Tire Chains

G. A. LUERS

It is necessary to have tire chains fitting fairly snug, otherwise the links cause a disagreeable noise by striking the mudguard supports.

While a chain will fit a new tire perfectly, it will be found after use that the tire has expanded due to the pressure and use and this expansion makes the process of applying the chain difficult. The tool illustrated was devised to overcome this condition which is experienced and make the application of chains easy. A short length of bar is forged to a hook shape at one end, while a longer section is forged similiarly at one end and these two parts are rivited as shown. Placing these two hooks into links near the junction of the chain, the long handle affords a substantial leverage which quickly brings the fastener into position for attaching. This simple tool can be made from practically any section of bar and completed without much work.



Lacquering and Bronzing Metals

R. E. A.
(WORK)

Lacquering is a process which preserves the bright surface of the metal by coating it with a layer of varnish. The colour of this varnish can be modified to suit the work to

which it has to be applied. The lacquer contains either seed-lac or shell-lac, hence its name. Seed-lac is the gum in its original form, and when it has been purified and prepared by moulding into thin sheets, it is called shell-lac. The material shellac as it is more usually called may be bleached so as to become almost colourless, but in that condition it is not so strong or effective for lacquering purposes.

When applying the lacquer, good results depend entirely on the condition of the work. Perfect cleanliness and a fair polish are necessary to ensure a successful application of the lacquer. The work must be heated to about a temperature of 212° F. before lacquering, and must be laid on evenly with a camel-hair brush. It is generally advisable to experiment on a piece of metal (or scrap) similar to the article to be lacquered, when the result can be observed as regards temperature, colour, etc. In using a new brush for the first time hairs are apt to come out and so mar the appearance of the work. Look out for this The brushes used for lacquer must always be carefully washed out in methylated spirits and be kept in a tin box to exclude dust or dirt.

Re-lacquering Old Brasswork

In re-lacquering old brasswork a hot solution is prepared by first boiling in water wood ashes and soft soap or soap lyes. The old brass is then dipped into this hot solution, when the old lacquer will immediately come off. A pickle should now be ready, composed of aqua-fortis (nitric acid) and water, about 1 part of aqua-fortis or nitric acid to 8 or 10 parts of water. The solution must be just strong enough to take off the dirt only, and the brass must not stay in the pickle any longer than necessary to achieve this object, as the acid attacks the metal very rapidly. Wash the metal so treated immediately in plenty of water, dry thoroughly, and polish with chamois and powder. Brush the metal clear of powder and lay the article on a hot plate until moderately heated, but do not overheat, as this will cause the lacquer to blister.

Hold the metal with pliers and apply the lacquer gently, being careful not to rub it on but always to stroke the brush one way. Draw it in is perhaps a better description. When the work is covered, place it on the hot plate again until the lacquer is hard. This may be tested on a piece of scrap metal treated at the same time, when it will be unnecessary to touch or finger the actual work. As soon as the lacquer is set, remove the article from the hot plate.

Increasing Your Profits With Proper Shop Equipment

L. M. Wilson

The subject of proper shop equipment is seldom given due consideration in the problem of profits and the building up of the busines of the repair shop.

Take the simple matter of drilling a hole in a piece of metal. There are several means by which the hole may be drilled. If the metal is not too hard an ordinary brace may be used. However, a breast drill will be found much better as a means of making the drill cut into the metal. If we have a post drill we are still more fortunate and if the post drill is power operated we are indeed blessed and our hole will be drilled at a minimum expenditure of time and labor.

Now, there are no readers who will question the best means of drilling that hole. The method that requires the least time and labor is the method that is going to produce the greatest profit if we are in the business of drilling holes. Therefore, we are certain that the most profitable means is to install the best equipment suited to our purpose.

And so we can go through almost the entire list of repair shop operations. It is easy to realize that where machinery gives way to hand work in drilling holes, the machine method is time and labor saving and consequently MORE PROFITABLE.

Now let us take the drilling operations again to hammer home another fact:

If we drill our hole with a brace we are most likely to cut it in accurately; to break the drill if it is of small size or to spoil the work in some other way. If we use a breast drill our work will be somewhat better. If, however, we use a post drill we will secure accurate work that is pleasing to our customer.

And so we are again convinced that proper machinery for the work in hand is best, not only from the standpoint of profit but from the standpoint of WORKMANSHIP which is ultimately again reflected in profit.

Again let us suppose we have a job of drilling holes on hand,—the brace method is going to take us some little time longer than the breast drill, and the post drill machine is going to do the job even more quickly.

Thus the best method of drilling holes not only saves our time and labor and insures better workmanship but it enables us to deliver the work more quickly to our customer and we can let that stand for SERVICE.

So we have through the medium of a simple job of drilling holes shown that proper shop equipment insures not only increased profits, but better workmanship and better service.

When you do work by hand which should be done by a machine, you are increasing your labor costs, cutting down your profit, and incidentally giving your customer poor work and service.

If your charges to your customer are honestly based upon the time consumed in doing a job by hand which should have been done by machine, the customer is likely to kick at the charge as unreasonable and at the service as poor.

On the other hand picture the customer who brings in a job that is quickly finished because you have the proper machinery and equipment with which to do the work. You go at it in a thoroughly efficient manner. The work is done properly, in a minimum of time and at a fair charge. (Which may even at that be only a little below the charge for the job done by hand). And your customer is thoroughly satisfied with your service, your work and your charges.

Queries Answers Notes

To Figure Pulley Speeds:—Please inform me how to figure the ratio or speed of shafting and pulleys?

Jos. M. Decker, New Jersey.

Wants to Hear from Cash Shops:—In sending remittance for my subscription for three years, I want to say that I like "Our Journal" very much. I have tried some of the "kinks" from the magazine, and found them all right.

I am interested in oxy-acetylene welding, as I do some of that too, I would

like to hear more from some of "Our Folks" that are running a cash business.

E. A. Anderson, Iowa.

Experienced Blacksmith Wants Good Location—Mr. J. H. Keeney of Nebraska in one of the issues of "Our Journal" mentions the matter of blacksmiths being very scarce, particularly those who can do general blacksmithing. I have had ten years of experience, and would be glad to have Mr. Keeney or some other smith tell me of some good locality where general blacksmiths are not too plentiful. Will Brother Keeney or some other reader let me hear from them direct or through the columns of "Our Journal"? The Editor has my address. L. G. V., Alabama.

Has a Difficult Case:—I am writing you for information I have a horse which comes to my shop that is bothering me very much. I have done everything that I know of and am still far from stopping the cause. This is the case:—The horse is a 6-year old gelding, is a pacer with rather of a suffeling gait. His difficulty is this:—He crossfires, and I do not seem to be able to stop him. He is the worst case I have ever had, and I have been in the shoeing business quite a few years. Can you help me with this case, or at least suggest some remedy?

Warren T. Barnes, New York.

Modern Magic:—I notice the Editor's little article in the June issue under the title, "The Modern Magic Wand" and I want to express myself as agreeing with him most thoroughly. In my estimation the oxy-acetylene torch has done more for the smithing craft than any other one item of shop equipment. And in saying this I am reminded not only of the extra work that the torch equiped shop can do, but think of the fine work that is done in conserving broken machinery. There is certainly no question regarding the good work of the O.-A. torch and best of all—the fine effect of it on the cash drawer of the up-to-date shop owner.

J. M. A.—Pennsylvania.

An Interesting Letter on Textile Mill Cutters:—My work here in the loom works and textile mills is very interesting. I have a lot of experimental work in the line of hardening tools and heat treating them.

In the accompaning engraving are shown several cutters. Fig. 1 is 1 by 2¼ by 3-16 inch in size and bevelled on the cutting edge like a scissors blade. Fig 2 is shorter but made very much like the longer one. In operation, the knife in Fig. 1 is bolted to the loom while the shorter cutter in Fig. 2 slides over the top of Fig. 1 and thus cuts the thread.

These cutters gave us considerable trouble in the hardening. Finally we tried heating them up in lead to a point indicated by the dash line at A. We then drew the temper to about 400°. This proved to be about correct for we have had no trouble since.

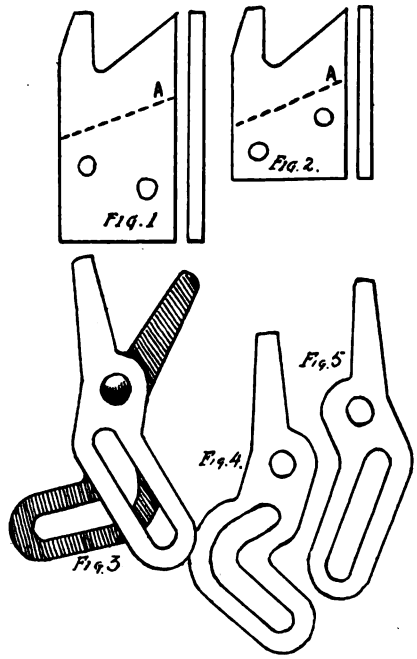
Another type of cutter is shown in Fig. 3. This is for cutting heavy duck. This cutter is held on a piece that slides forward to bring the cutter into action. The tail part is held by a bolt and a cam motion operates the cutter in a scissors like action bringing the blades together where the thead is cut.

This cutter or "scissors" is hardened all over. The cutting ends are drawn to 400° while the tail ends are drawn to a spring temper. The blades of this cutter are 3-16 inch thick.

E. M. Peterson, Massachussetts.

In Reply:—Fortunately calculating pulley speeds is a rather simple matter and something that no one shoud have difficulty in understanding.

It is well known that the smaller of two gears or pulleys will always run faster than the larger. Thus, if the driver is of larger diameter than the driven pulley, the driven pulley will run faster than the driver; but if the driven pulley is the smaller of the two, it will run



MR. PETERSON TELLS ABOUT TEXTILE CUTTERS

faster than the driven pulley. The product of the diameter of the driver and its number of r. p. m. is equal to the product of the diameter of the driven and its number of r. p. m., in the case of pulleys; in the case of gear, the product of the number of r. p. m. From this it will be seen that it is easy to find the size of one pulley when its speed and the speed and size of the other pulley are known, or, to find the speed of one pulley, when its size and the speed and size of the other pulley are known. The rule to be used is as follows:

To find the diameter (or number of revolutions per minute) of one pulley, multiply together the diameter and the number of r. p. m. of the other pulley and divide the product by the number of r. p. m. (or the diameter) of the first pulley.

This rule may be used to find the number of teeth or the number of r. p. m. of one or two gears, by using the number of teeth instead of the diameter of each pulley. The speeds of wheels, pulleys and gears are usually expressed in revolutions per minute, which is abbreviated. r. p. m.

As an example, two plleys are 36 inches and 12 inches in diameter, respectively and the larger pulley makes 120 r. p. m. How many r. p. m. does the smaller make? Multiplying 36 and 120 (the pulley diameters) together gives a product of 4320. Dividing this product by 12 gives 360 or the number of r. p. m. made by the smaller.

To ascertain the speed of pulleys where the speeds of both pulleys are known but only the diameter of one is known as in following: A pulley 54 inches in diameter runs at a speed of 100 r. p. m. and drives another puley at a speed of 450 r. .u. m. What is the diameter of the other pulley?

The solution to this is to multiply 54 and 100 together and divide the product by 450, thus will be found that the diameter of the pulley is 12 inches. S. S. B.

Will Enlarge Shop—Motor Cycle Kills Australian Rabbits:—Two new motor cars have been added to our population recently and both will be dependent on me to keep them going, which I will be only too glad to do. Beside other work, with the coming of the cars, I find my workshop is becoming too small, and I will soon be building it larger as heretofore I had mostly to do with motor cycles, and these do not require so much room as cars, but these also are becoming more numerous. I will have to enlarge very soon, and install all sorts of fixtures, hoists, rebabbiting jigs, etc., to be abe to turn out work as quickly as possible and as good as possible. Satisfaction for everyone has always been my motto. Every job will then bring in dozens more to be sure. I would like to write more about how I do things here, but if I began, there would be no end to it.

Last time I gave you a hint about the utility of motor cycles, and as I had to do with them most of my time, I am somewhat attached to them. Therefore I will give you another proof of their utility:—

The Motor Cycle as a Vermin Exterminator:—As rabbits are a plague here, their destruction is compulsary. It is well known the exaust gases of a motor are deadly poison in confined places. As the warrens and burrows of the rabbits must be dug out or otherwise destroyed, the idea struck a farmer who has a motorcycle to try to kill the rabbits in their warrens with the exhaust gas. It is very expensive to destroy them by digging. So he took a one-inch hose about 15 feet long, attached one end of this over the exaust pipe of the motor and the other was put in the burrow. The motor was then run on the stand for a few minutes and it then remained only to dig the dead ones out. That proved too that the idea was a good one. This trial proved that in this way one man could do more work of extermination in one day than would otherwise take many weeks.

Thus satisfied with the experiments this man set off on the motor with that hose and a light spade strapped on the carrier. Coming to a warren he stops puts the machine on the stand, attaches the hose to the exaust pipe while the other end he thrusts a couple feet into the warren. He then starts the motor and with the spade closes all outlets to the warren. He also loosely closes the hole where the hose was thrust in. Five minutes for the motor to pump its exaust and the hose pulled out, rolled up and put on the carrier, and off he is to the next one. Thus he alone treated in one day what would have otherwise taken several men about four weeks on this same farm. A couple of dogs with him chased everything into the holes. That it was a great success, was proved later by digging some of the warrens open. There was not only dead rabbits but foxes and other ground animals gassed dead. This will of course make the motor cycle still more popular as only the persons living here can fully realize the seriousness of the rabit plague.

F. H. Gierke, South Australia.

VOLUME 21 NUMBER 10

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

OCTOBER, 1922

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Contents October 1922

AN IMPORTANT A, B, C.

Several references to Safety First and safety slogans among the "High Spots" this month has caused us to reflect somewhat more than ordinarily on the accidents of the past "easy season" and the season of crowded roads.

No matter how few accidents there are, they always number far too many. And when one reflects upon the many there are, one is most emphatically impressed with the fact that had the simple A. B. C. of safety been observed the number of fatal accidents would have been greatly lessened.

And the meaning of the ABC of safety can perhaps best be illustrated by the story of its origin:—

A traffic supervisor commonly called a policeman, stationed at one of the country's bussiest corners in one of the larger cities, was well-known for his efficient handling of traffic. His courtesy in dealing with the occasional transgressor of the traffic regulations was equalled only by his firmness in handling the reckless drivers. One day while busily directing traffic at an extremely busy hour, he observed a woman, driving a large car, come dangerously close to causing a serious accident by neglecting to observe his signals. He immediately signalled her to stop and then tipping his hat he delivered the following short but pointed lecture on safety:—"Pardon me madam, but never forget the A. B. C. of Safety—Always Be Careful."

It is not possible to emphasize that A. B. C. warning too strongly. Motorists and drivers of motor vehicles are all too often inclined to be careless instead of careful.

And then too it would be an excellent idea for shop-owners and shop employees to take the same A. B. C. warning to heart in their shop conduct and work. A neat sign of generous proportion lettered with the Always Be Careful slogon will go far to impress the shop help.

A BUSINESS CREED

Some one has suggested that "Our Folks" have a business creed. How's this folks?

1—I believe in the work I am doing.
2—I believe that honest work done for honest people should be paid for at honest rates.
3—I believe in working not waiting; in laughing not crying; in boosting not knocking; in the pleasure of doing business honestly.
4—I believe in courtesy, in kindness, in good cheer, in friendship, in honest competition, in generosity, and above all in honesty.
5—I believe in increasing my trade for in so doing can I serve my trade better. I believe in service to the community for in such service do I serve my real purpose in life.

Let us have your suggestions?

A NEW SUBSCRIBER AND POET

A new member of the family from out Indiana way, W. J. Daniel by name, bursts into ryme as follows when sending in his subscription:

"I'm a sport as you can see
"By the money I am sending thee;
'And if your paper is a sham
"And is not worth a tinker's dam;
"With me it will be good and well
"But you will surely go to————"
—Well, you know where.

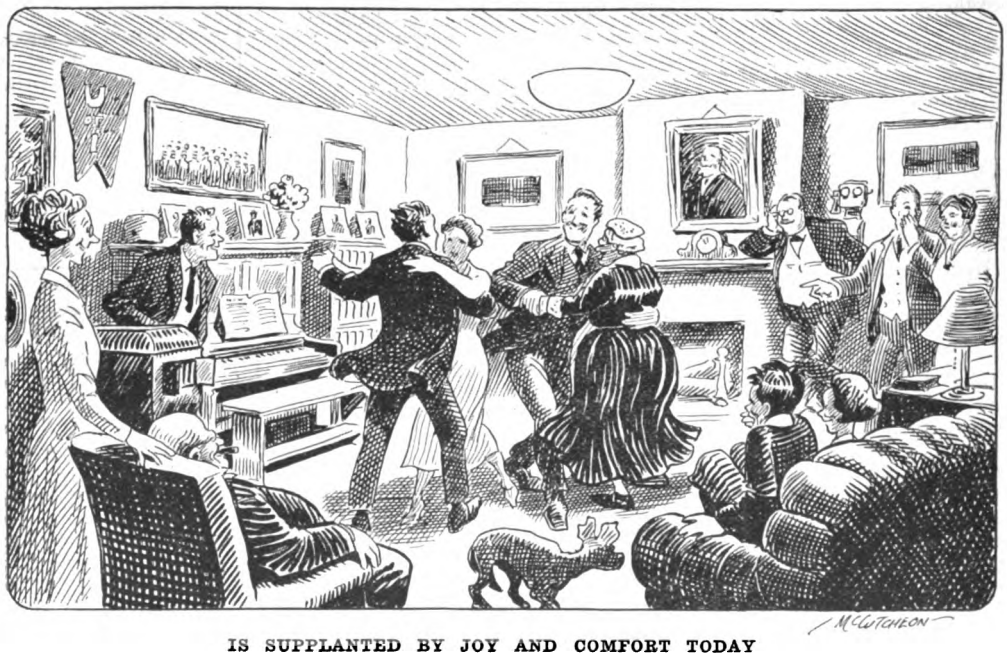
Needless to say we have no intention of going there as Brother Daniel will readily see after he has read "Our Journal" and become acquainted with "Our Folks" and our policies. And so we respond to Bro. Daniel in kind:—

We're sporty too, Dear Brother D——
We take no chance as you will C.
For "Our Journal's" not a sham,
It causes none to swear and damn.
It's council is both wise and well
So we're not likely to go to——
—where you said.

"The Changing World"

By John T. McCutcheon

THE UNINTERESTING PARLOR OF GRANDMOTHER'S TIME—



IS SUPPLANTED BY JOY AND COMFORT TODAY

This is the third of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

Repairing and Adjusting the Ford Cut-Out

Judging from the number of requests for Information on the Ford Cut-Out, many of "Our Folks" must be Puzzled and mystified in their treatment of this item of equipment on Mr. Ford's well-known and very popular vehicle. This article, published mainly in response to several requests, will clear-up the mysteries of the Ford Cut-Out.

Indications of trouble in the Cut-Out are, generally speaking, indications of trouble in other parts. As the cut-out is enclosed, it has small chance of getting out of order unless it is tampered with or affected by defective operation of some other part of the charging circuit. The cut-out is affected by the following:

1. Open circuit between the cut-out and ground through the battery, continued operation under these conditions will burn out the voltage and series coil.

2. Running with dirty commutator or at speeds which cause the current to cut in and out, will pit the points and eventually cause them to stick.

3. If the base is sprung in assembling the cut-out to the generator, the adjustment will be thrown out. It is very important, therefore, to fit them properly, bending the arms to position in a vise or with a pair of pliers.

Cut-out troubles are indicated on the ammeter in four ways:

1. The meter registers no charge when the engine is running at a fair rate of speed, lights off and the ignition on the magneto.

2. Too high a rate of speed must be obtained before a charge is registered, lights being off and the ignition on the magneto. In this case the meter will jump from 0 to 8 or 10 amperes charge.

3. The meter registers a discharge when the engine is stopped and the lights are off.

4. Ammeter registers more than 4 amperes discharge no lights burning and the ignition on the magneto, before points open as the engine is gradually slowed down.

Remember that in the first case commutator, loose connections or short or open circuits in the field or armature, and make tests accordingly before tampering with the cut-out.

In the second case the brushes may not be seated properly, the commutator may be dirty or there may be a slight short in the field or armature, or the third brush may be set improperly as would be indicated by a low charging rate.

In the third case there may be a short circuit between the ammeter and the switch. Besides the foregoing, it is always well to remember that the ammeter may be wrong.

Testing The Cut-Out

Figure 1 shows a method of testing the cut-out when the generator is assembled in the car and the engine is running. As stated in the engraving, care should be exercised that the pliers do not touch any metal part other than the contact. This test is used when the ammeter does not register either way with the engine running at a fair rate of speed, lights off and the ignition on the magneto. With the pliers in the position shown, the ammeter will indicate as follows:

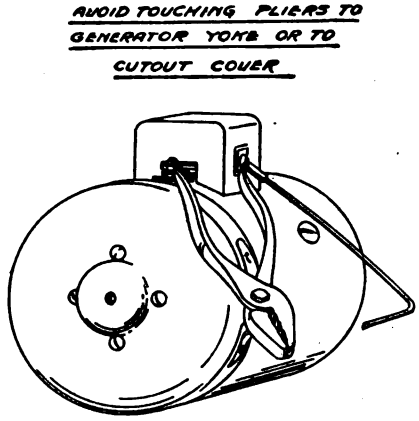


FIG. 1 SHOWING HOW TO TEST THE CUT OUT OR REMAGNETIZING FIELDS OF GENERATOR WHILE IN POSITION WITH ENGINE RUNNING

1. Full discharge, cut-out is probably all right, generator is not functioning properly because of internal trouble. Remove dust cover to examine pig tail, terminal or insulated brush for ground.

2. Slight discharge indicates that the cut-out is probably OK but the generator is not functioning properly because of a dirty commutator, brushes not seated properly, open or short circuits.

3. Neither charge or discharge indicates an open circuit between the cut-out and the batteries or in the generator. The possibility of it being in the generator may be elimated if a good live spark results when the generator terminal is shorted to the housing.

4. Proper charge indicates that the system, other than the cut-out and its two connections, is OK. If when the pliers are removed, the ammeter returns to and remains at O, tighten the cut-out to the generator terminal and the ammeter wire connection. This failing, remove the cut-out terminal carefully, as it may be repaired if not damaged by careless handling. Besides tracing, this practice will often correct the trouble by burning the dirt from under the brushes, blowing a slightly charged circuit, or charging a demagnetized field.

There are several styles of cut-outs in use, and the method of securing the cover varies in each case. The dash type is secured by the "dents" in the cover fitting it corresponding dents in the base. The cover is removed by inserting a screw driver between the cover and the base first on one side and then the other, as shown in Fig. 3.

The large generator type is secured by two punch marks just above the arms by which the base is secured to the generator. This cover may usually be removed by a steady raising of the generator terminal end first. The latest type of this cut-out is secured with a bar through the end of which the seal is made. Cut off one side of the seal and push it out. The bar may then be withdrawn from the opposite side. Figure 4 shows this operation. This frees the cover which then may be lifted off. In some cases it is necessary to relieve it slightly at the terminal with a screw driver.

There are two cut-outs with metal finish covers. These covers are secured to the base with screws. In one there is only a single screw: in the other the screw to the right through which the seal wire passes is the one to remove.

While a test stand is much more convenient, it is possible to adjust a cut-out on the generator. One

advantage in so doing is that the adjustment remains permanent, or in other words, is not disturbed in assembling it to the generator.

We will now consider the repairs necessary on a cut-out. They may be summarized as follows:

1. Mechanical; such as loose rivets, armature spring out of place, broken parts, points burned out or sticking. In each of the above cases the cut-out should be changed. The screws which hold the cut-out to the base may be loose, vibration would open the coils by crystalization or wear the fibre, allowing the screws to ground against the base.

2. Adjustment; not sufficient and the core when the points touch. Too much gap when the points are apart. Too much or too little tension on the tension spring. Points dirty. All of these may be corrected unless the core is loose or the points are worn so that they cannot be brought together before the armature and the core meet, in which case the cut-out would have to be changed.

3. Electrical: Such as short circuit in the voltage coil, short circuit in the service coil, or an open circuit in the service coil. With the exception of the times when these troubles are internal, it is possible to repair electrical trouble.

The equipment necessary to repair and adjust the cut-out is as follows:

On direct current ammeter reading both ways from 0 to 20.
One small screw- driver.
One small soldering iron.
One small goose-bill pliers.
One small screw driver.

The solder may be 50-50 such as used in radiator repair work, but instead of acid a non-conducting neutral paste should be used as flux.

Meter Remains at 0.

We will now suppose that by the process of elimation that the trouble has been located as being in the cut-out, and that the indications are the same as those previously described for locating trouble in the cut-out. Since no current is registered, it is evident that the circuit in the service coil remains open. The trouble may be due to:

1. Dirty contact points.
2. Open circuit in the series coil.
3. Short circuit in the series coil.
4. Open circuit in the voltage coil.
5. Short circuit in the voltage coil.
6. Too great a gap between the armature and the core.
7. Armature striking core or other part before points come together.

To determine the type of trouble remove the cut-out from the generator, leaving the ammeter wire attached. Connect the voltmeter to the terminal post as shown in Fig. 5. Start the engine and set it at such a speed that the meter registers 9 volts. With the voltmeter still in place, set the cut-out on the generator, the base bracket held firmly against one of its screws and the arm making contact with the terminal. Look at the meter and see if the voltage has dropped from ½ to 1 volt. If not the voltage coil is open. Repeat the test to make sure that you are reading the meter properly.

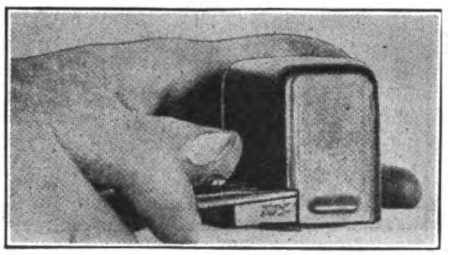


Fig. 3. REMOVING THE COVER FROM THE CUT-OUT WITH A SCREW DRIVER

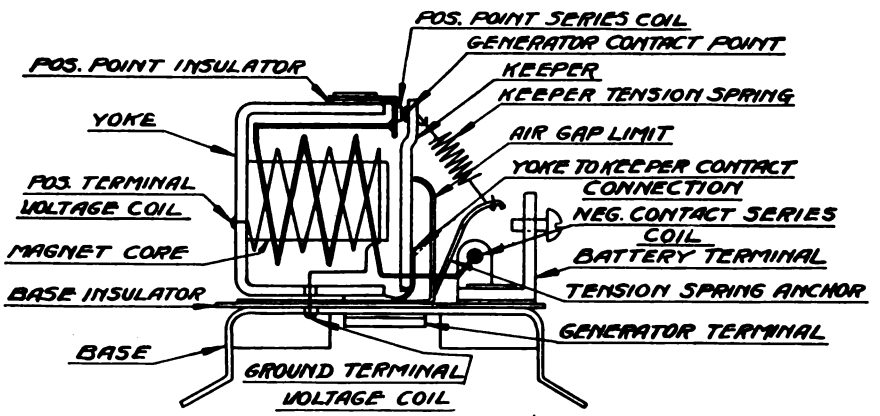


FIG. 2—A WIRING DIAGRAM OF THE CUT OUT WITH ALL PARTS CLEARLY INDICATED.

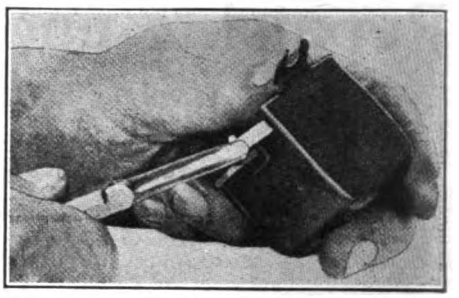


Fig. 4. WITHDRAWING THE BAR FROM THE LATER TYPE OF CUT-OUT SO THAT THE COVER MAY BE REMOVED

If an open voltage coil is indicated see that the terminal wires are properly soldered. One of these wires is secured to the base so that it is in connection with the ground (generator yoke) the other wire is soldered to the core yoke which connects it with the generator terminal. The circuit in this coil is always closed, and a small amount of current, ½ ampere, is passing through it even after the service coil cuts in. If either of these connections is broken, solder the wire back in place, using very little of the paste and taking care not to get any of the solder between the coils and the base, or the core yoke, where it is likely to cause a ground or short circuit. When soldering to the core yoke be sure that a flat joint is made, or it may touch the cover, causing a ground.

Shorted Voltage Coil

If the voltmeter turns to 0, or registers an appreciable drop, of say more than one volt, it indicates a short circuit in or before the voltage coil. Such a condition is caused generally by running the car with the charging circuit open. Whenever it is necessary to operate the car with the charging circuit open. such as when the battery has been removed the generator should be grounded as shown in Fig. 7. The wire used is a double strand of shipping tag wire, and the connection is made from the generator terminal to one of the brush end bracket screws. The practice of shorting the generator through the cut-out points may cause many other troubles in the generator. Not frequently such practice burns away the insulation. Wherever the cut-out has been damaged through such operating conditions, it should be replaced with a new one.

In some cases the terminal wire leading to the base makes contact with the magnet yoke, unsolder the

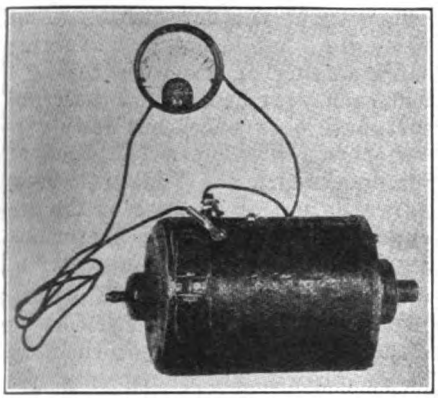


Fig. 5. THE MANNER OF CONNECTING THE AMMETER TO THE GENERATOR TO DETERMINE THE KIND OF TROUBLE

wire and slide a tube, made by rolling up a piece of paper, over the wire, after which resolder the wire to the base.

Another instance of short circuit occurs when one of the screws on the under side of the base works loose, or is sufficiently long to touch the yoke. If the cover is not provided with some proper insulator and the soldered connections to the score support is a little high, the cover will conduct the current to the base, thus grounding it. It sometimes happens that the solder will cut the paper insulator. On the black cover cut-outs it is possible to jam the cover down sufficiently to cause a ground. This is shown in Fig. 8, A and B. Lastly, the short circuit may be caused by a loose or foreign part in the assembly.

Dirty Points

Dirty or pitted points may be detected by a visual inspection. They may be cleaned or smoothed down with a piece of fine sand paper or with one of the files used on the coil unit points. If sand paper is used, it is advisable to purchase sand paper that is sanded on both sides. After cleaning the point hold the keeper (armature) down to see that the point makes a good contact and that the keeper is not touching the yoke, core or coil. There should be between 1-64 and 1-32 of an inch clearance.

The cut-out should also be inspected to see that the keeper is not sticking. This condition is found by holding the keeper down and inspecting as stated above.

Too Great a Gap Between the Keeper and Core

If there is too great a gap between the keeper and the core, the keeper will not be drawn down until the voltage has built up beyond the normal pressure of between 7 and 9 volts. If the gap is too great the cut-out will not function at all. Ordinarily the gap between the points when open should be from 1-64 to 1-32 of an inch.

If the gap is correct and the points will not close, it may be that the tension spring is too strong. The tension is relieved by bending the anchor upward or on the other type by pressing down on the spring. The cut-out should be so adjusted that it will cut in at between 7 and 9 volts; the engine being gradually accelerated, and it should cut out before the hand on the ammeter goes below 4 amperes discharge; the engine being gradually retarded. If it is impossible to obtain the above adjustment the trouble probably lies in the coil or magnet and the cut-out should be replaced with a new one.

Open Circuits in the Series Coil

An open circuit in the series coil is detected by holding the points together while the cut-out is in place on the generator. If the engine is not running, the ammeter should show 18 to 20 amperes discharge until they are pulled apart or the cut-out is removed. It is important to do this as soon as the test has been made to prevent the battery discharging. If no discharge is registered the coil is open. If the opening occurs at either end of the coil, the ends may be tacked down with a little solder. If the opening is at other than these points, the cut-out must be replaced with a new one.

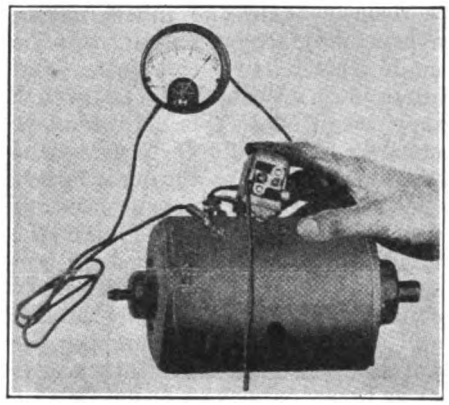


FIG 6—THE TEST IS CONTINUED BY HOLDING THE CUT-OUT ON THE GENERATOR WHILE THE VOLTMETER IS STILL ATTACHED

Short Circuit in the Series Coil

If the series coil is short circuited the hand of the ammeter will remain at 0, or will jump back and forth as it would if the commutator were dirty or the brushes not seated properly. This condition will be accompanied by arcing at the points. With the engine running at a fair rate of speed hold the points closed and see if the meter reading is steady, indicating that the generator is OK. If it is the coils that are shorted, the cut-out should be replaced with a new one.

Meter Reads Discharge After the Engine Has Stopped

This condition is caused by:

1. Ground in the series coil.
2. Points remaining closed.
3. Points sticking.
4. Keeper remaining down.

Ground Circuit in the Series Coil

A ground in the series coil may be detected by the ammeter showing a discharge when the points are open. Examine the leads to see that they are not touching the base, yoke or cover. If they are, move them away and cover any bare spots with shellac. Replace the cover and repeat the test. On the black covered cut-out a ground may occur by the cover being forced down too far as shown in Fig. 8 A. It should be so placed that the fibre boss fits into the opening in the cover as shown in Fig. 8B.

Grounds also occur where the fibre insulation between the battery terminal base or cover permits the terminal, its screw or rivet to touch the base or cover. It is sometimes possible to correct this condition by moving the terminal a little or installing a new fish plate.

Points Remain Closed

The points may remain closed either because the points are sticking due to a fused or pitted condition or the keeper may not be moving away due to a weak tension spring or its touching the core and yoke. This condition is indicated by a discharge when the engine is running slowly or stopped, the meter reading a normal change when the engine is running at a fair rate of speed.

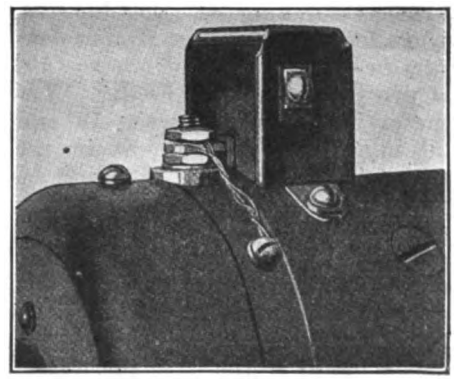


FIG. 7—THE MANNER OF GROUNDING THE GENERATOR

First remove the cover and examine the points to see that they are not sticking or that they are not pitted. If they are badly fused together the cut-out should be replaced with a new one. If the points are not too badly pitted, they may be dressed down with a piece of fine sand paper or a coil unit point file. The cut-out should then be readjusted as has been previously explained.

Generator Tests

The following tests and determinations may be made with one of the ammeters which are sold as standard equipment with the Ford

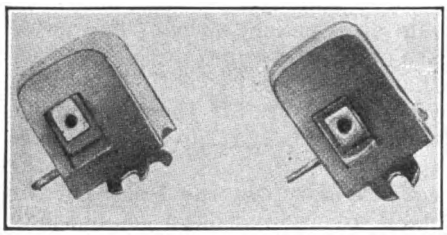


FIG. 8—A. & B. THE FIGURE TO THE LEFT SHOWS HOW THE CUT-OUT IS GROUNDED BY FORCING THE COVER DOWN TOO FAR

starting and lighting system. The standard 6 volt battery, preferably one which has been in use is used and the connections are made as shown in Fig. 9.

The correct reading is from 2 to 4 amperes, the generator running at a slow, steady speed, and with no arcing at the brushes. A heavy discharge, the hands going beyond the limits of the instrument indicates trouble in the head, such as a third brush not seated, fields open probably at the third brush or ground connection, third or positive brush holder or pig tail shorted. To prove an open field, raise the third brush and connect A to it. If open no reading will be shown on the ammeter.

No reading on the ammeter indicates dirty commutator or brushes not seated one is due to the brushes sticking in the holders, worn too short to make proper contact or spring out of shape so that it presses against the holder. Ammeter fluctuating between 18 and 20 indicates, short circuit in the armature. Ammeter reading 6 with a higher RPM indicates a shorted field. If the ammeter is normal but there is a decided flash at one point on the commutator, an open armature is indicated. Turn the armature over by hand, one segement at a time; if there is a point where the armature will not start to rotate, that coil is open.

The Practical Joker in the Practical Shop

News accounts of the topics of the day are so frequently filled with the sad accidents that are the results of a practical joke that it is hardly necessary to speak of the practical joke in a practical mechanic publication such as "Our Journal." The matter, however is brought to mind by a recent and very unusual happening which resulted fatally in the case of one man and a serious injury to another. The frequency with which the so-called practical joke turns fun into a funeral is sufficient excuse for the publication of this story.

The story of this pitiful happening is related as follows: A broken telephone wire was discovered during the noon hour in the side yard of a small manufacturing plant. Several of the plant's employees thinking the wire carried but a faint charge of electricity decided to give the shop "goat" a scare. There is usually some one individual in every shop organization who is made the butt of all jokes and horse play. With this idea in view they requested this unfortunate member of their force to grasp the wire in an attempt to put it out of the way. Unfortunately, and of course, unknown to the men the telephone wire ran over a high tension line with which it came into contact on account of the break; and instead of merely shocking the unfortunate individual into a surprise he was shocked to death. One of the "jokers" seeing the plight of the unfortunate man attempted to rescue the individual and was himself severely burned about the arms. And this second man was only saved from a similar death by the presence of mind of a telephone lineman who had in the meantime come up to repair the line.

This unexpected affair would not have happened except for the ever-present and persistent practical joker.

When tempted to inflict rough horse play or so called practical jokes upon their fellow employees should stop and think of the possible results should some part of their plan miscarry.

The shop proprietor, or manager should make it a strict rule that any one in the shop organization found guilty of perpetrating practical jokes of any nature will be promptly and immediately dismissed without further excuse. And this rule is made not alone for the safeguarding of the lives that are lost each year because of these unfortunate occurences but its observance will prevent a life time of remorse which the "jokers" must naturally suffer because of the unexpected outcome of a shopman's act or a shopman's suggestion.

The thoughtless use of the compressed air hose in an effort to play a practical joke upon the body of an unfortunate fellow employee

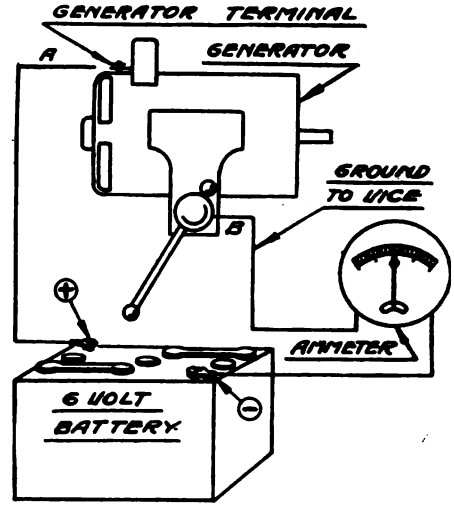


Fig. 9. A SIMPLE TEST FOR THE GENERATOR WHICH REQUIRES NO SPECIAL EQUIPMENT

has resulted in frequent deaths and in untold of suffering and injury to others. The innocent looking charged electric wire left unguarded to be grabed by an unsuspecting person has added many names to the fatal accident roll. And added to these are the almost innumberable practical jokes which have resulted in both temporary and permanent injury, for fellow workers.

Let the motto in your shop be "Stop-Think-Don't". Call the attention of your men to this safety slogan. Explain its meaning and the reason of it and then keep it posted prominently about the shop.

When you buy a drill you purchase holes—not merely a piece of fluted, twisted steel. When a man purchases an automobile or truck he buys transportation,—not merely so many pounds of metal. And the cost of that transportation is not merely the first cost of the car but the upkeep and Service cost with which you have so much to do. Proper service means greater mileage per dollar—cheap Service means greater cost per mile. Sell transportation Service to the motorist, not merely hours of work or labor. Get this idea across to your customers. It means better service to your customer, greater satisfaction and a higher plane of business effort. Sell transportation service.

More Suggestions on Collecting Accounts

Collection Agencies and a Warning—How to Use the Telephone as a Collector—How to Trace the chap who thinks it Cheaper to Move than to Pay Bills—How a Lawyer can Help—Using the Sight Draft.

There are times when using a collection agency for the settlement of unpaid accounts and bills that are long over-due, will prove profitable. Usually, however, the accounts handed to the collection agency are in or very close to the "dead beat" class. There are many of these professional collection agencies scattered throughout the country, and one can usually find from two or three in the smaller towns to dozens of them in the larger cities. Some of these agencies work exclusively through the mails, while others pursue their collections through professional collectors who are usually up to all the tricks of the trade. As it is generally understood, the average accounts handed to the professional collection agency, are usually for a bill that will prove difficult of collection. The professional collector, employed by the agency, after one or two mild attempts to collect the account, usually brings his professional "strong arm" methods into play, and really stops at nothing short of actual personal violence in the successful collection of the bill.

These collection agencies arrange to pursue the matter of collecting through the law courts, though they will usually await your instructions before proceeding in this matter.

Those agencies, who perform their work through the mails, make use of extremely forceful letters, as they undoubtedly feel that they must use extreme measures to collect an account upon which the business man has already used all of his ingenuity.

As in practically all other lines of business there are reliable and unreliable collection agencies, and when the business man decides to send a list of accounts to one of these agencies for attention, it is well to determine before hand whether or not the agency with whom he intends to do business, is reliable or unreliable. Collection agencies have been known to retain all of the money collected instead of just the legitimate percentage to which they are rightly entitled, and it is sometimes equally difficult, if not more so, to collect from some collection agencies as it is to get the money from the original debtor. It is, therefore, well to pick your collection agency with extreme care, and even after they begin work for you, to keep careful records of their collections and to follow up their work when in doubt concerning their reports on any of the accounts listed with them.

The Telephone As a Collector

The telephone can be made an excellent aid in collecting delinquent accounts, though it is only as a means of following up the delinquent that it can be made at all effective. An Ohio shop-owner, for example, uses the telephone to remind delinquents when they have failed to meet a promise to pay their accounts at a certain time. He tempers his talk according to the condition of the account, and the frequency with which the delinquent has failed to keep his promises. The telephone has the added advantage of being able to present your side of the proposition and to also answer the delinquent's arguments right on the spot. On the other hand the written letter presents only your argument and no matter how strongly you may present it, it requires no response on the part of the delinquent unless he wants to give it.

Of course, in the case of the telephone, it is easily possible for the delinquent to slam the receiver on the hook after you have called him up repeatedly, but as in everything else, persistency in the matter of calling him up regularly and frequently with an occasional veiled reference to the possibility of other party line subscribers knowing what is being said over the phone, cannot help but result in the successful outcome of your campaign and the payment of the bill.

Keeping Tabs on the Skipping Debtor

Another class of debtors, that goes far toward making the path of the modern merchant a rough one, is the "skips" or that class of charge customers who find it cheaper to move than to pay their bills. Of course, as a general rule, the shop-owner knows his customers more or less intimately and is acquainted with their comings and goings, if not directly then through the medium of friends and acquaintances. And this is an excellent way to keep tabs on those of your customers who are likely to move and "forget" to settle up their bills before they go.

When a debtor moves away and leaves no address, but instead leaves an unpaid bill of generous proportion, it is up to the business man to use all the resources at his command, in order to get the money that rightly belongs to him. In the first place it is necessary to get in touch with the debtor as quickly as possible, and this will in all possibility sorely tax the ingenuity of the shop-owner, particularly if the debtor is a professional skip and is in the habit of wandering from one point to the other leaving nothing but a trail of unpaid accounts. Naturally, when the debtor is located, one or the other of the schemes already mentioned may be used in an attempt to secure the money he owes you.

How one debtor of this caliber was located, was told by a Central New York State shop-owner as follows:

"A fellow by the name of J. D. Stone, who lived a little way out of town owed me a bill of $78.00 that had been running for quite a while. Payment had been made from time to time, but this followed by repeated jobs of repairing did not reduce his indebtedness to any marked extent, so that when the man moved away his bill stood about the above amount. I tried my best to locate him through friends and acquaintances, but the most that I could learn was that he had moved into Central Illinois. I had tried addressing letters to various points that he was supposed to have moved to, but without success. Finally I hit upon a plan which I tried out simply because I wanted to show him that I was just as clever as he was. I accordingly placed an ad in one of the Chicago papers, which read as follows:

J. D. Stone—If J. D. Stone will communicate with the undersigned he will

learn something to his advantage and profit. Address L. T. M., care of Newspaper office.

"I made arrangements with the newspaper, to forward any reply to me, and instructed them to run the ad for three days. Within the week I got a reply from my former customer and I immediately worked a bluff on him which brought the money by return mail. I wrote him a letter, enclosed a statement of his account and told him I knew all about his new location, what he was doing and with whom he was dealing and trading and that I wanted payment of my bill within a certain time.

"I have since tried the same scheme on one other occasion, and it worked out in practically the same way, except that in the second case, I was afraid that the debtor would call my bluff so I determined before hand just who he was dealing with, what he was doing and for whom he was working."

The scheme referred to in the foregoing is an excellent one for getting in touch with the debtor, while if he does not see such an advertisement, himself, someone who knows him is very likely to run across it and advise him concerning the ad.

Another idea for locating the skipper is contained in the suggestion to send a registered letter, requesting the postoffice people that the signed receipt be returned to you. Of course, this can only be used when you have some idea of what the debtor's new location is, but it will assist you in knowing, whether or not, you have his correct address.

Another scheme which will enable to secure the debtor's own acknowledgment of a letter, consists in using fictitious letter-head upon which a letter is written, offering the debtor a souvenir of some kind, if he will send in his correct name and address.

This letter-head, of course, should show that it has no relation to the shop or business of the man who is trying to collect a bill and the letter should say nothing, whatever, regarding an unpaid account, but should be as carefully disguised as possible in order to get the debtor to do just exactly what you want him to.

It is sometimes possible in the case of the skipped debtor to call upon him personally when you have located him. While a call or trip to a distant point is only excused by the possibility of securing payment on an overdue account of large proportion, it is sometimes possible to make a call of this kind in connection with some other trip, such as a vaction or a convention trip which can be combined with the collection.

"And He Wonders Why He Keeps Poor"

The average South Dakota citizen gets up at the alarm of a Connecticut clock, buttons his Chicago suspenders to Detroit overalls, puts on a pair of cowhide boots made in Ohio, washes in a Pittsburg basin, using Cincinnati soap, and dries on a cotton towel made in New Hampshire; sits down to a Grand Rapids table, eats hot biscuits made with Minneapolis flour, Kansas City bacon and Indiana grits fried in Omaha lard, cooked on a St. Louis stove; buys Irish potatoes grown in Michigan and canned fruits put up in California, seasoned with Rhode Island spices, claps on his old wool hat made in Philadelphia, harnesses his Missouri mule, fed on Iowa corn to an Indiana plow

At night he crawls under a New Jersey blanket and is kept awake by a South Dakota dog—the only home product on the place.

"And he wonders why he keeps poor."

An Excellent Piece of Advertising

In sending in the above piece of advertising Mr. A. J. Yeager says:—"We use this slip in our mail to boost the Buy at Home movement. We have had quite a number of calls for permission to use it. You may print it in "Our Family Paper" as some of the other boys may use it. This slip made such a hit with our printer that he printed a thousand of them with no charge."

Here is an excellent piece of literature to send out to your local customers. Show it to your brother merchants in town and start a "Buy at Home" movement. Mr Yeager we know will be glad to see the entire "Family" use his idea.

Sending the Lawyer After the Skipping Debtor

It is usually possible to collect successfully through the medium of the lawyer's office when the skipping debtor has once been located. In other words, when you find that a former customer has left town and forgotton to balance his account with you, your first move, of course, is to locate the man. After this has been done, it is usually possible to employ a lawyer in the town or in the immediate vicinity of where your debtor is located. You can usually secure the names of lawyers in other towns in your county, by communicating with the clerk or some other county officials.

However, if the debtor has left the county, you can get the same information from some of the officials at the state capital. Of course, it is understood that a lawyer employed in this way will require a commission or percentage upon all of his collections. This usually depends upon the amount of work the lawyer has to do in making the collection.

How To Use a Sight Draft

Another method of collecting that is commonly used on debtors residing in other towns is the Sight Draft. This is the means of collecting that is put into operation through the medium of your banker. When you have located your former customer and skipping debtor in another town or city explain the circumstances to your banker and instruct him to issue a Sight Draft on the man. This your banker will do through the medium of a bank located in the same town in which your debtor is residing. The bank in the debtor's town will then advise your debtor that they have received a draft on him for a certain amount which they will ask him to pay at their bank. There is, of course, a slight charge for making a collection in this way, but your banker will be very glad to explain just exactly what this charge is and all about this method if it is not entirely clear to you.

Of course, the Sight Draft method of collecting will not force money out of a deadbeat's pocket, but this method coupled with a letter or two, with reference to the possible injury to the debtor's credit standing which may result from the repeated drawing by means of drafts, will usually result in the successful collection of the account.

A letter to send to the debtor just previous to drawing on him or previous to making a draft on

him for the amount due is as follows:

I have not been favored with an answer to my recent letters to you and in the absence of an explanation of why the account should not be paid, I am making a draft against you for the amount of $10.00.

"I always regret drawing upon a business man in this way, because of the possible effect upon his business and credit standing However, your continued silence regarding the matter of your account, leaves nothing else for us to do and we are sure that you will see the advisability of paying this draft when it is presented to you."

A Novel Envelope Idea

Another novel idea for collecting is one used by a Missouri business man and has proven very effective in getting the debtor's attention. This shop-owner's stunt is to send a series of letters after the first statement, sending each letter in an envelope that is a size or two larger that the preceeding letter. His first piece of mail to the debtor is of course the statement at the first of the month. Sometime between the tenth and the fifteenth, a small note mailed in a note sized envelope refers to the statement previously sent and from that time on the four or five succeeding letters are each written on a large sheet and mailed in a larger sized envelope. Proper sized sheets and envelopes to match, can be purchased in practically any stationery store, and if a bill is enclosed in each case, It will not be necessary to use letter-heads or printed stationery for carrying out a scheme of this kind.

A Simple License Holder Easily Made

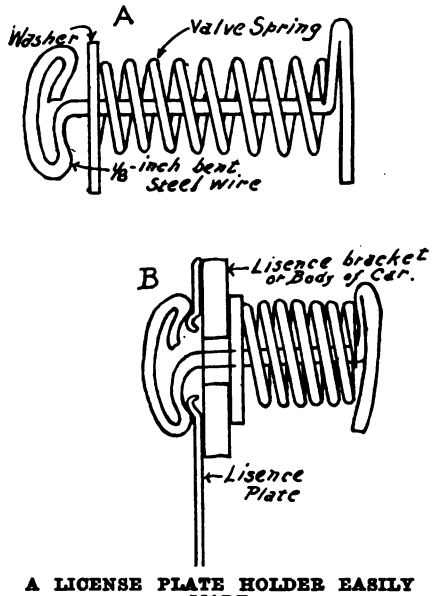
G. A. LUERS

The accompanying engraving shows a very simple license plate holder for automobiles and trucks. It is quickly and easily made and the practical shop man can undoubtedly make a number of these for his customers. In view of the fact that the material used is mostly that found in the scrap pile the price received for them will be almost clear profit, as they can be made up during spare time.

As shown in the engraving the holder is made up of a heavy piece of wire, a valve spring and a washer, these combined as shown serve as a license plate holder for fastening plates to the vehicle properly. One feature of this plate holder which will appeal, is the fact that the plates are quickly detachable and that they may be put on or taken off the vehicle without the use of a screw driver or wrench.

The spring used may be an old valve spring or any other kind of wound spring though it should be reasonably stiff. A piece of eighth-inch steel wire is bent as shown after a washer of suitable size has been strung on to the wire.

To secure the plate to the vehicle the fastener is pushed through the slot in the license bracket or any similiar slot in the body of the car, and then through the slot in the license plate. It is now given a quarter turn and it will hold the license plate as shown in the engraving at B. The edges of the slot in the license plate is usually ridged or beaded and this ridge will prevent the holding wire from turning out of the slot. If the spring holds the wire firmly against the face of the plate. This idea presents a little suggestion for added profit to the practical shop owner enabling him to get some return from his scrap material and his spare time.



A LICENSE PLATE HOLDER EASILY MADE

Some Points About Air and Kiln-Dried Wood

Comparative Strength of Air-Dried and Kiln-Dried Wood

Some wood users claim that kiln-dried wood is brash and not equal in strength to wood that is air-dried. Others advance figures purporting to show that kiln-dried wood is much stronger than air-dried. But some 150,000 comparative strength tests, made by the Forest Products Laboratory, of the U. S. Forest Service, on kiln-dried and air-dried specimens of 28 common species of wood show that good kiln drying and good air drynig have the same effect upon the strength of wood.

The belief that kiln drying produces stronger wood than air drying is usually the result of failure to consider differences in moisture content. The moisture content of wood on leaving the kiln is generally from 2 to 6 per cent lower than that of thoroughly air-dried stock. Since wood rapidly increases in strength with loss of moisture, higher strength values may be obtained from kiln-dried than from air-dried wood. Such difference in strength has no significance, since in use a piece of wood will come to practically the same moisture condition whether it is kiln-dried or air-dried.

It must be emphasized that the appearance of the dried wood is not a reliable criterion of the effect the drying process has had upon its strength. The strength properties may be seriously injured without visible damage to the wood. Also, it has been found that the same kiln-drying process can not be applied with equal success to all species. To insure uninjured kiln-dried material, a knowledge of the correct kiln conditions to use with stock of a given species, grade and thickness, and a record showing that no more severe treatment has been employed, are necessary.

Points About Gluing Wood

Here are several practical questions on the kiln drying of lumber, with the answers as determined by experiments at the Forest Products Laboratory.

How can surface and end checking be controlled in lumber during drying?

Answer: By having the humidity in the kiln high enough to prevent too rapid surface drying. If the surface dries too rapidly it tends to shrink but is prevented to a certain extent because the inside of the piece has not lost sufficient moisture to cause it to shrink as much as the outside. Surface and end checking is the result.

Is there any advantage in steaming green lumber at the beginning of a kiln run?

Answer: Yes. Steaming the lumber heats it through quickly before the surface begins to dry. If the lumber is then subjected to the proper drying temperature and

humidity, the moisture inside transfuses to the outside more rapidly than if preliminary steaming were not used.

What temperature is it safe and efficient to start with in kiln drying green red gum lumber one inch thick?

Answer: Red gum, 136° F. Northern highland oak, 115° F. Southern lowland oak, 105° F.

What are two causes of cupping of resawed lumber?

Answer: Casehardening and uneven moisture content. The wood is casehardened when the surface becomes "set" without full shrinkage, because of drying faster than the interior. When lumber which is casehardened or of uneven moisture content is resawed, unequal shrinkage of the two faces occurs, resulting in cupping.

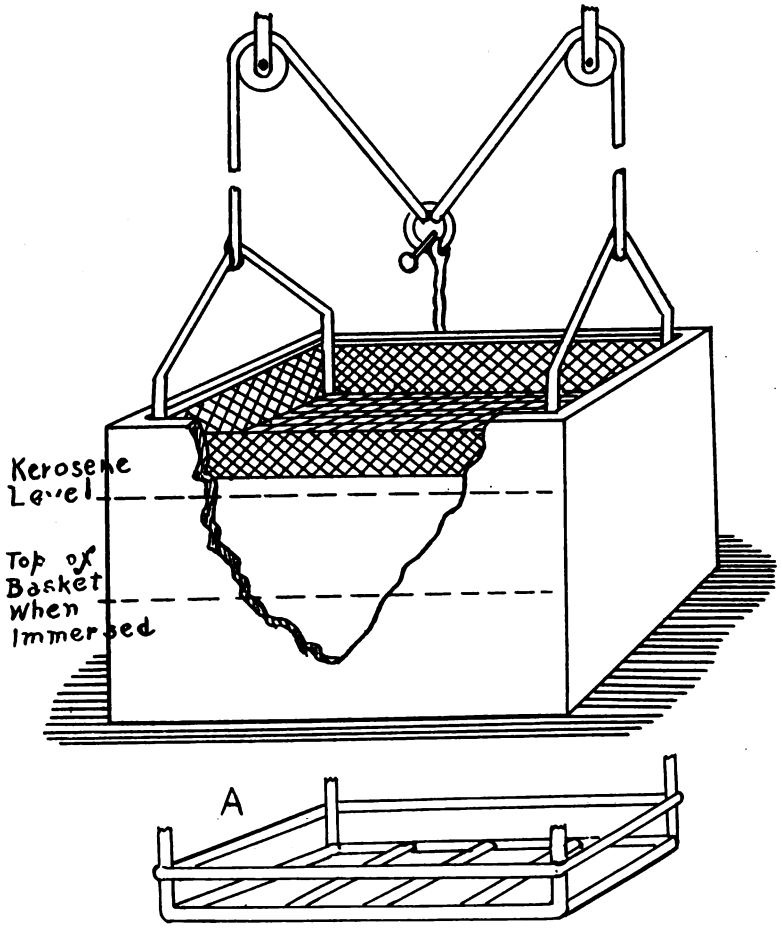
Here are several practical questions on the gluing of wood, with the answers as determined by experiments at the Forest Products Laboratory.

At what temperature should animal glue be melted and kept before using in order to reduce deterioration to the minimum? What effect does a temperature much above or below the correct temperature have on animal glue?

Answer: At about 140°F. A temperature much higher reduces the strength by chemical decomposition and one much lower permits bacterial decomposition.

Can a strong joint be made with animal glue after it has chilled on the wood and formed a firm jelly?

Answer: Yes, provided sufficient pressure is used.



A COMBINATION CLEANING TANK AND DRAIN RACK THAT MAKES THE CLEANING OF THE DIRTY MACHINE PARTS EASY.

What is the most desirable pressure to use in gluing joints?

Answer: Pressures from a few pounds up to 1000 pounds per square inch can be used. The proper amount depends upon the gluing conditions, the wood, and the glue.

What are the principal causes of starved joints?

Answer: Application of pressure too quickly after spreading the glue, high temperature of room and wood, high gluing pressure, and porous wood.

On which are starved joints most likely to occur, white oak or birch?

Answer: Birch.

List in order the following glues from the highest to the lowest in water resistence:- high-grade animal, blood albumin, casein, and vegetable.

Answer; Blood albumin, casein, high-grade animal, and vegetable.

What are the chief causes of warping in plywood?

Answer: Uneven moisture changes and unbalanced construction.

What causes sunken joints in veneered panels?

Answer: Machining the glued joints, usually of the core, before the moisture added in gluing has been thoroughly equalized or dried out.

Name two detrimental effects possible from heating wood before gluing.

Answer: 1. Weak joints resulting from either a starved condition of the joint or from too rapid drying of the glue.

2. Warping of laminations or plies.

Will tooth planing the wood before gluing make a stronger joint?

Answer: No. Under usual gluing conditions, as strong joints may be made from smoothly surfaced as from that which has been tooth planed.

A Combined Cleaning Tank and Drain Rack

J. M. MOORE

We recently installed a cleaning arrangement in the shop and realizng what an improvement it is over the usual kerosene tub I am going to pass it on to "Our Journal."

We like most repair shops had been using a tub or half a barrell for putting greasy and dirty auto parts through the kerosene bath. This tub arrangement became so filled with dirty sediment this summer with no time to clean it out that I determined to rig up something better at the first opportunity.

Accordingly I built a heavy vat or tank of wood. Into this I fitted a tin lining that I was able to purchase rather cheaply from a junk dealer. Or to tell the matter as I proceeded, I first looked about for the tin or metal lining. I had intended to build the wood part first but considered it possible to pick up a tin lining cheaply, which I did. I then built the wood vat to fit the lining.

Quite a little soldering and patching was necessary on the lining but it did not take me very long to get the tank into good leak proof shape. I turned down the top edges of the lining and nailed them to the top edges of the wood holder.

Then I made a frame of rod iron as at A, welding the joints by means of the oxy-acetylene torch. This was made very substantial so that it would not buckle under the weight of heavy gears and pinions. The rods across the bottom kept the screening from sagging. This frame I then covered with a screening with a half inch mesh. Two hangers were then fitted—one to each end of the screen frame and the frame then suspended as shown.

The rope holding the frame was so fitted so that where the ring at X is in a line with the two pulley, the screen basket will be about half way down in the kerosene bath thus to lower the basket of parts into the bath the ring is unhooked from the stud holding it and the basket sinks into the bath. If the basket is repeatedly raised and lowered the kerosene will be washed over and around the parts until thoroughly cleaned. To drain, the basket is raised, the ring caught upon the stud and the parts may be removed when wanted.

This simple and inexpensive device is not only a great time and labor saver but greatly simplifies a most disagreeable job. In fact our men were inclined to slight the cleaning end of an overhaul job before, while now none seem to mind it.

Two Experiences in Tractor Work

H. D. KUHLMAN

Through ignorance and carelessness the farmers in the United States are losing millions of dollars every year on damage done to modern farm machinery. I am a blacksmith and also do auto and tractor repairing and I will mention only two cases out of more than a dozen which I had before me last harvest, to show how necessary it is for farmers and their sons and help to know something about handling autos, trucks and tractors and stationary gasoline engines and electric light plants.

A fifteen year old boy drove his tractor to another field. The water in the radiator was very low. But the distance was only about a mile and as there was a full tank of water at the other field, he let it go until he reached the other field. Coming to the water tank the engine was steaming hot, and the boy thought he had to cool the engine as quickly as possible and he poured cold water into the tank. The result was that the engine could not be started again and they called for me. When I came up I found all four cylinders cracked.

In another case I was instructed to put a new pinion on an engine. The old one was broken and the flywheel had to be taken off to slip on the new one. This was done in a hurry, but when the engine was started it could hardly move the tractor from the place. I told the driver to stop, that there was something else wrong.

After further investigation I discovered that the boy never had tended to the grease cups on the whole gearing. The tractor was new, therefore, there was more danger. Two bearings became so hot that they started to melt and the shaft got so tight in the bearings that the force of the engine sprung the shaft out of shape.

It is not the damage alone that is done to the machinery, that the farmer has to reckon with but the lost time and the damage done to the crops in the field

Benton's Recipe Book

A Message to My Readers

The letter received from Brother B. R. B. of Ohio and published in this column this month reminds me of a little message that I want to give the good readers of my column.

This column of recipes, formulas and short hints has been appearing in "Our Journal" for several years, and readers have been kind enough to say that they have enjoyed my efforts and have profitted by the information. If you good readers have enjoyed and profitted by the information given here as much as I have enjoyed gathering and giving the information, I on my side am well satisfied.

But generally speaking, it has been a one sided arrangement. I have journeyed into the "far fields" for recipes, formulas and hints. Occasionally some good reader, such as R. R. B., has come along with a good tried recipe or formula and you don't know how I have enjoyed getting them. Now, it occurs to me that if each and every reader of this column would send in just one recipe, short cut or hint, we would all be gainers and this column would have enough material to double in size for some months to come.

How about it good folks? Each and every one of you have several favorite recipes or formulas that you use in your work. Suppose you send along just one (no real objection to more if you want to send them) and then you will feel lots more interested in the bit of work that I am trying to do here.

When sending in your recipes, sign your full name and address and tell me just how you want your reciepe signed—whether with initials, full name or some nom-de-plume or pen name. I am going to give each reader full credit for each receipe he sends in.

Now who will be first?

Sincerely yours,

Benton.

Blueing Steel is another common request F. J. P., Ohio, L. M. T., Illinois and J. L. H., Texas ask for a simple means of blueing steel. The following simple process will undoubtedly fill the needs of each. Run your pieces through your finishing polish and then place them in a pan of equal parts of clean sand and powdered charcoal. Now heat evenly until the parts come to the desired color when they may be allowed to cool. Wipe thoroughly with a clean cloth.

A Cement for Cast Iron is sent in by B. R. B. of Ohio with the following comment:—"I am sending you herewith a recipe for a cast iron cement that may be of interest to you and your readers. I am glad to send this along as a slight expression of my appreciation for the many useful and helpful hints you have given me during the few months I have been reading Our Journal and Benton's Column. This cement I find very useful for many jobs we have to perform, as our work seems to range from about everything from the repair of threshing engines, machines and equipment to toy trains for the youngsters. And while we have been kept extremely busy during the past season we try not to turn any one away no matter what the job. But—I've almost forgotten what I came for—Here's the recipe:—Make up a dry mixture of one ounce of sulphur, two ounces of sal-ammoniac and one pound of fine cast-iron filings. Mix this up thoroughly and place in a tightly covered jar or other container where it will keep dry. When ready to use take one part of this mixture to about twenty parts of clear, clean filings. Add water and very fine clean sand to form a stiff paste and use."

Very good Brother B. R. B.—Come again when time permits. This "corner" or column is not exclusively Benton's—good formulas and recipes of proven worth are always welcomed.

The Modern Shop Owner

(With apologies to Walt Mason)

Joe Joelson is a shop man who is a skillful scout and everyone endorses the work he's turning out. He loafs not with old cronies who at his doorway stop while there is work awaiting within his cheery shop. But some folks say that smithing has sickened and gone dead. That autos, trucks and tractors have laid it in its bed. Some smiths go 'round complaining and wildly tear their hair, and gnash their teeth and then assert: —"The business has gone bare."

But Joelson keeps a working with hammer, wrench and file. He makes no doleful murmur, but wears a pleasant smile. "The out look does look bloey the future don't seem bright for smith shops where the smither ain't seen the proper light.

"I don't go 'round a blusterin', a cussin' up an' down—I just keep on a working" says Joe without a frown. He says: "I keep a fixin' the things they bring t' me for I ain't narrow minded as you can plainly see. I think the horse and auto, the truck and tractor too, the carriage, gig and wagon and the whole darn cats mew, are just as much a part of smithing work and trade as anything that Tubal Cain or Vulcan ever made. And so I keep a plugging at fixing up the rigs, the autos, trucks and horses, the wagons and the gigs. I keep on gathering shekels and adding to my pile, ignoring all the foolish bunk that some folks talk the while. For I'm not narrow minded, while busying my self and broadening my business and securing filthy pelf."

High Spots

LOOK AT YOUR WRAPPER

A First-Class doer of first-class work is pretty certain t' have a first-class business.

What's come o' the old fashioned smith who used to argue about cold an' hot tire setting?

Some men are like the loose pulley—they keep whirling about but never do anything worth while.

Remember—you get six months credit for a new subscriber. Look at your wrapper and then determine to advance the date at least six months.

The gas pump is really the greatest accessory "sales counter" you can have. Across the gas hose you have a great opportunity for sales not otherwise possible.

One motorist we know when asked how much mileage he got from a new car replied: "Well, when my wife's with me I get about four thousand words per gallon."

We've missed our misson with this issue if this number han't caused your thinking mechanism to operate faster and with more pep. How about telling us how this issue has affected you or your business. Do it now

Shout about what you're doing. If you can repair anything that comes along tell folks so. If you specialize, say so. One shop we passed a while ago had a sign reading: "We mend anything but broken hearts and peoples habits." Another read:—"We specialize in mending everything but folks ways."

Lots of Talk we all hear of the high-handed methods of overcharging in many of the garages when an unfortunate accident causes a motorist to depend upon the "sharpers" who run some of these places. Ever hear of one of "Our Folks" taking undue advantage of an owner whose car has broken down? We haven't.

The mechanic may be expert in the building of machines but if he fails in his building of character his real mission in life will have missed fire. The forger and former of metals may produce world masterpieces but unless his forming of characters has been on the proper plane 'twere better that his name be unknown.

Three good ways to scatter some real good cheer is to send in a new subscriber to "Our Journal."

First:—You cheer the new reader by introducing "Our Journal" to him. Second:—You receive six months credit on your own account. Third:—You send us a new reader. Try it—it's easy to get a new "member" and to make three folks happy.

The Smith and general Repair man cannot afford to imitate the "get-rick-quick" artist. Usually the repair shop man is permanently located. To succeed, to make money, to build a business he must sell the same customers over and over again. He must treat them fair and square each and every time they come to him. He must build up a reputation for honesty, full value and square dealing. He must deliver satisfaction with a capital S every time he serves a customer. He must serve each customr so that he will return for more satisfactory service. **And Best of All**—"Our Folks" are doing just those very things.

"D'y' 'spose I been stung?" was the way Tom greeted us when we dropped in on him the other day. What are you referring to, Tom?" was our query as friend Tardy handed us a sheet all covered with figures. "Well, y' 'member them thare parts for Fords that I bought awhile back? Well, I been keepin' track of 'em like you always say a man should in order to know if he's makin' money or not, an' here I am with all these figures an' them parts still unsold an' all the broken parts accounted for an' accordin' to my figures I'm about ten dollars out of pocket. D'y' 'spose them was fake parts?" We couldn't help but wonder how long it would be before Tom Tardy woke up.

Do you agree with everything in this issue? Of course you don't. You're not expected to—But you are expected to tell your side. Let us have your story. If you tell your ideas and opinions as other readers do we can all learn from this exchange of ideas. And that reminds me of that good old saying regarding the exchange of ideas:—If you have a dollar and I have a dollar and we change, each of us will still have a dollar. But if you have an idea and I have an idea and we exchange ideas we will then each have two ideas. Think it over and keep the idea found. "Our Journal" is an excellent bank. Deposit your ideas freely and receive not only interest but interest and principal many time compounded.

Cylinder Regrinding as A Business for the General Repair Shop

In this Installment of a Series that is proving most Interesting to "Our Folks," you will find many kinks that will help in the Building up of a Regrinding Business. Valuable Suggestions and Money-Saving Advice on many matters connected with the Business and Mechanical End of the work will be found in this article.

No hard and set rule can be given as to the amount of clearance which should be allowed between the pistons and cylinder walls. There are so many conditions to be taken into consideration, including the construction and speed of the motor, style and material of the pistons, also the parties who are to drive and the service given the motor after grinding.

Even the manufacturers themselves are divided in the matter of clearance, each having his own pet theory on what it should be. Some idea of how they vary can be judged from the following table of a few of the makers of cars.

Maker	Finish	Diam.	Clearance	Piston Material
Chalmers	Grind	3¼"	0.005	Lynite
Chevrolet	Ream	3.686"	0.003	C. I.
Continental	Grind	3¼"	0.001	C. I.
Continental	Grind	3⅛"	0.002	C. I.
Continental	Grind	3⅜"	0.002	C. I.
Continental	Grind	4⅛"	0.002	C. I.
Continental	Grind	4⅛"	0.003	C. I.
Dodge	Ream	3⅞"		C. I.
Franklin	Grind	3¼"	Taper from 0.003 0.001	Magnalite
Hudson	Grind	3½"	0.0035	C. I.
Hupmobile	Grind	3.248"	0.001	C. I.
Maxwell	Grind	3.622plus	0.013	C. I.
Mitchell	Grind	3¼"	0.0025	C. I.
Oakland	Ream	2⅜"	0.005	Alum.
Oldsmobile	Ream	2⅞"	0.002	Lynite
Packard	Grind	2.998	0.004	C. I.
Pierce	Grind	4½"	0.002 0.003	C. I.

TABLE SHOWING AMOUNT OF CLEARANCE BETWEEN CYLINDER WALLS AND PISTONS BY VARIOUS MAKERS. "C. I." IN MATERIAL COLUMN INDICATES CAST IRON

As a general rule it is safe to allow .001 to each inch diameter of the hole on cast-iron pistons.

The majority of the regrinding concerns and, as can be seen from the table, the manufacturers themselves, shade this a little. This can be done, provided the fitting of the piston rings and pins is an A-1 job and that when assembling the motor every precaution is taken in regard to squaring up the piston and rods, giving it plenty of oil and with the assurance that the driver will operate the car at moderate speed the first few hundred miles. If however, it is a taxicab, race car, or motor truck, it is well to be generous on this allowance and make it from .00125 to .0015. The heavy duty of the last two classes causes greater heat expansion than in the ordinary motor. With a taxicab, there is no assurance as to who is to drive it, and therefore it is well to take no chances.

Piston manufacturers in many cases, especially on patented construction or alloy material, can best tell what clearance should be left for their particular style of piston.

Manufacturing Pistons

It is well to remember that, in manufacturing pistons a regrinding shop equipped with only a lathe and a drill press to do this work cannot hope to compete with a manufacturer who has the proper equipment and up-to-date methods. One time when it does seem advisable to make pistons complete, is for orphan sizes. Especially is this true if it is a rush job and the regrinding shop is a long ways from the piston manufacturer.

Even if it were possible to get them from the manufacturer, it would require time; and the fact that you are able to get it quickly will fully warrant the extra expense in making it.

Remember, however, that there are several important factors that constitute a successful piston. They should be of best gray iron, closely grained and sufficiently rigid and reinforced to stand strains and still not be too heavy for high-speed performance. It is only possible to make such a piston with a uniform wall; and to do this, the operations are as follows:

Start by holding the piston from the inside diameter while the centre is put in the closed end and a roughing cut is taken from the outside diameter. The opposite end can then be camfered by holding the rough turned outside in a chuck. By such methods, uniform thickness of wall can be obtained.

Another operation on the piston is that of the wrist-pin hole, which must be at RIGHT ANGLES to the axis of the piston. This can be done either, with a jig on the drill press or on a lathe.

Finishing Semi-Finished Pistons

There is one operation on pistons that can be nicely taken care of by practically all regrinding concerns, and that is the finishing of the outside diameter.

Most piston manufacturers will furnish them finished or semi-finished. By using a semi-finished piston, which usually comes ⅛ inch oversize, and grinding it down to fit the bore, not only will it increase production, but it will allow the carrying of a larger supply on the same investment.

Finished pistons will change, even when bought from the best of manufacturers, and will frequently be found out of round.

(A slight tap with a wooden hammer when fitting out of round pistons to holes will usually bring them back.)

In finishing the outside of the pistons a suitable external grinding machine must be obtained as the

cylinder grinder is of no value for such work. In securing such a machine, it is well to keep in mind two facts: that the length of a piston seldom exceeds 6 inches or 8 inches, and the diameter even on the larger sizes does not ordinarily run over 5 inches. Therefore a small-size external grinder that will swing 6 inches or 8 inches with sufficient length between the centers is very satisfactory.

The pin holes on semi-finished pistons come rough reamed with .002 or .003 left for finish reaming. Any good adjustable hand reamer will take care of this.

Remember that in finishing the outside diameter the lands should be relieved and made smaller than the skirt by at least .008 inch or .010 inch. The excess heat and solid metal cause greater expansion at this point.

Always measure a piston below the wrist-pin hole and not above it on the head.

Piston Pins

While the standard pins can usually be secured from stock in inch, .005 inch, or .010 inch over size, it sometimes is necessary to order special ones. That there may be no confusion in ordering special sizes, be sure to give oversize above standard, make of car, model, motor, diameter and length, slot or screw hole, distance width and depth of slot diameter of set screw hole, distance from center of set-screw hole to end of pin; also state if pin has oil holes or oil grooves.

Overside Identifications

It has been generally adopted by oversize piston-pin manufacturers, in order to identify them so they can be readily distinguished from one another, that the ends be painted different colors. For instance, standard, no color; .003 inch oversize, red; .005 inch oversize, yellow; .008 inch oversize, white.

Fitting Piston Pins

Use an accurate reamer and be very careful not to remove too much metal. Remember that the clearance between the pin and bearing should be .0005 inch to .001 inch. A loose-fitting piston-pin with too much clearance will cause a piston-pin knock which will eventually mean that the whole motor will have to be pulled down and new pistons inserted.

On the other hand, if it is a ringing fit, it will also cause trouble, because there must be room for a film of oil on the pin. A well-fitted pin will last for years.

Fitting Rings

In fitting rings, first try them in the piston grooves. They should be perfectly free, but without side play. If a little too wide to slip into the grooves, lay a piece of fine emery cloth on a flat surface and then rub the ring until it just fits.

The distance between the end of a gap cutring should be from .0015 inch to .002 inch per inch diameter of the cylinder.

The whole secret of a good ring is that it be perfectly round when in place, and the best results will be obtained if this is carefully checked up.

Manufacturing of Piston Rings

We do not recommend the average regrinding shop to manufacture piston rings. It requires considerable equipment; and unless one is going into it as a business, it is far better to purchase the rings from those who are making a business of it.

Measuring Holes

While there are number of convenient dial gauges for measuring holes, it has been found that, in a regrinding shop, ordinary inside micrometers are the best all-around gauge.

All Holes Should be of Equal Size in the Same Block

All holes in the same block should be ground to the same size. This was not always done by the first companies to take up regrinding. Many times, when the differences were slight, the pistons got mixed in the assembling, and the wrong piston would be used; then trouble developed. It also makes a more perfectly balanced motor and in case of repairs is easier to refurnish from the records kept by the regrinding company.

Thin Walls

Occasionally the shifting of the cores, when molding the cylinders, leaves a thin wall. In regrinding such cases, if the wheel should break through, of course the man doing the work cannot be held for this misfortune. Futhermore, should there be a deep score and the owner wished it ground out and not filled, he must assume all the responsibility if he has trouble later.

Size	Cyl.	East	South	High Middle West	Low Middle West	Far West
		$ 22.60	$ 24.00	$ 23.00	$ 17.00	$ 28.00
Under	2	43.00	41.50	45.00	34.00	42.00
3″	6	58.00	60.00	64.00	51.00	60.00
	8	74.00	77.00	83.00	66.00	76.00
	12	109.00	100.00	120.00	101.00	107.00
From	2	22.50	27.00	24.00	18.00	32.00
3″ to	4	46.00	46.00	48.00	36.00	50.00
3½″ dia.	6	59.00	64.00	68.00	53.00	71.00
From	2	24.50	29.00	28.00	23.00	36.00
3⅝″ to	4	44.00	49.00	54.00	42.00	5q.00
4″ dia.	6	66.00	70.00	76.00	63.00	81.00
From	2	25.00.	35.00	32.00	24.00	43.00
4⅛″ to	4	50.00	55.00	60.00	46.00	69.00
4½″ dia.	6	68.50	77.00	84.00	68.00	97.00
From	2	28.00	37.00	35.00	26.00	49.00
4⅝″ to	4	53.00	62.00	67.00	50.00	79.00
5″	6	72.50	82.00	93.00	73.00	111.00
From	2	28.00	40.00	42.00	26.00	60.00
5⅛″ to	4	55.00	66.00	78.00	50.00	93.00
6″ dia.	6	72.50		130.00	73.00	136.00
				Prices without pins		Prices with pins

TABLE SHOWING APPROXIMATE AVERAGE PRICES CHARGED IN DIFFERENT PARTS OF COUNTRY FOR CYLINDER REGRINDING

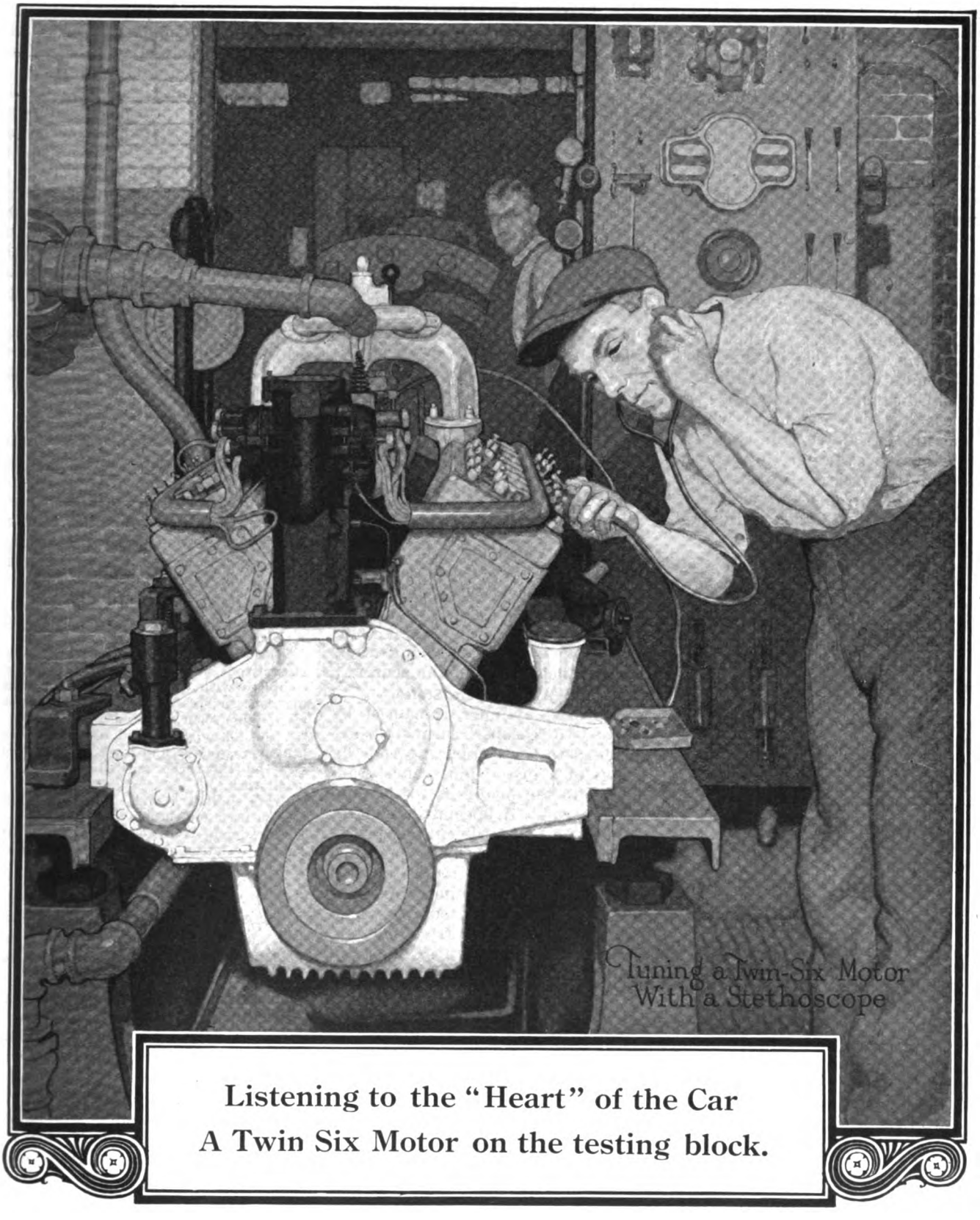
It would be better business for all regrinding concerns to refuse to touch such jobs, if, in their opinion, there is a doubt as to the strength of the wall after grinding.

Prices Charged for Regrinding

As for prices that are charged for regrinding, they vary in different sections of the country, also in the localities in the same section. It is best to get several price lists from the nearest concerns doing business and charge according to the conditions in your particular locality. Never cut prices under a competitor as regrinding is a quality proposition and it will cheapen your work and eventually be a losing proposition.

On the other hand, remember you cannot make a fortune overnight. Excessive prices will only be an incentive for your customers to buy new blocks or refinish by the boring method.

The price table shows averages taken from several shops in each section. Those in the East, South, and middle West include regrinding, fitting new pistons and rings.



Listening to the "Heart" of the Car
A Twin Six Motor on the testing block.

The finely made motor is carefully tested. The motor expert listens to the "throbbing heart" of the car by means of a stethoscope. By means of this sensitive instrument faults in the running of the motor are quickly detected just as the physician detects faults in heart and lung action with a similar device.

When motors knock, fail to deliver proper power and other faults develop, regrinding or reboring the cylinders and fitting with new pistons will again make it run "sweetly."

(The above engraving published through the courtesy of Burroughs Adding Machine Company, Detroit, Mich.)

It does not include fitting pins to the pistons. Those in the far West include grinding cylinders, furnishing finished pistons, rings, and pins.

Prices on the Western Coast and those on the Eastern Coast are approximately the same. The prices for a complete job on the Western Coast include fitting pins to the pistons. This is not done in any other section of the country. Therefore, while the price of a complete job on the Western Coast is a little higher than in the east, for the amount of work that is done they are approximately the same.

In the South we find that they are a little higher than in the East; in the middle West, cities like St. Louis, Chicago, and Dayton are the highest to be found anywhere, while in Milwaukee, Indianapolis, and Cincinnati they are lower even than on the Western Coast. These are local conditions and will have to be met with by each individual concern.

Crankshaft Grinding

An allied line which fits in very nicely with cylinder grinding is that of crankshaft grinding. Too much cannot be said about the importance of keeping a crankshaft in perfect condition. The crankshaft, virtually the backbone of the motor, when sprung out of alignment or when its journals are worn out of round, will soon wear the main bearings and connecting-rod bearings which bear directly on the shaft, consequently will cause the motor to knock.

It is impossbile to properly fit a set of bearings to a shaft which is out of round or out of alignment, or when its journals are worn out of round, will soon wear the main bearings and connecting-rod bearings which bear directly on the shaft, consequently will cause the motor to knock.

It is impossible to properly fit a set of bearings to a shaft which is out of round or out of alignment, and the extra time consumed in obtaining even a fair job would more than pay for the regrinding of the shaft.

There has, however, been a great deal of misunderstanding regarding the actual crankshaft grinding.

By the old method of filing, lapping, and polishing a shaft, a slow and expensive operation, which is often misconstructed as grinding, it is impossible to obtain accurate results. This work should be done on machines built especially for crankshaft grinding.

Repairing Scored Cylinders

The regrinding trade seems to have recognized three most used methods of doing this work. One is by fusing silver nickel alloy into the scores and regrinding the bore.

An other method of repairing scores is what is known as the patented eagle process.

The scores are dovetailed and a strip of copper alloy inlaid and rolled into same, thereby making the alloy a part of the cylinder. This method is entirely mechanical and is applied in such a way that there is no heating or enlarging the diameter of the bore and it eliminates all possibilities or warping the block. It is guaranted not to melt or come out, even if the cylinder runs without water or oil.

The third process which has recently come into the market is known as the soldering process.

This is in a way a combination of the other processes since the score is dove tailed and a metalic filler of high melting point is fused into it. It has been quoted as not filling the score but also impregnates the pores adjacent to it at the same time, expanding as it cools and resulting in its being thoroughly anchored into the score.

To Avoid Future Scores

A scored cylinder is caused by one of two reasons. All pistons are fastened to the connecting rods by means of a piston pin securely anchored to the piston or to the connecting rod. A special-shaped set screw is used to keep the piston pin from moving. The thousands of little shocks due to the up and down movement of the connecting rods loosen these set screws which hold the piston pin from moving. The movement of these loosened pins from side to side causes the walls to score where the pin touches.

Some pistons are equipped with brass bushings into which the piston pin works. Occasionally these bushings work loose, due to the vibration, and score the cylinder walls in the same manner that the piston pin does.

In fitting pins, be sure they are locked in tight, as a little carelessness here will ruin the best of regrinding jobs.

Aligning Fixtures for Rods and Pistons

Every regrinding company should have an aligning fixture. With this, it is easy to detect the slightest twist or bend in a connecing rod or an out of square hold in the piston. These can be secured from various companies.

To test a connecting rod, the bearing is clamped to the bushing as it is clamped to the crankshaft, and this bushing is slipped on the arbor of the fixture. If the connectng rod is twisted, the wrist pin will touch on one side of the square at A and not on the other at B, as in Fig. 1. A perfect rod will touch equally on both sides of the square.

To align up the rod and piston, remove the square and place the piston along the face of the fixture as in Fig. 2. If it does not lie perfectly straight along the surface, it is out. Use the vise clamps in an ordinary vise to straighten. Your fixture is absolutely accurate and will give you a perfect test.

Ordering or Shipping Instructions

It will save a vast amount of trouble, delay and expense if you have on your literature ordering and shipping instructions. These will vary according to business principles and local conditions, but a summary of what many are insisting on is as follows:

Always give make and model of car.

Complete instructions as to what is desired to be done.

When regrinding and fitting with oversize pistons and rings; send pistons, piscomplete with conecting rods. Regrinding concerns reserve the right to replace worn pins when required.

Clean all cylinders and blocks Remove all covers, valves and loose pieces. Otherwise an extra charge will be made for such work.

Crate cylinders well, and same crate can be used for returning.

Place name and address on crate and advise by letter how cylinders and blocks are being sent.

Terms

Terms for regrinding are usually cash or C. O. D. We advise that you insist on cash payments. You can ill afford to carry accounts especially when you are first starting in. The fact that all have a standard price for each job makes it possible to send remittance with the order.

Price lists are net to the motor owners, but to garages and repair shops the discount usually allowed is 15% in the East and 20% in the West.

Record of Work

Above all things, keep a record of every job, including make and model and sizes of integral parts used. This is not only useful for personal reference, but is invaluable to the owner. He will appreciate your being able to give him immediate service on duplicate parts if he requires them.

OUR HONOR ROLL

THE DATE IS ON YOUR WRAPPER

The date upon which your subscription expires is now printed on your wrapper. Look for the date—then you'll know just how you stand on our records.

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These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents. (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

S. G. Silar, Ala. ..... June, 1950
H. Pam, Minn. ..... Dec., 1941
E. Krebbiel, Colo. ..... May, 1937
The Fix-It Shop, Utah ..... July, 1935
J. W. Olds, Kansas ..... May, 1934
P. Cocks, S. Aust ..... Sept., 1934
J. Torrey, Mass. ..... Dec., 1933
D. Elledge, Nebr. ..... Mar., 1933
L. White, Vt. ..... Feb. 1933
R. Tompkins, Texas ..... Sept. 1932
Anton Olson, Minn. ..... June. 1932
Pat Martin, Nev. ..... June, 1932
David Miller, Pa., ... June, 1932
A. F. Mildebrandt, Mich. ..... May, 1932
V. Z. Vanourek. Wisc. ..... Feb., 1932
J. Gamble, N. D. ..... Feb. 1932
Otto Dannemann, Minn. ..... Jan., 1932
J. E. Erickson, Minn. ..... Jan., 1931
Roy Brown, Mo. ..... Dec., 1931
Clint Gilland, Ark. ..... Dec., 1931
Weston Carriage Co., Fla. ..... Oct., 1931
C. Graf & Sons, Ohio ..... June, 1931
F. Victorino, Hawaii, T. H. ..... July, 1931
A. Rice, Pa. ..... May, 1931
C. Crossen, Ill. ..... Feb., 1931
W. Waldorf, Ore. ..... Feb., 1931
W. Watt, Kans. ..... Dec., 1930
W. Waldeck, Ind. ..... Nov., 1930
O. Colwell, R. I. ..... Oct., 1930
A. Reeve, Fla. ..... Sept., 1930
J. Huntington, Calif. ..... Aug., 1930
H. Sherman, Pa. ..... Aug., 1930
A. Ross, Scotland ..... July, 1930
E. Stroup, Ind. ..... July, 1930
C. Hawkins, Ore. ..... May, 1930
G. Lawrence, Mass. ..... Mar., 1930
J. V. Ober, N. D. ..... Feb., 1930
A. Danielson, Wisc. ..... Feb., 1930
J. Sefcik, Kans. ..... Jan., 1930
J. Erickson, Minn. ..... Jan., 1930
J. Ennis, N. J. ..... Jan., 1930
R. Curtiss, N. L. ..... Jan., 1930
C. Fischer, Ind. ..... Jan., 1930
T. H. Joslin, Mass. ..... Dec., 1929
J. Gronland, Conn. ..... Dec., 1929
R. Wilson, Md. ..... Dec., 1929
Geo. J. Lauer & Sons, Mo. ..... Dec., 1929
C. C. Lewis Co., Mass. ..... Oct, 1929
Fred Ruch, Mo. ..... Sept. 1929
C. Winslow, Calif. ..... Aug., 1929
N. Smithson, Tex. ..... Aug., 1929
M. Barnardi, Calif. ..... July, 1929
J. Wilder, Mo. ..... May, 1929
J. H. Schwartzman, D. C. ..... Mar., 1929
C. Vanblad, Pa. ..... Mar., 1929
A. J. Cook, Calif ..... Apr., 1929
J. Bulley, Vt. ..... Feb., 1929
F. Price, S. C. ..... Jan., 1929
New Jersey Reformatory, N. J. ..... Jan., 1929
S. S. Albright, Calif. ..... Dec., 1928
P. Treiegan, Calif. ..... Dec., 1928
J. Wind, Ky. ..... Dec., 1928
M. Maleneck, Pa. ..... Dec., 1928
R. Krueger, Wis. ..... Dec., 1928
Geo. V. Popp, N. Y. ..... Nov., 1928
J. Wurst, Fla. ..... Nov., 1928
H. Eilenbarger, Tex. ..... Nov., 1928
A. Brookman & Co., Vict., Aust Sept., 1928
J. Vaichetti, Colo. ..... Aug., 1928
D. Dyson, Cuba ..... Aug., 1928
T. Parrish, Wash. ..... July, 1928
D. Ramsey, So. Africa ..... June, 1928
J. Uts, Ill. ..... June, 1928
F. Brackett, Mo. ..... June, 1928
C. North, N. J. ..... June, 1928
K. Reimer, Manitoba ..... June, 1928
W. Cromwell, Pa. ..... May, 1928
P. Schwartre, Pa. ..... May, 1928
John Laux, Okla. ..... Apr., 1928
J. Miles, Ky. ..... Apr., 1928
E. Harris, N. Y. ..... Apr., 1928
H. Hangse, N. D. ..... Apr., 1928
L. Bergoutz, Pa. ..... Apr., 1928
S. LeClair, Vt. ..... Apr., 1928
John L. Schulte, M. ..... Mar., 1928
E. G. Jones, New Zealand ..... Mar., 1928
F. Ulrich, Calif. ..... Mar., 1928
J. Eyre, Nebr. ..... Mar., 1928
E. Wilner, N. Y. ..... Mar., 1928
H. Boger, N. C. ..... Mar., 1928
A. Simpson, N. D. ..... Mar., 1928
Waddington Farm, W. Va. ..... Mar., 1928
P. Costa, Terra Haute ..... Mar., 1928
G. Smith, New Zealand ..... Mar., 1928
A. Black, Calif. ..... Feb., 1928
L. Eisenhart, Idaho ..... Feb., 1928
A. Wible, Md. ..... Feb., 1928
W. Rogers, Md. ..... Feb., 1928
S. Hetem, So. Africa ..... Jan., 1928
N. A. Englund, Iowa ..... Jan., 1928
L. Larsen, Nebr. ..... Jan., 1928
J. Barnhart, Pa. ..... Jan., 1928
J. Burns, Conn. ..... Jan., 1928
S. Portelance, Quebec ..... Jan., 1928
Frank Wankum, Mo. ..... Dec., 1927
G. H. Esarey, Ill. ..... Dec., 1927
C. Forrest, Calif. ..... Dec., 1927
R. Leventon, Calif. ..... Dec., 1927
F. Vanneter, Calif. ..... Dec., 1927
J. Kirsten, So. Afr. ..... Dec., 1927
R. Keeney, Colo. ..... Dec., 1927
G. Travis, Ill. ..... Dec., 1927
E. Lewis, Iowa ..... Dec., 1927
J. Forschel, Tenn. ..... Dec., 1927
D. Meason, Scotland ..... Dec., 1927
J. Templeton, Scotland ..... Dec., 1927
S. Frey, Ind. ..... Nov., 1927
A. Wilson, Iowa ..... Nov., 1927
Morley Garage, Mo. ..... Nov., 1927
B. Miller, Ark. ..... Nov., 1927
O. Roberts, Calif. ..... Nov., 1927
H. Fackiam, Wisc. ..... Nov., 1927
J. Staats, Mo. ..... Nov., 1927
W. N. Scofield, Mo. ..... Oct. 1927
Robert Murray, Calif. ..... Sept., 1927
W. Morrison, Calif. ..... Sept. 1927
W. Wilson, New Zealand ..... Sept., 1927
W. Morrison, Calif. ..... Sept. 1927
F. Bock, Nebr. ..... Aug., 1927
D. Lyon, So. Africa ..... Aug., 1927
E. Delay, Ill. ..... July 1927
W. Gottstein, Aust ..... July, 1927
John Forest, N. B. Can ..... June, 1927
W. Patterson, Okla. ..... June, 1927
W. Egly, Pa. ..... June, 1927
A. Gooding, So. Aust ..... June, 1927
W. Geer, Pa. ..... June 1927
A. Mellum, N. D. ..... June., 1927
R. Wilson, England ..... May, 1927
J. Brenneman, Va. ..... May, 1927
C. Stebbins, Kans. ..... May, 1027
J. Devero, Iowa ..... Apr., 1927
F. Bruschi, Calif. ..... Apr. 1927
S Forman, N. J. ..... Apr., 1927
H. Dyressen, N. D. ..... Apr., 1927
M. Griffin, Conn. ..... Mar. 1927
E. LeClair, N. Y. ..... Mar. 1927
P. Flanagan, Calif. ..... Mar., 1927
J. Anderson, Calif. ..... Mar., 1927
F. Evarts, Calif. ..... Mar., 1927
J. Peterson, Iowa ..... Mar., 1927
G. Shoemaker, Pa. ..... Mar., 1927
C. Geiger, Pa. ..... Mar., 1927
G. Norton, D. C. ..... Mar., 1927
Tom V. Ward, Ohio ..... Feb., 1927
T. Tillman, Calif. ..... Feb., 1927
J. Hanght, Ill. ..... Feb., 1927
W. Pontius, Iowa ..... Feb., 1927
J. Howes, Md. ..... Feb., 1927
M. Goller, Pa. ..... Feb., 1927
F. Roschy, Pa. ..... Feb., 1927
O. Knisely, Pa. ..... Feb., 1927
L Stocker, Texas ..... Feb., 1927
Watson Clark, N. C. ..... Jan., 1927
J. J. Thompsin, Ohio ..... Jan., 1927
J. S. Bunker, Iowa ..... Jan., 1927
Feldmeyer & Schaake, Mo. ..... Jan., 1927
R. Hoover, N. Y. ..... Jan., 1927
C. Adams, Conn. ..... Jan., 1927
C. Radeleff, Iowa ..... Jan., 1927
H. Lamons, Aenn. ..... Jan., 1927
J. Schneider, Calif. ..... Dec., 1926
P. Kauth, Ill. ..... Dec., 1926
A. Grandadam, Ill. ..... Dec., 1926
F Harding, Iowa ..... Dec., 1926
H. Grimm, Utah ..... Dec., 1926
J. Smith, Wash. ..... Dec., 1926
C. Hall, Wash. ..... Dec., 1926
H. Mekler, Ill. ..... Dec., 1926
F. Bird, N. Y. ..... Dec., 1926
R. Sherman, Maine ..... Dec., 1926
C. Hardy, Mass. ..... Dec., 1926
L. Cordes, Mo. ..... Dec., 1926
R. Pogue & Son, Texas ..... Dec., 1926
H. Rickley, N. J. ..... Dec., 1926
A. Hallander, Calif. ..... Dec., 1926
J. Griffiths, Iowa ..... Dec., 1926
W. Swetnam, Ky. ..... Dec., 1926
F. Hoopengarnder, Md. ..... Dec., 1926
L. Turner, Kans. ..... Dec., 1926
W. Matthews, England ..... Dec. 1926
J. W. Lawson, Idaho, ... Nov. 1926
W. N. Scofield, Mo. ..... Oct., 1927
Z. Damur, Sask., Can. ..... Oct., 1926
W. Branch, N. C. ..... Oct., 1926
Hanson & Marvin, Cal. ..... Oct., 1926
W. Branch, N. C. ..... Oct., 1926
F. Matsocks, Ark. ..... Sept., 1926
E. Jones, Wise. ..... Sept., 1926
Inglis & Son, Neb. ..... Aug., 1926
J. Clark, Jr., Vict. Aust. ..... Aug., 1926
L. Wesley, Ariz. ..... July, 1926
J. Buchner, Mich. ..... July, 1926
J. Dambach, N. J. ..... July, 1926
H. Mitchell, N. Y. ..... July, 1926
I. Boles, Ohio ..... July, 1926
F. Vavasour, New Zealand ..... July, 1926
O. S. Long, Ill. ..... June, 1926
Ralph Murphy, N. Mex. ..... June, 1926
L. H. Miller, N. Mex. ..... June, 1926
S. Butler & Son, Mich. ..... June, 1926
A. Schmitt, Nebr. ..... June, 1926
M. Broton, N. D. ..... June, 1926
J. Campbell, Oregon ..... June, 1926
F. Over, Pa. ..... June, 1926
A. Clark, Jr., Clct, Aust. ..... June, 1926
J. N. Jacobsen, Texas ..... May, 1926
C. Sager, N. Y. ..... May, 1926
H. Pirret, Oregon ..... May, 1926
P. Sowa, Oregon ..... May, 1926
D. Ackland & Son, Man. ..... May, 1926
J. Sinclair, W. Aust. ..... May, 1926
M. A. Towner, Ohio ..... Apr., 1926
David Williams, N. Zealand ..... Apr., 1926
C Sex, England ..... Apr., 1926
P. Peterson, Iowa ..... Apr., 1926
G. Bowers, Okla. ..... Apr., 1926
E. Dignan, South Aust. ..... Apr., 1926
Wm. F. Snider, Ind. ..... Mar., 1926
W. F. Tippey, Mich. ..... Mar., 1926
J. Carswell, Ark. ..... Mar. 1926
C. Burton, Mass ..... Mar., 1926
W. Pochelu, Oregon ..... Mar., 1926
A. Bowman, Va. ..... Mar., 1926
W. Widger, N. Y. ..... Mar. 1926
W. Glenn, Colo ..... Mar. 1926
T. Moore, Vict., August ..... Mar. 1926
H. Brown, Va. ..... Mar. 1926
H. Barnes, Va. ..... Mar., 1926
G. Iller, N. S. W., Aust ..... Mar., 1926
E. Jones, New Zealand ..... Mar., 1926
B. E. Campbell, Mass. ..... Mar., 1926
Edwin Slee, N. Y. ..... Feb., 1926
G. Torrey, Calif. ..... Feb., 1926
E. Schauppner, Nebr. ..... Feb., 1926
F. Trogdon, N. C. ..... Feb., 1926
A. Garver, Ohio ..... Feb., 1926
C. Jones, Pa. ..... Feb., 1926
J. Fox, Kans. ..... Feb. 1926
R. Dean, Texas ..... Feb., 1926
J. S. Rush, Ohio ..... Jan., 1926
J. Murphy, Calif. ..... Jan., 1926
O. Temple, Idaho ..... Jan., 1926
F. Kearns, Ill. ..... Jan., 1926
J. Murphy, Nevada ..... Jan., 1926
W. Post, N. Y. ..... Jan., 1926
J. McIntire, Pa. ..... Jan., 1926
N. Karolewicz, S. D. ..... Jan., 1926
L. Messersmith, Idaho ..... Jan. 1926
J. Merritt, Calif. ..... Jan. 1926
J. Hess, Ohio ..... Jan. 1926
W. Pederson, Ill. ..... Jan. 1926
Powell Bros. & Whitaker, Eng. Jan., 1926
H. White, N. Z. ..... Jan., 1926
F. M. Pedersen, No. Dak ..... Dec., 1925
D. S. Kistlers, Mo. ..... Dec., 1925
Alfred Rasmussen, Wisc. ..... Dec., 1925
E. A. Pierson, Okla. ..... Dec., 1925
Nick Schumaher, Iowa ..... Dec., 1925
Geo. Jones, Ore. ..... Dec., 1925
H. E. Hiers, S. C. ..... Dec., 1925
M. Rawlins, Calif. ..... Dec., 1925
J. Hulvey, Ill. ..... Dec., 1925
P. Nelson, Minn. ..... Dec., 1925
J. Devine, N. J. ..... Dec., 1925
S. Wright, N. Y. ..... Dec., 1925
E. Lain, N. Y. ..... Dec., 1925
W. Jones, Texas ..... Dec., 1925
Williams & Turner, W. Va. ..... Dec., 1925
A. Spence, B. C. ..... Dec., 1925
N. Buchanan, Ont. ..... Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ..... Dec., 1925
W. Snyder, N. Y. ..... Dec., 1925
J. Skiff, Pa. ..... Dec., 1925
F. Cronk, N. Y. ..... Dec., 1925
J. Singer, N. Y. ..... Dec., 1925
H. Edwards & Sons, N. Y. ..... Dec., 1925
G. Strait, N. Y. ..... Dec., 1925
E. Monroe, N. Y. ..... Dec., 1925
L. Luch, N. Y. ..... Dec., 1925
L. Rajewsky, Minn ..... Dec., 1925
W. Bolle, Ill. ..... Dec., 1925
F. Carlson, Ill. ..... Dec., 1925
W. Seamans, Ky. ..... Dec., 1925
J. Wrley, Mo. ..... Dec., 1925
J. Mallay, N. J. ..... Dec., 1925
S. Haslett, Ohio ..... Dec., 1925
C. Seidles, Pa. ..... Dec., 1925
W. Robertson, S. C. ..... Dec., 1925
H. Collins, Ohio ..... Dec., 1925
G. Hanshaw, Okla. ..... Dec., 1925
W. Bate, Conn. ..... Dec., 1925
R. Shipley, Iowa ..... Dec., 1925
W. Nattress, N. M. ..... Dec., 1925
J. Sammerlee, N. Y. ..... Dec., 1925
D. Rhymes, Texas ..... Dec., 1925
L. Heath, Calif. ..... Dec., 1926
E. Wright, Ill. ..... Dec., 1925
C. Frazier, Ky. ..... Dec., 1926
G. Leuts, Ohio ..... Dec., 1925
J. Sebesta, S. D. ..... Dec., 1925
P. Oram, England ..... Dec., 1925
F. Wortell, Calif. ..... Dec., 1925
E. Thomas, N. Y. ..... Dec., 1925
H. Miller, Wash. ..... Dec., 1925
M. Bates, N. Y. ..... Dec., 1925
J. Woods, Oregon ..... Dec., 1925
W. Areford, Pa. ..... Dec., 1925
J. Howell, Mo. ..... Dec., 1925
J. Morrow, Pa. ..... Dec., 1925
A. Darling, Sr., N. Y. ..... Dec., 1925
J. Goebel, Kans. ..... Dec., 1925
C. Rausch, Ohio ..... Dec., 1925
R. Noble, Jr., Ont. ..... Dec., 1925
C. Lynch, Oregon ..... Dec., 1925
H. Clauson, Pa. ..... Dec., 1925
Neles, Bros., Calif. ..... Dec., 1925
H. Lefler, Mich ..... Dec., 1925
D. Bullinger, Mo. ..... Dec., 1925
A. Potter, Conn. ..... Dec., 1925
R. McMains, Calif. ..... Dec., 1925
W. Jordan, Maine ..... Dec., 1925
R. Fisher, Pa. ..... Dec., 1925
P. Kaimuloa, T. H. ..... Dec., 1925
H. Hesse, Kansas ..... Dec., 1925
F. Hinkey, Ohio ..... Dec. 1925
N. La Duke, N. Y. ..... Dec., 1925
Bob. McIntyre, Nebr. ..... Nov., 1925
James MacNab, Scotland ..... Nov., 1925
G. C. Ironside, B. C. Cand. ..Nov., 1925
A. Wassmuth, Idaho ..... Nov., 1925
G. Illsley, Mass. ..... Nov., 1925
A. Speir, Ohio ..... Nov., 1925
W. Clepper, Texas ..... Nov., 1925
J. Mallett, Queensland, Aust. ..Nov., 1925
J. Dribble, South Aust. ..... Nov., 1925
W. Schaid, Wis. ..... Nov., 1925
J. W. Lawson, Idaho ..... Nov., 1926
Peter Vondenbosch, Ill. ..... Oct., 1925
D. Fraser, N. J. ..... Oct. 1925
L. Krause, Ind. ..... Oct. 1925
R. C. Lewis, Pa. ..... Sept., 1925
Peter Weise, Iowa ..... Sept., 1925
E. P. Gates, Mass., ... Sept., 1925
John K. Hawn, N. J. ..... Sept., 1925
Nugent-Covey Wagon Co., Calif. Sept., 1925
M. Pople, N. S. W., Aust. ..Sept., 1925
J. Wilkinson, Queens, Aust ..Sept., 1925
C. Williams, Victoria, Aust. ..Sept., 1925
Reynolds Bros., Pa. ..... Sept., 1925
F. Krems, Calif. ..... Aug., 1925
D. Allen, Mont. ..... Aug., 1925
G. Fisher, & Bro., Ohio ..... Aug., 1925
W. Dixon, Ohio ..... Aug., 1925
F. Shupe, Pa. ..... Aug., 1925
W. Wright, Va. ..... Aug., 1925
Jacob Holzapfell, Pa. ..... July, 1925
A. D. Holroyd, Iowa ..... July, 1925
R. Weide, So. Dak ..... July, 1925
Wm. Atkinson, Wyo. ..... July, 1925
J. H. Beck, Mass. ..... July, 1925
H. Knoues, Ill. ..... July., 1925
A. Veit, Mass. ..... July, 1925
J. Stadler, Calif. ..... July, 1925
Sligo Iron Co., Mo. ..... July, 1925
G. Hogoboom, N. Y. ..... July, 1925
H. Schriber, Pa. ..... July, 1925

Tales of Trips and Tours

BY

"WANDERER"

The tales here related are the experiences of a traveller through the highways and by-ways of the country districts. In his wanderings about he meets many members of the craft, stops at many shops and has many experiences. The tales of his experiences are interesting and carry with them many practical suggestions. They run the entire range of craft activities as will be noted as you follow his tales month after month. The experiences he relates are Facts not Fancy.

The True Tale of the Anvil Ringer Who Forged Ahead and the Hammer Swinger Who Forged a Chain

Not over ten miles from the city where "Our Journal" is published is an up-to-date progressive town of less than three thousand souls. It is the home town of many folks who journey daily to the big city to business. It has a thriving, bustling business section of its own and is set mid a prosperous and beautiful farming district.

Here are located the Anvil Ringer who forged ahead and the Hammer Swinger who forged a chain. For, the Anvil Ringer kept pace with the times and even a bit ahead of them on occasion; while the Hammer Swinger was content to watch the Parade of Progress from his window of yesterday where he had chained himself.

Here ten years ago the Anvil Ringer and the Hammer Swinger each owned an up-to-date general smithing business. Both did a general line of work and both prospered well in the days before the coming of the automobile, the truck and the tractor. Busy were the forges in both shops and the ring of the anvils were heard from early morn till dusk, and after on the busy days.

Then came the automobile and its great popularity. Folks in the town bought automobiles. Merchants purchased trucks. Farmers acquired tractors. The motor vehicles became more and more popular—they became common on the streets of the town. Folks no longer turned to gaze in wonder and awe at the contraptions that ran without horses, mules or oxen. The automobile had come to town and country side. Single and double stall-like structures began to make their appearance in the yards and back lots of town residences. The implement sheds on the farms began to shelter four-wheeled vehicles that boasted of a steering wheel but no thills; they also housed self-propelled trucks and "iron horses" that made easy work of pulling a multiple of plow bottoms and a harrow beside. The automobile had come.

And with the coming had also come more work for the repair shops. The smiths were called upon to do an occasional job of repairing and fixing on the "benzine buggies". And one shop owner went at the work with a will and a determination to keep pace with progress, and his name in this tale shall be "Anvil Ringer." And the other who had no time for the "stink wagons" shall be called the "Hammer Swinger."

With the coming of the automobile all was hustle, bustle and business at the shop of the Anvil Ringer. General work had to be done on time as usual. Wagons and buggies were still to be fixed. Carriages must still be kept in repair for Sunday and for Fair Week. Implements must be in proper "fix" for field and farm. And added to all of the regular work was the occasional job on a gasoline propelled vehicle.

As these became more numerous there was a dropping off of shoeing and buggy work. The family carriage was sent to the shop less frequently; owners of automobiles were taking the owners of carriages for pleasant trips into the highways and byways of neighboring counties. And carriage and buggy owners were becoming owners of Fords and Overlands and Studybakers. And the shop of the Anvil Ringer began to repair Fords and Overlands and Studybakers. And the same shop housed the large and small trucks of farmers and merchants while they were being repaired. And tractors too were among those present in the shop of the Anvil Ringer.

The establishment took on a renewed activity. Busy as it was before it now seemed pulsing and throbbing with energy and activity. The plot of generous size immediately fronting the shop which had for so many years been occupied by wagons buggies and implements awaiting each its just turn, was now generously crowded with all manner and make of automotive vehicles.

And at the shop of the Hammer Swinger was also great activity. The slump in the shoeing of horses prompted great discussion on the coming of the auto and the passing of the horse. The increasing number of self-propelled vehicles drew nothing but words of contempt and derision from the vocabulary of the Hammer Swinger. "The tarnal contraption would not do away with buggies and carriages." And with each fresh utterance the Hammer Swinger forged another link in the chain that was to hold him to his window of yesterday.

TODAY—If you visit the up-to-date, progressive town of less than a thousand souls you will find the shop of the Anvil Ringer humming with activity in all departments. The parking plot is now occupied by a modern display room, for the Anvil Ringer now sells cars, trucks and tractors as well as Service. An occasional horse still receives attention. The metal tires of horse vehicles still have the skilled services of an efficient smith, but the rubber tires of the vehicles of a modern day demand the time and attention of a corps of repair and service attendants. Wagon and horse implements still have the time and attention of men who count their years of employment under the Anvil Ringer by the score, but the service station for the cars which the Anvil Ringer sells is open day and night and a competent crew is kept busy.

For the Anvil Ringer's establishment TODAY cares for the tires of rubber as well as of metal; it sells the accessories of motor vehicle requirements as well as those of the horse ; it fills the needs and wants of the auto, truck and tractor owner as well as he who still prefers the horse, the wagon and carriage.

And the Hammer Swinger still occupies the same shop of ten or thirty years ago. He is still shoeing an occasional horse. He still devotes himself to the repair of an

occasional wagon or the shrinking of an occasional tire. But modernity has passed him by. Viewing the pageant of progress from his window of yesterday he must content himself with a diminishing and declining business because he refused to take unto himself that which may have been had for the mere taking when competition was not keen, but which now can not be had without a gigantic struggle if at all.

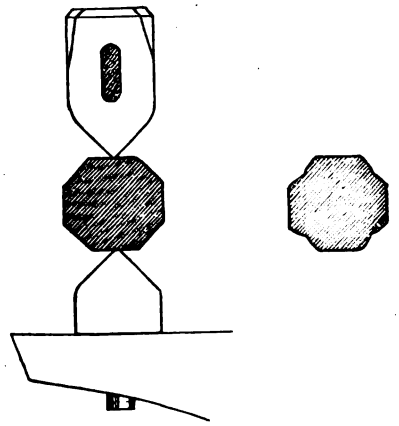
And while the foregoing is the tale of what has actually happened in a town not more then ten miles from Buffalo, the same story could be told of almost any other town of equal size in the United States.

Forming, Dressing and Resharpening Drills

L. R. SWARTZ

Without a few swages, creasers and shapers, the smith will find the dressing of drills rather an annoying proposition.

In forming a bit on the end of a plain bar of steel, the first tools required will be a top and bottom creaser for starting the flutes which



FIGS. 1 AND 2, SHOWING HOW FLUTES ARE FORMED IN THE OCTAGONAL BAR

form the point of the bit into a cross as shown in Fig. 1.

The octagonal bar should be heated and upset enough to square up the end, and then the crease started in the middle of opposite sides of the bar, as in Fig. 2; then the crease should be started on the two other sides of the bar—leaving one side to stand between the creased sides to form the backing for the corners. This crease should not extend very far above the flare of the bit. (Fig. 3.)

An ordinary square-faced set and a top-and-bottom-swage will now come into play. The ways through the swages (Fig. 4) should be tapered a trifle, the steel being worked with the point of the bit toward the narrow end of the ways. When the bit has been brought nearly to shape the cutting edges may be formed, either by forging or chipping to an edge. To square up the edge so that all four cutting edges may be even, a shaper (Fig. 5) with two deep V shaped grooves crossing each other in the center of its face will be required. One end of the bar is placed against a solid block of wood or against a post or sill of the shop, the edges of the bit placed in the creases of the shaper and the shaper is then driven with a hammer or sledge against the cutting edge of the bit.

This forming and shaping operation is a very important matter because a bit that is hard enough to drill very hard rock is apt to break if one wing of the bit receives the full thrust from the steam head of the machine. This is bad enough of itself but the broken steel at the bottom of the hole will then ruin the edges on the other three wings of the bit.

Another important matter is to see that all four wings are as nearly as possible the same width from center of bit to corner of cutting edge.

Bits are usually dressed and gauged in sets, each bit in the set being the length of the feed-screw of the machine longer than the one before it. Gritty rock wears down the corners of the bits so that each succeeding bit in the set is made a trifle smaller than the one before it so as to prevent the bit from sticking when it is started. This reduction in size should be determined by the amount of wear in drilling. The bit should be as wide as it is possible to permit and follow the hole properly.

Work the steel at as low a heat as possible. Do not hurry your heat. Good steel requires care and a reasonable amount of time in heating and working. Do not forge too long after the heat has passed.

In tempering make the bits as hard as they can be and stand up to the work. A good plan is to harden and draw to copper color.

If the steel is hard and glassy a little borax in the brine has a tendency to toughen it.

In resharpening dull bits begin by squaring up the edge with the creased shaper to drive back the center even with the corners or nearly so. This will spread the bit a trifle and when the corners are driven in to gauge or a trifle under, drive up again with the shaper when you will find the edge is sharp to the corners—unless the bit has come out very dull.

If the rock is not seamy and one has not time to keep the bits in the shape, bits dressed in the shape of fluted well drilling bits (Fig. 6) can be made to do the work, using a top and bottom fuller for forming and keeping open the flutes. The angle at the cutting edge should not be sharper than the corner of a square. In forming the head or chuck end of a bar use another drill for a pattern and forge to shape, then finish between round swages of proper size.

It would be well to have an idle chuck and piston rod, or a machine head to line up by. In doing this place the machine head of piston rod in such a position that the machine head is stationary, put

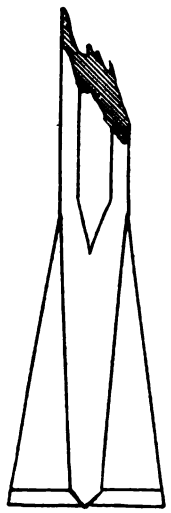


FIG. 3 SHOWING THE LENGTH OF THE CREASE

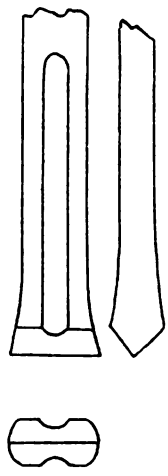


FIG. 6 SHOWING SIMILARITY TO A WELL DRILL BIT

the bar in the chuck and turn the bar by means of the chuck—straightening as needed till the center of bit does not vibrate on being turned.

In straightening by means of a chuck and piston rod, fasten the bearings, which may be of wood, to a plank or bench. Draw bearings close on the rod; just tight enough to permit the rod to be turned. The rod is turned and straightened as needed until the center of the bit is stationary when turned.

How I Started in the Auto and Tractor Repair Business

H. D. KUHLMAN

A few years ago I visited my good old friend Bob. Bob is a general blacksmith. In his large shop, a brick building, you will find all up-to-date machinery and tools a blacksmith can think of, everything is clean and in order and Bob is an expert in his trade.

When I walked in, a farmer was arguing with Bob about the price of a new wagon pole. The bill was $3.75 but the farmer claimed it was a quarter too much and he would have his work done in the other shop next time. But Bob didn't care a bit.

The next day was Sunday. I walked down to the garage in the morning and after staying there a little while the very same farmer, who argued with Bob about a quarter, drove in with a big six cylinder Buick car. He asked if the new tires had come. Finding they had arrived he said:—"I want one put on now and I will take the other with me when I come back," he said. He asked for his bill. It amounted to about $130.00. He wrote out a check gave it to the garage owner and said:—::I am very much obliged to you for your accommodations."

This caused me to think, and think very hard. I talked with

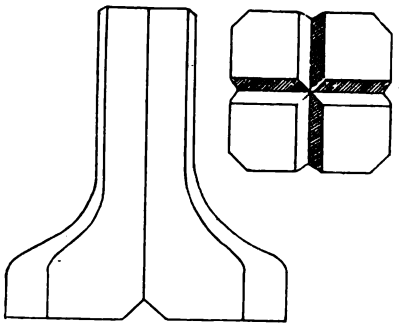


FIG. 5—THIS SHAPER FORMS THE CUTTING EDGES OF THE DRILL EVENLY

Bob about it. "Yes" Bob said, "all farmers will kick about prices in the blacksmith shop, but they gladly pay any price to keep up their pleasure cars.

We talked about the owner of the big garage. Before the automobile began to get popular he had a blacksmith shop in the same town. He had the reputation of being the poorest blacksmith in that part of the country; he never turned out a good piece of work. His shop or rather his old shack was old when he bought it. I was in there several times. He had an old wooden emery stand, and on old out-of-date gasoline engine. Other old worn out machinery and tools together with material were scattered all over the shop in disorder and dirt, his old bellow's suffered with consumption. To myself I called him Tom Tardy.)

At that time when farmers commenced buying autos he sold his shack to a better smith, went into partnership with a man who knew something about selling cars, and how to do a little repairing.

He sold a good many cars and had done good business. Now he is the sole owner of the biggest garage in town and while he is no mechanic himself he hires good men to keep up his business.

After reflecting what good luck Tom Tardy had I made up my mind to learn the garage business. But how? I have seen this question asked by blacksmiths a good many times in "Our Journal" but it never was answered to my satisfaction. I worked in several garages, but when I found out that I couldn't learn what I had to learn I became disgusted.

Time passed on and I didn't get any further.

One day I happened to pass the yard of a tractor agent. I saw two young men working on a tractor, while one man was standing by giving the young men instructions. I walked up to them and learned that the instructor was a traveling expert for his company. I had a little conversation with him and told him that I was a blacksmith and would like to learn the auto and tractor trade.

"There is nothing easier for you than that," he said, "I have been following that trade myself. You just go to a good auto and tractor school. There you will learn all that you want to know. I have been an instructor myself. Send for a catalog and you will find out all about it."

So I did. One glance over these interesting catalogs and my mind was made up to go to school. I had seen and watched several schools but I didn't like them; their students did not learn much and could not keep a position.

But in the ideal school, a student works in overalls with real tools on real cars instead of sitting at a polished desk before a book or chart and listening to yarns of a professor who may never have had his hands dirty.

In the good school the student gets practical instruction on the blacksmith forge, the turning lathe and other tool machinery. He learns to solder, to braze, and how to handle the welding and cutting torch. He gets thoroughly acquainted with all the mysteries of the electrical parts of the auto and

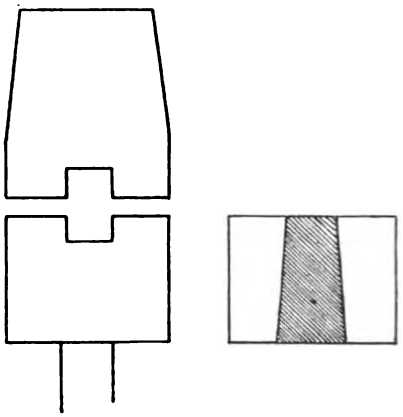


FIG. 4—SHOWING THE TOP AND BOTTOM SWAGES AND HOW THEY ARE TAPERED

tractor. In fact, there is not a thing on a car or tractor on which the student has not a chance to take apart and put together again.

Every student there has a chance to become an expert in the automobile business. It is up to the student, how much he is able to learn. It is easier for a smith to learn then it is for any one else, because a good smith knows all about how to handle and work all different kinds of iron and steel and other materials while the average garage man is no mechanic at all.

Since the auto and tractor became popular, every blacksmith lost a great deal of trade in horseshoeing, buggy and wagon, repairing. Therefore we blacksmiths got the full right to take revenge and do the auto, truck and tractor repairing ourselves.

We don't need a big garage with show windows, and other modern outfits. All we need is room enough for a few cars to work on. Without going to a good school first and getting thoroughly educated I never could have started in the auto and tractor business. When a man starts in business, and doesn't know what he should about it he will have a sure failure. The time when money making is very easy has gone forever and will never come back. Now a days we need a good education in the auto craft or we will make a failure.

A Few Farm Figures From the 1920 Census

The extent to which the farmers of the United States are now utilizing the latest aids which inventive genius has offered to the producing and business world is illustrated by some facts presented in the 1920 census. For the first time, says the Trade Record of The National City Bank of New York, the 1920 census now presents figures on the number of automobiles, motor trucks, telephones and farm tractors in use on the farms of the country, the number of farm homes lighted with gas or electricity, and the number having "water piped into the house."

These figures, says the Trade Record, indicate that the automobile and telephone are now a big factor in farm life, not merely as a comfort or convenience but as an actual aid in business. The number of telephones, by which the farmer may communicate with his local trade center or with the great cities in which the prices and markets for his products are determined, is officially stated at 2,498,493 in 1920, while another authority puts the total number of phones in all the United States "without regard to ownership" at the end of 1920 at 13,411,379, which suggests that nearly one-fifth of the phones in the United States are now in the farm home and farm business service; while 38% of the reporting farms were equipped with telephone service in 1920.

The automobile statistics are also extremely suggestive. They show the number of automobiles on farms in 1920 at 2,146,362, while the total of automobiles in use in all the United States in 1920 is placed 7,904,000, suggesting that the farmers owned in that year considerably more than one-fourth of the automobiles of the country, to say nothing of the 139,000 motor trucks and 246,000 farm tractors reported in operation on the farms in 1920. Over 30% of the reporting farms in 1920 utilized automobiles.

Still another evidence of the disposition of the farmer to utilize machinery in increasing his business activities is found in the fact that the value of his "farm implements and machinery" reported in 1920 was nearly three times as much as in 1910, five times as much as in 1900 and seven times as much as in 1890. The official valuation of farm implements and machinery in 1920 is $3,195,000,000 against $1,265,000,000 in 1910 $750,000,000 in 1900 and $494,000,000 in 1890.

It is not surprising then, adds the Trade Record, in view of the increasing use by the farmer of these time and labor saving devices, the telephone, the automobile, the motor truck and the farm tractor, coupled with the enormous increase in his farm implements and machinery, to find that the census reports the value of horses on farms in 1920 only $1,782,000,000 against $2,084,000,000 in 1910 a decrease of 14% in value of horses, while all other classes of farm animals increased in value in the same period, the increase in value of sheep being 70%, poultry 141%, cattle 143%, swine 148%, and goats 184%.

Enlarging the Use of Micrometers

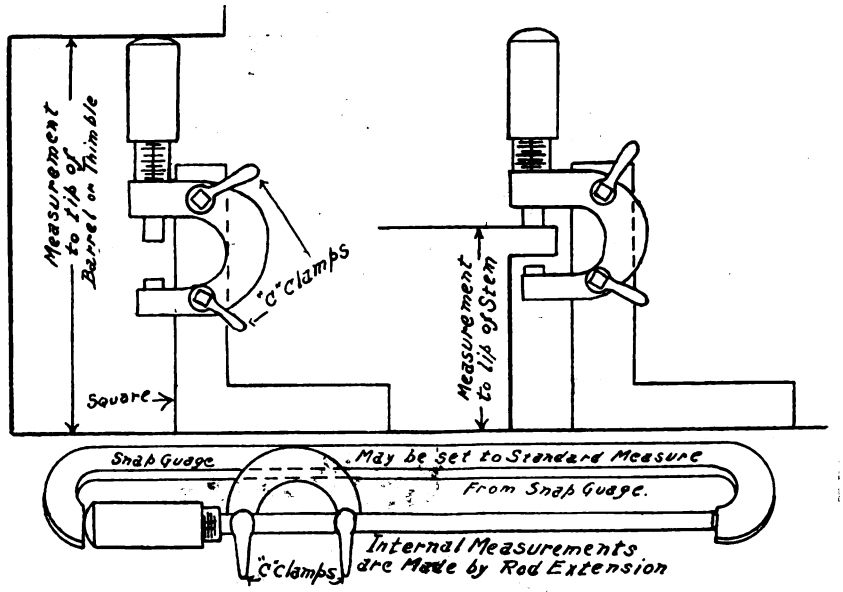
The range of serviceability of the Micrometer with which most machinists are familiar is increased by the methods shown in the engraving.

For accurate work on the surface plate the micrometer can be at-

November 11th to Thanksgiving Day is the Annual Roll Call of the American Red Cross

This worthy organization deserves the support of every thinking person. Its work needs no press agent, its purpose is well known. During the Roll Call Period in November be prepared to renew your membership in this worthy service for humanity.

tached to the blade of a machinists try-square and the head or thimble of the micrometer used to make accurate inside measurements. The steam can also be used for readings from the base to a point above as shown in the illustration.



SEVERAL SUGGESTIONS FOR ENLARGING THE USEFULNESS OF THE MICROMETER

For use in this manner the micrometer is clamped to the try-square by means of suitable "C" clamps. The illustration shows the manner in which the anvil of the micrometer is clamped to the square. A variation of this same idea may be employed in measuring the internal dimentions of cylinders. For example: a stiff rod is clamped to the anvil of the micrometer and the instrument may then be set to a standard dimention by means of a snap gauge as illustrated. This same method of measuring by means of the micrometer and the rod may also be used in taking measurements then those of cylinder interiors.

From these ideas other methods of accurately measuring work in hand may be planned by using the micrometer in various ways.

Use Lever to Remove Battery

G. A. LUERS

Storage batteries on some cars are mounted in straps suspended from the frame. When the battery projects below the car considerable dirt and mud is thrown up on it by the wheels and this lodging about the case of the battery makes its removal difficult. Lifting these out by the handles, is not always possible as the handles are frequently badly cut and weakened by the electrolyte from the cells.

An effective method of starting the battery from the case is used by a local battery shop. Rest a six or eight foot "two by four" over the rear axle with the end bearings against the battery case. Use this as a lever to pry the battery out. This saves damaging the stuck battery where an attempt is made to force it out with the slender handles from above frequently pulling these off and damaging the case.

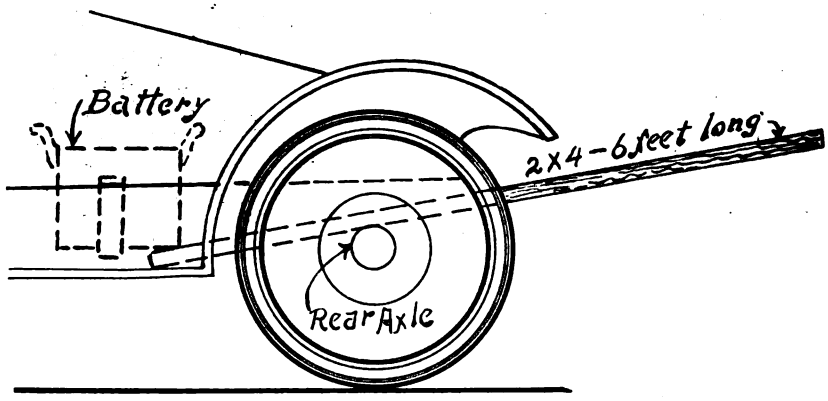
Gasoline Better Says Bureau of Mines

Results of the semi-annual motor gasoline survey, just concluded by the United States Bureau of Mines, indicate that the average gasoline sold in the country is of a better grade than has heretofore been the the case. Laboratory tests of motor gasoline sold in New York, Washington, Pittsburg, Chicago, New Orleans, St. Louis, Denver, Salt Lake City San Francisco, and Bartlesville, Oklahoma, during the month of July show that this year's gasoline is much more volatile than that sold two years ago, and that it has a somewhat better distillation range than last summer's samples.

Increase in volatility of gasoline means an increase in its rapidly and intensity of explosion. It means that the "old bus" will be easier to start on a snappy December morning. It means also that less carbon residue will be found clogging the cylinders.

A comparison of the average figures compiled by the Bureau of Mines during the past several years shows that motor gasoline is also becoming more uniform in character. The large seasonal change is disappearing, but "winter gasoline" still has a lower initial boiling point than "summer gasoline." This difference in volatility is made intentionally to facilitate starting the motor in cold weather. The end point shown in the present survey is slightly lower either than that of last winter or of the summer of 1921.

The average of the entire country considered as a whole does not show much change from a year ago, but samples from individual cities show some distinct changes. Of 132 samples collected by the Bureau of Mines in the present survey ten failed to meet Federal specifications as regards the initial boiling point of 140 degrees F., and sixty-one samples failed at the 90 per cent point (374 degrees F.)



HOW A LEVER MAY BE USED TO ASSIST IN THE REMOVAL OF THE FORD BATTERY

The semi-annual motor gasoline survey just completed is the sixth made by the Bureau of Mines. Detailed figures appear in Serial 2388, Bureau of Mines, Washington.

Queries-Answers-Notes

HIS department is the place for discussing shop and business matters. Here you may ask for information on any topics or matters that interest you; bring to the attention of the progressive craftsmen of the day the subjects that should have their attention. You are requested to make use of this department as often as desired.

Mounting Gas Engine on Wheels—I would like to have plans for mounting a 2½-horse power gas engine on a truck and so geared so it will pull itself. Can some reader favor me with this information, Perhaps some reader has fitted up a gas engine in this way.

W. E. W., North Carolina.

Distance Spark Jumps:—In testing the ignition our men will remove the plugs one after the other and note if each produces a spark. Isn't it true that a plug may produce a proper spark in the open air and fail to do so under compression?

S. J. D.,Illinois.

In Reply:—Yes, a spark that will jump from one-quarter to three-eights of an inch will jump but one-sixteenth of an inch under compression in the cylinder. A plug that sparks amply in the open air may fail to spark under compression. The resistence is greater under the compression in the cylinder.

S. S. D., New York.

Wants to Dress Drills:—I want to ask some questions through your paper. Can you tell me where to write and whom to write to for information as to how to dress steam and air drills?

I am and have been, since I was quite a young man a horse shoer and general blackmith. I had to quit horse shoeing and am working for a Construction Corporation and getting along fine. I never saw steam or air drills dressed or made. So if you can give me such information as I need you will be doing me a great favor.

C. F. Goodnough, New York.

In Reply:—An article on drill dressing in this issue will no doubt give this reader the information he wants.

Service Dept.

Using Engine As Brake on Hill:—To settle a discussion we had in the shop kindly advise if it is best to use the compression of the engine in descending a hill or it is best not to do so? A says it does not pay in the operation of the car while B says it not only pays but is easier on the machine, saves the brakes and is generally a safer method of braking the car.

A. E. B., Pennsylvania.

In Reply:—Generally speaking it is good practice to use the engine as a brake in coming down long, steep hills. Hills of this kind are particulary hard on brakes and brake linings and with an experienced driver no harm is likely to result. It is certainly easier on the braking mechanism of the car to use the compression of the engine.

Driver, New York.

Frosting Glass:—Can the editors or readers tell me how to produce a frosted effect cheaply on glass? Our accessory department is partitioned off from the repair shop by a glass and wood dividing wall. It is desired to frost this glass for a distance of about seven feet and leave the rest clear. How can I frost these lower frames so the work will look neat and yet not cost a great deal?

J. R. Gage, Indiana.

In Reply:—In several establishments recently visited the writer has seen ordinary white house paint used with good effect The paint is thinned somewhat so as to allow a certain amount of light through. One garage owner tells of using a solution of epsom salts for frosting head lights—perhaps the same thing would do for the glass panels of a partition. "Dissolve five cents worth of the salts in a cupfull of water and apply the solution to the glass and allow to dry" is the formula he gives. If the glass to be frosted is not too great in area perhaps Mr. Gage would like to try the salts treatment. S. O. S., New York

Hardening Plow Lays:—I saw in the August number that Mr. W. Olsen from Dakota wants to know how to harden Plow Lays. I will tell you how to do it and do it right. Do not put them in a frame or clamp; if you do you will have soft spots on them. Sharpen the lay. If it warps a little don't straighten it until you are ready to harden it. When hardening, lay the side of the landside down in the fire and heat it red hot. Then turn the lay over face down and heat to an even heat, dark red now. If the lay is sprung out of shape take it to the anvil and straighten it with a wooden mallet. Then lay it in the fire again face up and sprinkle Cyanide on it allowing the fumes from the Cyanide to go up the chimney. Be sure to move the lay to get an even heat on it and not too hot. Now take hold with a pair of tongs on the landside and dip it in the water. Point down first. Be sure to heat the lay on the bottom side when you are ready to sprinkle the Cyanide on, if you do not it will warp.

Robert Johnson, Nebraska.

Treatment of Battery in Winter:—Just a few words to ask about storage batteries. I would like to know what to do to batteries that are idle during the winter.

What would be best: to discharge completely and how; or to keep them fully charged and how?

Antoine Moisan, Quebec.

In Reply:—An idle battery should be charged at least once a month. This can of course be done by allowing the battery to remain in the car and then running the engine and thus charging the battery until all the cells bubble freely. However, it is usually best to care for a battery by means of an outside circuit. This is the way in which the battery service station cares for idle batteries, charging them periodically and regularly and maintaining them at the proper gravity.

In winter storage it is vitally necessary to guard against the battery freezing. An idle battery slowly self-discharges. While a fully charged battery will not freeze under normal winter temperatures—it will require at least a temperature of 40° below zero to freeze it—electrolyte of a gravity as low as 1.160 will freeze at 10° above zero. A battery may of course be kept in a room where the temperature at all times is above freezing but the battery will never the less need charging regularly in order to keep the plates in good condition.

Battey Box, New York.

An Interesting Letter from Australia—Home-Made Tools—Pulley Sizes—A Self-Centering Lathe Device—I have written to several firms who advertise in "Our Journal" and have received replies from them, and also the names and addresses of their Australian Agents.

The handy home-made tools shown in "Our Journal" are very good. I often make some of these and show them to friends of mine who are in the motor business. They appreciate them and say "Our Journal" is worth its weight in gold.

I am making a treadle lathe for wood-turning; could you tell me a simple way to correct the size for the driving wheels on the crank shaft, so I can change the speed without altering the length of the belt. I enclose a rough sketch and would like you to give me the diameter of the other two drivers whose dimensions I have not marked. The crank shaft finished, is 1½ inches in diameter and has a crank throw of 3½ inches.

Kindly suggest an easily made appliance for bringing a crankshaft into shape, as I have several more to make of the same dimensions as the above.

I have asked for information and now wish to pass on a handy little appliance I made for turning small wooden pulleys in an ordinary wood turning lathe. No matter what bore, they will center reasonably accurate. This device is made clear in the engraving on page 240 and shows all parts of the device in section cutting it exactly through the center.

Harry Brodribb, Australia.

To Paint a Car:—Being a subscriber of your paper for about twelve months, I must say I am very pleased with it up to the present. I want to ask you a question, through your paper. Tell me the correct method of painting a car, say a dark green or grey. The car being in good order but paint being in bad order. Also how to paint a car with "Riplon" correctly?

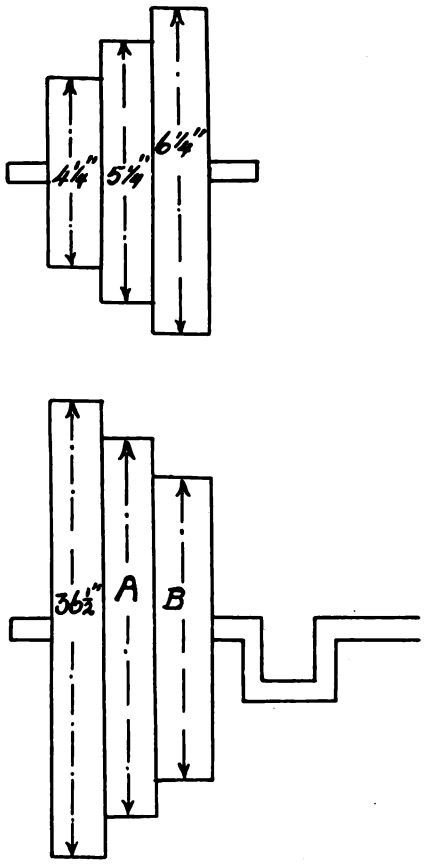
F. Crebert, Australia.

In Reply:—It is of course, best to repaint the car in question in the old way, by first removing the varnish coat and getting down to the color coat, if the old color coat is not to be removed. If, however, a new color is to be applied it will be necessary to get down to the priming coat.

The modern paint manufacturer, however has made all of this work unneces-

sary and the novice or would-be-painter who is not thoroughly familiar with painting processes will find his labor cut down to a minimum by making use of one or the other of the modern quick painting methods.

These newer paints are very easily and readily applied by the unskilled painter and give very good results for the average job. Of course, where the very best class of work is desired it will be necessary for the painter to remove the old varnish and color if need be and start



THE DRIVING WHEEL MARKED A SHOULD BE 35¾ INCHES AND B SHOULD BE 34½ INCHES

with a proper base in order to build up a durable lasting color and varnish.

In as much as you have failed to state just what material you have to work with, how far you expect to go in the painting of the car in question it will be imposible for us to give you the exact information on the work to be done. However, as we judge that you are not entirely experienced in the painting of vehicles by the old fashioned process we strongly urge you to use one or the other of the newer and quicker methods now to be found on the market.

A talk with your paint supply house will enable you to secure paints, varnishes and combination color varnishes that will produce very good results.

With reference to "Riplon" we are not familiar with the application of this material and would suggest that you communicate with the handlers of this product.

Painter, New York.

Rear Axle Leaks Grease:—Will you kindly let me know what to do for a Ford which is giving me considerable trouble. The left rear wheel lets the crease run out so badly that the tire is all full of grease after a short run.

P. C Geiger, Pennsylvania.

In Reply:—Possibly you are using too light a grease in lubricating the differential. If so you will of course, realize that it would have a tendency to leak out over the brakes. Also too light a grease would not have sufficient body to properly cushion the gears.

Another cause of this difficulty is too much grease in the rear axle; one and one-half pounds of grease is plenty. It is of course understood, however, that a small amount should be added every thousand miles.

If the front washers are very badly worn they will allow the axle shaft and differential to shift from side to side and thus pump grease out of the axle housing. This usually causes the grease to appear around the left wheel first as that wheel is nearer the drive gear. Worn front washers will also cause the gears to grind. The noise will change as the car turns the corners to right or left and the weight of the car is shifted from side to side. Worn thrust washers require that the rear axle be removed from the car and taken apart before new washers can be fitted. Ball-bearing thrust washers are now made for the Ford rear axle and because of the lesser friction are claimed to wear longer.

The front washers after long usage become worn and hard these can be replaced after removing the wheel without taking the axle off the car. The two front washers should be put on the axle shaft near the roller bearing to the differential. A third front washer should be placed near the outside end of the axle shaft just inside of the other roller bearing. These front washers are cheap and easily replaced and if the proper amount of grease is used usualy cure the rear axle grease leaks.

In connection with the remedy of this eakage of grease from the rear axle it may be mentioned that if the grease used is too stiff or heavy the gears will simply cut through the grease and the bearings will not be properly lubricated. It is best to use the exact type of grease recommended by the various manufacturers of lubricants. S. S. B., New York.

Welding Springs—Aid-Gap—Paint for Tire Casings:—I am very sorry, indeed, that I didn't get in touch with your paper many years ago, I think it a real help to the man who wants to know things. I have been taking your paper a short time and think lots of it.

I have a few questions that I would appreciate being answered:

(1) How may I weld automobile springs to cause them to have the right spring and not break again?

(2) What is the proper distance to space a field coil from magneto on a Ford?

(3) What is the best receipe for making paint to paint old auto casings to make them look new?

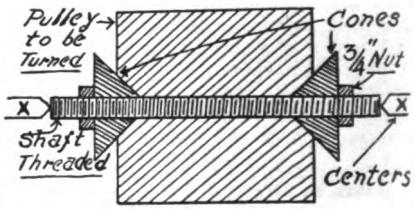
R. A. Murdock, North Carolina.

In Reply:—I—Unless one is well experienced in the welding of spring metal it is best to leave the welding off auto spring leaves to others. It is a simple matter to tell anyone how to weld spring leaves yet it is quite another matter to instruct anyone so they will properly grasp the correct operations and successfully accomplish the work. The writer has successfuly welded spring leaves with Laffitte welding plate and had the weld hold up without another break, but in the writer's estimation it is best to fit a new leaf into the set.

One very good method that is followed by a great many repair shops today is to salvage all old auto springs and spring leaves and sort them according to size holding them in racks for the purpose. When called upon to repair a broken spring, the spring is taken down and a new leaf or two or three as the case may be, is fitted into the set from the stock of good ones kept on hand for that very purpose. If the old springs are cleaned and "slushed up" with a good rust preventative or grease they can be held in stock almost indefinitely.

2—If it is the "air gap" on the Ford magneto that this reader means the proper distance is 1/32 of an inch. This is the correct distance between the magnets and the core of magneto coils. If the space is any more than this the amperage and voltage will be less, and if any less than 1/32 of an inch there is liability of the magnet striking the coil core.

3—The best tire paint receipe of which we have knowledge is made up as follows:—Mix five pounds of pure whitening into one quart of gasoline stirring



A SELF-CENTERING DEVICE FOR THE TURNING LATHE

thoroughly until well mixed. Then add one quart of good cold patch cement slowly also stirring thoroughly as it is poured into the first mixture. After a thorough mixing the paint is ready for use. It is applied with a brush and dries with a white surface which not only improves the appearance of the casing but also protects the casing surface to some extent.

S. S. S., New York.

Go after the getting of more business with the going of a "go-getter." That means intelligent determination and persistency. And one never knows how much business one can get until one goes after it. Be a "go-getter."

Try a want ad in "Our Journal" if you want to sell a machine, tool or a whole shop full of equipment. "Our Journal" is read by the men who buy. Our want column will take care of any want on your list. Buying, selling, hiring, renting or exchange—and the cost is but a trifle.

It's not what you earn but the money you save that counts in the final reckoning. Of what avail is a thousand dollars a week to the individual who spends a thousand and ten. Yet the laborer who earns a dollar a day and spends but ninety cents of it is a Croesus beside the other.

Ol' Uncle Billy Martin sez:—"Not much of a trick t' size up the man whose dog hides under the house when it ses 'im come in the gate."

VOLUME 21 NUMBER 11

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

NOVEMBER, 1922

BUFFALO, N. Y., U. S. A.

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Contents November 1922

Business Outlook Excellent

"While there can be no doubt that the two great strikes in the coal and railroad industries have put a check upon industry" writes John E. Edgerton, President of the National Association of Manufacturers in the Industrial Digest," yet practically every large industrial district is planning to make considerable extensions of its forces.

"The only way to put the country back on a real prosperous basis is to stop quarreling and go to work industriously and conscientiously" further says Mr. Edgerton.

And now that we have solved at least for the time being, the strikes that so seriously menaced not only the prosperity but the normal welfare of the country, we may well look forward to a most prosperous fall and winter.

"Mr. Edgerton points out that "Government reports show that the production of raw products has more than come back to its own. Our farms have produced more than $1,000,000,000 worth of produce above last year's record; wool production has increased and there are further fine reports on the production of iron."

These figures are most significant and especially so are the excellent production figures with reference to farm products. These latter effect the smith and rural repair shop owner vitally. They mean the difference between prosperity and a winter shut-down of the shop. With farm products of all kinds in abundance, the farmer while securing a somewhat lesser price per unit, is able to sell larger quantity and thus in better shape finacially.

And with the farmer in better finances, the smith and general repairman must also be in better shape in a business and financial way.

The present and coming seasons promise to be excellent ones for the general shop owner. Farmers, merchants and rural residents should have ready money. They should be well able to pay for their work, their supplies and your service. Make a strong effort for after trade and business. And then make a stronger one after your pay.

Ask 'em to Buy.
Ask 'em to Repair it Now.
Ask 'em to Pay.

Hardly possible is it to say too much about Safety First and all that it means. And yet it seems hardly necessary to remind folks continually to save their own lives. Yes, it would seem as tho' Barnum was right when he said there was "one born every minute."

Know Just What a car, truck or tractor needs in the way of accessories and parts. You can increase your sales of needs and requirements of motorists in your section and make that knowledge turn real money into your pocket.

Here' An Idea— fan belts usually break without warning. And a broken fan belt may result in a repair bill all out of proportion to the cost of a mere fan belt. Start a campaign to sell an extra fan belt to every car owner in your neighborhood. Tell them what might happen when the fan belt breaks. The extra one is cheap insurance.

"The Changing World"

By John T. McCutcheon

THE DRUDGERY OF YESTERDAY'S KITCHEN—

IS DRIVEN AWAY BY SCIENCE TODAY

This is the fifth of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

Invisible Repairs to Tanks, Fenders and Metal Body Parts

W. J. GORDEN

Every Repairman knows the difficulty of Reshaping and Repairing Bent and Broken Sheet Metal Parts so the Repair will be inconspicious. In this article Mr. Gordon describes methods of Repairing and Reshaping these parts, that will be new to many Practical Metal Workers.

It is not an easy matter to repair a bent or broken fender, tank or body so that the repaired place will be invisible when refinished, but the fine cars and bodies developed today require that this work be done with a fine degree of craftsmanship. Haphazard reshaping of fenders that have met with an accident may do for the cheaper cars and for utility cars and trucks, but the proud owner of an expensive car or even of a cheap car in which he takes a special pride in appearance desires expert work in reshaping and repairing bent and broken metal parts.

In the reshaping and repairing of bent and broken sheet metal parts, tanks and shapes experience will go a long way toward successful accomplishment of the work. On the other hand, practically every job is different and except for the fundamentals in the reshaping and straightening of metal parts no strict method of procedure can be laid down.

Generally it is not advisable to straighten fenders, lamps and similar parts that have boken surfaces. At times, however, it is necessary to repair such broken parts for one reason or another and in such event a method which we have found most excellent both from the standpoint of the strength of the repaired part and also in the appearance of the finished job, will be found to be entirely satisfactory.

The method of repair will be described as it was effected in the case of a punctured gas tank in a recent collision job which we had in the shop. This tank was bent and its side punctured somewhat as shown in the engraving at A, Fig. 1. This shows a cross section of the broken metal. It was of course a simple matter to bend the bent metal back into its original shape as shown at B. But when this was done an irregular hole somewhat as shown at C. was disclosed. This could have been soldered in the old way or could have been repaired by means of the oxy-acetylene torch. But for some reason the owner of the car did not want it repaired in that manner and so we proceeded as follows:—

First, we cut a piece out of the tank as indicated by the dash line in C. After cutting this piece out the edges of the hole were carefully trimmed up with a file, leaving

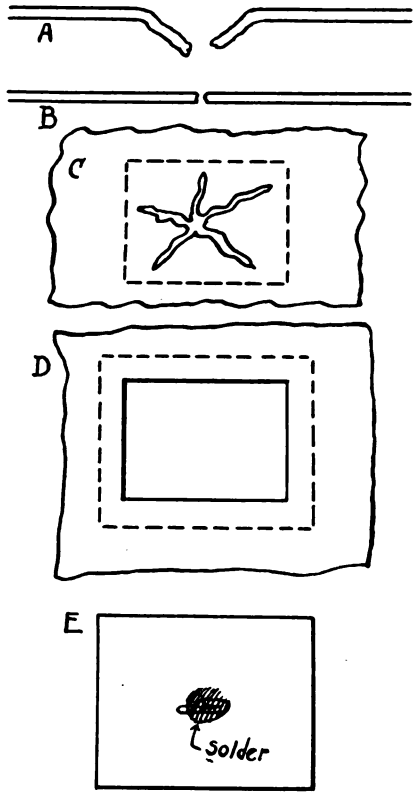


FIG. 1—THE BROKEN SECTION IS CUT OUT AND A NEW PIECE OF SHEET METAL SOLDERED INTO PLACE

them square and clean. Then a piece of sheet brass somewhat larger than the hole was fitted on the inside of the hole as shown at D. In order to hold this in place while soldering it permanently, a fine hole was drilled in the center of the brass plate before placing it in position and a piece of wire run through the hole and bent over on the inside so it would not pull through. A drop or two of solder will effectually fill the hole and keep the wire in place. See E, Fig. 1.

The brass plate was then pushed into the tank and held firmly in place by means of the wire while the joint was carefully and thoroughly soldered all around. This gave the job the appearance in section as shown at A, Fig. 2. The hole in the metal of the tank proper was now carefully measured and a piece of brass cut to exactly fit into that hole. The brass was the same thickness as the metal of the tank so that when put into place the surface of the plate would be exactly flush with the surface of the tank.

The fitting of this plate must be very carefully done and it was found best to cut the plate slightly larger than needed, as it can then be trimmed with a file to fit closely on all sides.

This plate was then drilled in the proper place to take the wire that still protruded from the first plate. The extra solder was now scraped away from the joints made by the first plate and the second plate carefully fitted into place. Solder was now carefully melted into the joints made by the second plate while the wire was pulled up tightly so as to hold the plates in position. The work now appeared as at B, Fig. 2 which shows the plates and tank in section.

When the solder was firmly set a couple of drops of solder were melted around the wire where it protruded from the top plate, and the wire cut flush with the surface of the plate.

The solder joints were now carefully filed level with the tank surface and the entire job smoothed up. And when the tank was refinished, repainted and varnished it was impossible to find the repaired spot.

The explanation of this method of repairing broken surfaces in

sheet metal would indicate a very lengthy and laborous job, but to the workman thoroughly familiar and experienced in soldering, the work is extremely easy and will result most satisfactorily in every way.

So much for invisible repairs to broken sheet metal parts, the repairing of bent parts and then reshaping them back to their original form is quite another problem.

In the straightening of metal parts such as fenders, body parts and other shapes there are just three matters to bear in mind at all times. First: proceed slowly. Second; support edges of the part being straightened; and Third; use light blows. And in order to follow these rules a number of special tools are necessary. I will try to enumerate the tools needed and also detail the uses to which each is put in the order of their use.

First in importance is a block of some kind to support the metal adjoining the bent spot. A very convenient block for this purpose is

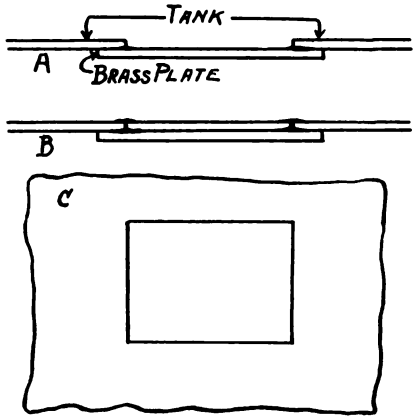


FIG. 2—THE PATCHED SECTION IS INVISIBLE WHEN THE WORK IS DONE PROPERLY

the one shown at A, Fig. 3. This block is of steel about an inch in thickness and about four or five inches across. It may be finished up in several different shapes, with edges of various curves so as to fit practically any curvature of the work. It's edges are beveled as shown and it is fitted with a handle so that it can be held firmly against the work.

The next tool is a heavy wooden mallet. This is shown at B, Fig. 3 and is used for the first straightening operations. The block at A is held on one side of the bent part while the heavy mallet is used to gradually hammer the metal back to its original form.

The next tool is a light weight mallet which is employed after the metal has been roughly hammered into shape. This now smooths up the work and is usually employed in conjunction with a hand anvil or block consisting of an ordinary anvil fuller as shown at D or a special block made of babbitt metal or lead as at E. When made of babbitt metal or lead the hand block at E is usually shaped exactly like the original form of the bent part. This may be accomplished by pouring the lead or babbitt into an unbent section of the part to be straightened.

While the wooden mallets are excellent and exactly suited to bending large indentations in the surface of metal parts, they will not remove the smaller dents and unevenesses. A tinsmith's hammer is excellent for this purpose. As usually fashioned this hammer has a perfectly flat face. I find however that if this face is shaped up with a slight crown as at G, in Fig. 3, it is a more satisfactory tool. This prevents the edges of the face from marking the surface of the metal, which is likely to result if the face were as shown at F. This hammer is used to remove the finer dents, while a still lighter hammer is sometimes required for the finer imperfections. This hammer is in the nature of a tack hammer or light riveting hammer as shown at H.

After the finer indentations have been removed by means of hammering with the light hammer at H. filing is employed in order to bring the surface to a perfectly smooth uniformity. A half round file will be found most suitable for this and small imperfections and dents and thus make the surface perfectly smooth.

Other special tools not mentioned in the foregoing are wooden blocks of various shapes, sizes, and forms whose use is determined by the particular job in hand. Forming chisels of various shapes and sizes are used for shaping up corners and edges. One with a half-round edge is used for shaping up a beading or a groove. And beside these many special tools will be fashioned by the practical craftsman for special shapes and forms.

In the reshaping of metal forms it is best to use comparatively light blows and many of them rather than very heavy blows. And all blows should be directed to the point of the bend as shown in Fig. 4 at A. It is also best to pull the blows as at B rather than to direct them full and dead upon the bend.

In filing the surface after the larger dents have been removed, the smaller imperfections can usually be felt with the hand or fingers. When these are filed, the metal may be cleaned up further with emery paper and thus a perfectly clean, smooth surface prepared for painting and enamelling.

Practically any bent, broken or

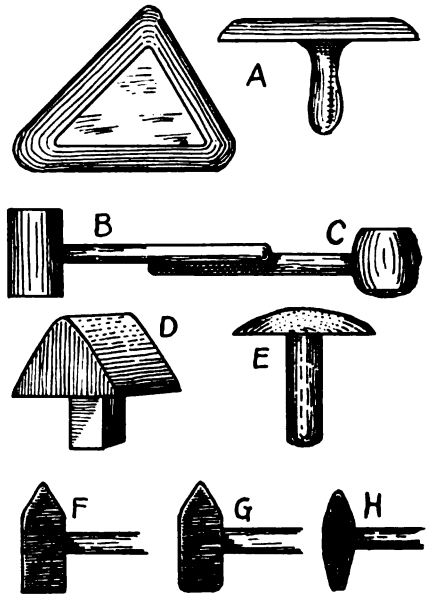


FIG. 3—SOME OF THE TOOLS USED IN STRAIGHTENING SHEET METAL PARTS

punctured sheet metal parts can be repaired and reshaped by the foregoing methods and if proper care and patience is exercised the repairs and reshaping will result in putting the damaged parts back into apparently the original shape with no visible trace of breaks, repairs or indentations.

Blacksmithing for the Beginner

J. RAMMELL

Calculating Stock

The exact amount of stock required in making a weld is hard to determine as so much depends on how carefully the iron is heated and how many heats are required to make the weld. The only real loss which occurs in welding is the amount of stock burned off or wasted in scale.

Of course, in preparing the ends for the weld, the ends are upset and scarfed and thus the stock is somewhat shortened. The piece is still farther shortened, by overlapping the ends when making the welds, but as all this material is afterwards hammered back in shape no loss occurs. No positive

rule can be given, but as a rough guide ¼ to ¾ the thickness of the stock on light will answer the purpose.

Stock for Bent Shapes

It is very essential in modern

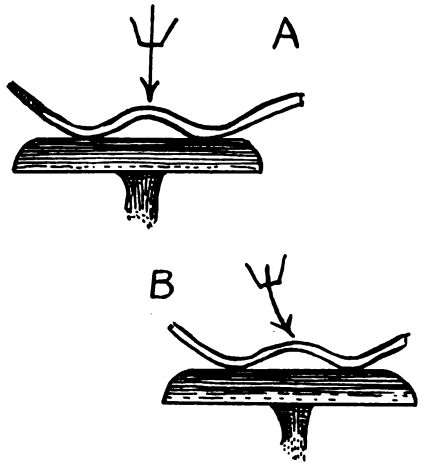


FIG. 4—ALL BLOWS SHOULD BE DIRECTED TO THE POINT OF THE BEND

blacksmithing to know the exact amount of stock required for a given piece of work. There are four different methods. The first and most accurate method is by mathmatical calculation if it can be conveniently applied. Take for example Fig. 1: If the outside were measured it would seem that 16 inches of stock were required. If the inside were measured 14 inches of stock would be required.

It has been found by experiments, if a piece of straight stock be taken and a line be drawn on it through the centre, and this piece of stock then bent, that the outside line will lengthen the inside line will shorten, while the centre line will remain unaltered. This is universally true, and the proper length of stock for any bent shape may be obtained by measuring the centre line. As in Fig. 1 the centre line measures 7½ inches, this will be the length of each leg. So 15 inches of stock will be required to make this particular bend.

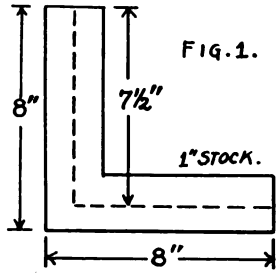
Circles

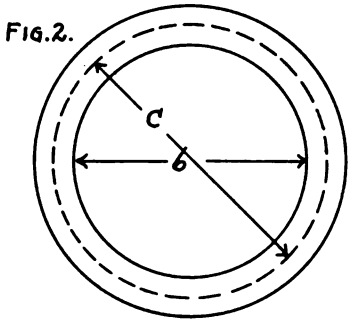
On circles and parts of circles the length of stock may be easily calculated. The circumference, or distance around a circle is found by multiplying the diameter by 3-1/7 or more accurately by 3.1416.

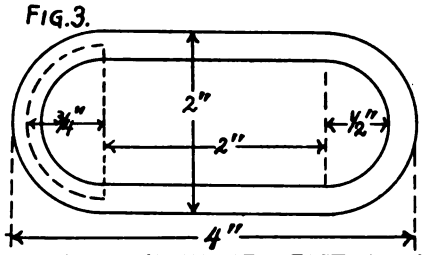
As an illustration, Fig. 2 is a 6-inch circle made of 1-inch stock. This would make the diameter of the circle made by the centre line "C" 7 inches. This is called the calculating line and the length of stock required would be 7 times 3-1/7 or 22 inches.

A combination of straight lines and a circle is shown in Fig. 3. The outside diameter of the ends being two inch, would leave the two straight sides two inches. The calculating diameter is 1½ inches. The total length of stock required for the end would be 1½x3-1/7=4-5/7 or approximately 4-11/16 inches. The length of the sides would be two inches. The total length of stock required would be 4 inches plus 4-11/16=8-11/16 inches. With a slight allowance for welding, the stock should be cut 8¾ inches.

Scrolls or irregular shapes may be measured in two ways. Either by measuring the centre line of the bent shape with a string or more accurately by setting a pair of dividers and stepping off the center





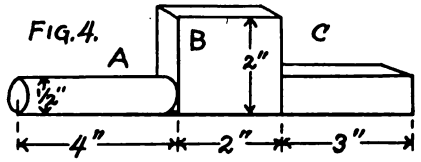


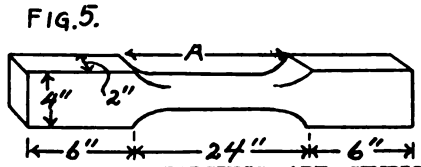
THE CALCULATION OF STOCK IS A MATTER WHICH THE YOUNG SMITH SHOULD STUDY CAREFULLY

line. Keeping account of the number of steps.

Caluculating Stock for a Forging

In doing this kind of work there is one rule to be remembered and that is, that the volume of the stock remains unaltered, although its shape may be changed. Take for example the forging at Fig. 4. For convenience we will divide the forging into three parts; the round end A, the centre rectangular block B and the square end C; The stock being one by one-half inch. The block B will, of course, require two inches of stock. The end 3 would





ODD SHAPED FORGINGS ARE SIMPLY CALCULATED WHEN PROPERLY ANALIZED

have a volume of ½x½x3 inches or ¾ of a cu. inch. The stock has a volume of ½x1x1 inch or half of a cubic inch. The number of inches of stock required for end C would then be ¾÷½ or 1½ inches.

The end A is a round shaft or cylinder 4 inches long and ½ inch in diameter. To find the volume of a cylinder, multiply the square of the radius (half diameter) by 3-1/7 then multiply the result by the length of the cylinder. This will give the volume of A as ¼x¼x3-1/7x4=11/14 and the amount of stock required to make this piece would be 11/14÷½=1-4/7 which might be called 1-5/8 inches. There is of course a slight loss due to scaling in working the iron which must be allowed for. This is done by allowing a slight amount of the stock required in each case. The amount of stock in this case would be as follows:—For round shaft A, 1¾ inches; for block, B. 2 inches and for square shaft C 1-5/8 inches or a total of 5⅜ inches to make this forging.

In the foregoing just described it would of course not be necessary to take just the exact amount of stock. As it could be drawn out and the surplus ends cut off. But in a forging like Fig. 5 it is essential that the exact amount be used as it is important that the distance at A be correct. The stock used would be 2x4 inches. Each end of course would require 6 inches of stock. The centre part is a cylinder 2 inches in diameter and 24 inches long. The volume of this would be 1x1x3-1/7 by 24 or 75-3/7 which might be taken as 75½ cubic inches. Each inch of length of 2x4

(Continued on page 251)

Boosting Business For The General Repair Shop

The right kind of Advertising for the Repair Shop will very materially increase its Trade. This article will interest every shop Owner who desires to increase his business by means of the right kind of advertising at a minimum of expense.

If any shop is so situated that it has all of the business it can possibly get there would still be real need for advertising that shop's service, if only for the purpose of holding the business it has.

But, fortunately, no business is so situated and it is therefore necessary to advertise in some manner in order to advance the business and to keep it from actual decay.

In the first place let it be understood at the start that advertising, as used here is not necessarily the use of newspapers and circulars. Advertising here is meant in the broader sense of boosting business by any and every legitimate means. Personally calling the attention of some individual to your shop and service is just as much advertising, as is the sending out of a circular or letter.

While there are many ways of advertising a business and while in some cases one particular method may work very successfully in some individual case, it is generally best to use every possible means at the shop owners command to boost business and trade.

Personal Calls

No doubt, the best and most effective way of boosting and increasing business and trade, is the personal call. In other words, selling your service, your shop and your work individually to the people you want as customers.

And this personal work is productive of excellent results especially in the case of such work as cylinder refinishing, oxy-acetylene welding, electric welding, implement repairing, tire repairing, and work and service of similar kinds.

And personal work done in soliciting trade for any particular department of the shop, will naturally bring business in other work, especially if a word or two is dropped regarding other features of your service. It is an excellent idea while making personal calls to have neatly printed cards, or better still folders or circulars, which you can leave with your prospective customer as a reminder.

One live, hustling general shop owner we know has a neat card that measures about six by six inches square and folds to a neat size three by six. The outside face bears his name and address with a few brief lines telling of the service he offers. This in his case includes: —"General Repairing, Automobile Work and Blacksmithing, Gas Welding, Tire and Tube Repairing, Spring Replacements. Selected line of Accessories and Supplies."

On the inside of the card he pictures an oxy-acetylene job before and after welding. Above the pictures appears the headline — "Don't Throw It Away." And then he explains his welding service, tells of some of the jobs he has done and gives a brief explanation of how oxy-acetylene welding saves money and materials for the user of machinery, implements and trucks.

On the back fold of this very well-arranged card he gives a very complete list arranged in alphabetical order, of the line of service, supplies and accessories that may be had at his shop.

This man makes it a point to always have a few of his cards in a neat clean case in his pocket and there is seldom a day that does not find him leaving a card with some one who can use his service. As a consequence his business is in a live, growing condition and his money expenditure is hardly worth mentioning.

Other Shops as Customers

One excellent source of business and one which the average general shop owner seldom considers are the other shops in the locality. If your line of service is general or special in character, neighboring shops must have calls for some work which they cannot do and which is exactly in your line.

For example, take gas or electric welding. If you do either at your shop, call upon the shop owners who do not have the facilities for doing this work and arrange with them to turn such work over to you. Tell them what you can do for them in the way of a division of profits and then give them an occasional call as a reminder. Of course, the biggest part of your trade will come direct, but all the work that you can possibly turn your way can be made to pay a profit, and no opportunity should be disregarded.

In the case of cylinder refinishing, the same thing can be done. In this case however it will perhaps be necessary to sell the cylinder refinishing propostion to the other shop man.

The different channels through which to boost for more trade will depend largely upon the service offered by the individual shop. Generally speaking however, merchants, factories, farmers, auto, truck and tractor owners, mills and plants, and the owners of threshing outfits may be called upon personally.

Compiling a Mailing List

There are several sources from which a mailing list may be compiled and these of course depend upon the locality and the facilities which the shop owner has at hand.

Telephone books, town and city directories, voters lists, tax lists and the secretaries of various organizations, lodges and other associations may all be consulted with profit. If your town or county boasts of an automobile club, a tractor club or a farmer's club, its membership list carefully checked to eliminate duplication and "not-wanted" names will give you an excellent start toward a valuable list of prospective customers.

One shop owner started an excellent mailing list by taking the license numbers of the cars, and trucks that passed his door at frequent intervals. These numbers were then looked up in the license bureau and the owners sent a special letter with an invitation to stop in when passing the next time.

Material to Send

There is no end to the type of

matter that can be sent at intervals to a carefully compiled mailing list. There are letters, circulars, folders, blotters, cards, booklets, price lists and no end of matter ranging all the way from the simple cheap dodger to the more elaborate folders and booklets. Some shop owners also use novelties and souveniers of various kinds. These however, usually run into considerable money and are generally used upon the occasion of "Fair Week" or some other happening of importance. They should, of course, be distributed with extreme care so as to get them into the hands of just the person where they will do the most good.

The subject matter for circulars, letters and other literature may have an almost unlimited range and it is hardly possible for the practical and up-to-date shop owner to feel at a loss as to what to say in his advertising literature. The several ideas suggested in this article will suggest others and the wide-awake shop owner will likely be most concerned with choosing most suited subjects for advertising treatment rather than feel at a loss for material.

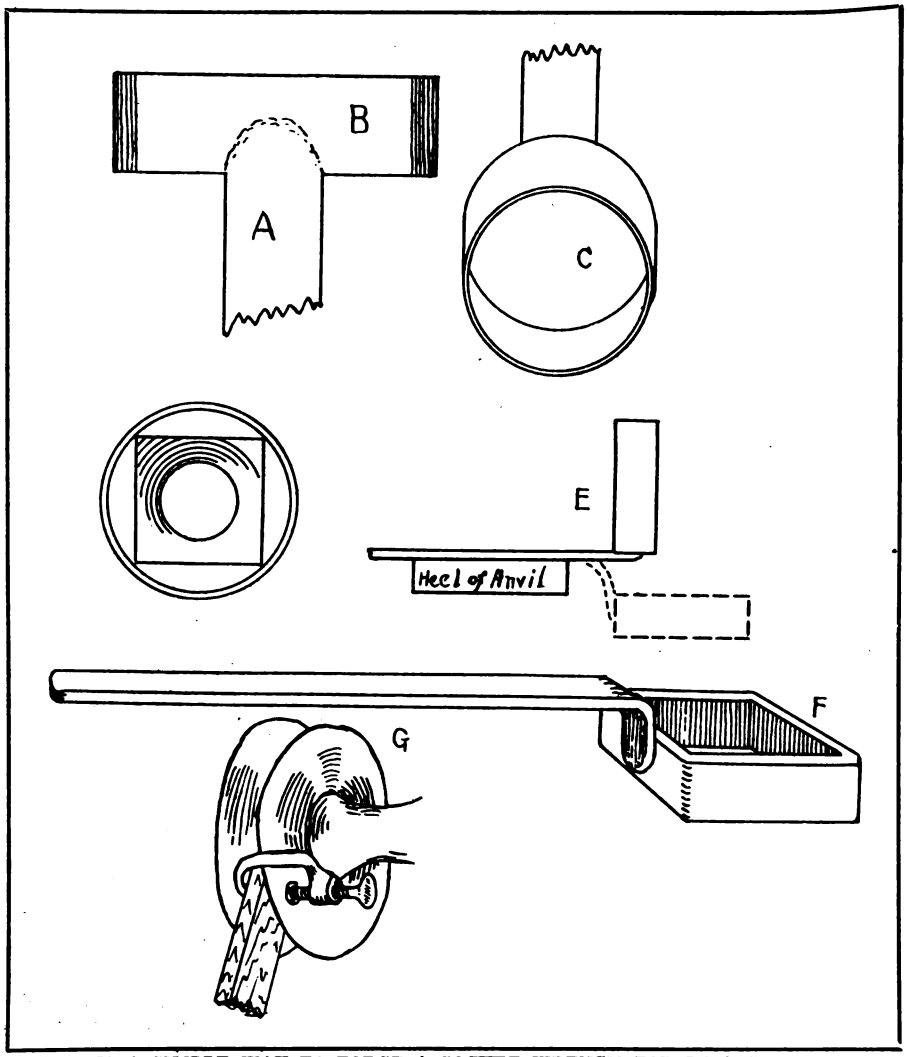
Newspapers

These are decidedly worth considering and while advertising in them regularly is likely to run into considerable money, an occasional add will get many folks coming your way that you would not otherwise get at all. It is an excellent idea to keep in touch with the editor of your local paper and through him to get all the editorial mention possible. When you put in a new machine, a new line of accessories or add a new line of work let the editor or a reporter know about it. Perhaps you can write an occasional article on some subject that would be very acceptable to the editor for publication.

Forging A Special Socket Wrench

J. BALDWIN

Here is a simple way to forge a socket wrench for removing nuts from disk cultivators or for any other special purpose where a socket wrench is desirable. It can be made to fit any size or shape of nut and is easily and quickly made. Take 1½ by ½ inch stock or 1½ by ⅜. Measure the nut carefully and allow for bending and the weld and then take a piece of stock the correct length and weld a piece A to the center of the short piece. The piece A will form the handle while the cross pieces will form the socket. If the wrench is for disc cultivator nuts the cross pieces B may measure about five inches. After welding the pieces A and B as shown bend the short piece round and weld as at C. Now bend in the vise or over the anvil as at E and then fit the round part to the nut as shown at D. The finished wrench will appear as shown at F.



HERE IS A SIMPLE WAY TO FORGE A SOCKET WRENCH FOR DISC CULTIVATOR WORK OR FOR OTHER SPECIAL USES

For use in unscrewing nut on disc cultivator, clamp the disc to a 2 by 4 timber as shown at G resting one end of timber on the spindle to keep the disc from turning. Now the nut may be taken off with little or no trouble.

You will find this wrench a handy one for narrow work, in fact a very useful one for most any work where a good socket wrench with good leverage is needed.

Assembling the Motor After Refinishing the Cylinders

Many a perfect cylinder refinishing job has been spoiled when the motor is being assembled.

Great care should be taken to first wash the cylinders and pistons, rings, etc., carefully with gasoline. Be sure every particle of abrasive material and foreign matter is removed.

Make certain the wrist pin fits both the rod and piston, and see that it is securely fastened on. Better go over this an extra time and make sure, for a loose pin or screw will ruin the entire job the first time the engine is run.

Measure the pistons for roundness after assembling with the connecting rods, to see they have not gone out of shape. A slight tap with a wooden hammer will correct any change.

After assembling the pistons on the crankshaft, test them to see if

they are absolutely square. Do not take it for granted, that merely because the connecting rods were straight before it was pulled down they will be when you assemble them. There are many chances and reasons why they may have become twisted or out of square. This could happen in taking off the block with the pistons still connected to the crankshaft, when it is an easy matter to bend or twist the rods. Again, in scraping in the connecting-rod bearing or in tightening the caps, a slight variation at this end will increase many times at the piston end.

That the pistons are square is highly important; and, if not, the cylinders might just as well not have been refinished for the pistons hitting on the sides will give all the troubles of an out of round hole.

Put plenty of oil on all the pistons before assembling in the cylinder.

The rest of the assembling is purely a repair job, but every detail should be thoroughly gone into as though it were a brand-new car. In fact, the vital parts are new and with limits usually closer than those allowed by the manufacturer. Therefore, they should demand careful attention.

Be sure the crankcase is well filled with a good light or medium oil and that the system is working perfectly. Run the motor slowly for one-half day, giving it time to cool naturally.

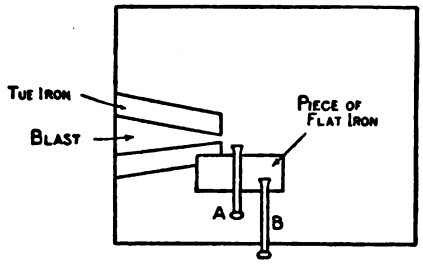
And finally do not fail to instruct the driver for he can right at this time either "make or break" the job. No matter how carefully the holes have been ground or the pistons and rings fitted, every motor requires some running in.

As an average, careful driving for 300 to 500 miles at 15 to 20 miles an hour will suffice in running in a motor. At the end of this time, the oil should be carefully drained out and the new supply put in. Self-control on the part of the driver in the beginning will give him value received many times over in days to come.

Hardening and Tempering Tools for Stonework

A writer in Work the English amatuer mechanics journal tells a querist how to harden and temper stone masons tools as follows. His directions will no doubt interest some of Our Folks.

It is assumed that the tools querist refers to are the chisels, punches, etc., that stonemasons and carvers use, and to temper these successfully the following method must be followed: Having drawn the tools down to the shape and size desired, the fire must be made up specially for the tempering process, which is as follows: Remove the clinker (if any) from the tuyere iron, so as to have a clear passage for the blast. Make up the fire and blow up until there is a nice



HARDENING AND TEMPERING TOOLS FOR STONE WORK

red fire. Then place a short piece of flat iron (say 2 in. by ½ in.) on the top and blow up until that is red hot all over. This must be placed so that the blast is blowing just at the front edge (see accompanying illustration, which shows a plan). Now lay the tools on the hot iron so that they hang over not more than ½ in of the front edge (see A), and when red hot cool in water, but do not dip the tool in the water any deeper than the part that has been hanging over the hot plate in the fire. Rub it bright with a piece of sandstone, then place it on the hot iron (see B) and bring it down to the color desired. For granite a very light straw, for marble straw color, for York and other soft stones from deep straw to purple. But the exact color can only be found out by practice and experience, as much depends on the quality of the steel from which the tools are made. When tempering tools of any description there is one very important point that must be adhered to, and that is, do not plunge the tool in the water straightaway from the fire, but hold it out just long enough for the heated part to be of a uniform heat with the part to be tempered. If cooled out when one part is hotter than another it puts different strains or tensions on the metal, so that one part is pulling against the other, with the result that when a blow is given it will break; in fact, they will often break when cooling out, especially if one part is very much hotter than the other. With reference to the powder used, the writer does not know of it, but at the same time would strongly advise querist not to heat the steel until cold, for steel should not even be hammered to a black heat. If beaten at too low a temperature it will cause minute fractures, so that it will be an impossibility to temper it to stand without breaking.

Cherry Red—What Does It Means

H. H. KUHLMAN

What is cherry red? I never was able to find a distinctive red on cherries. They vary from the very dark to the lightest red. Therefore, if I heat a piece of steel for hardening and try bringing it to a "Cherry Red." I may be just as far wrong or right as I would be if I were to merely guess at the temperature. But this little story may help us all out of doubt:

A granite quary was owned by several "stonecarvers" and a blacksmith who did the tool dressing and who was an expert in this line. It happened that the blacksmith had to quit for some reason and the stone carvers didn't know what to do because they didn't want to depend upon a hired man.

The smith therefore suggested that he teach "Frank" the trade. Frank was a skilled stone carver and always liked to tinker around in the blacksmith shop in spare time. The blacksmith showed Frank first how to draw out a chisel and among other things warned him not to hit a chisel on the edge any more after he had flatened it out. But when the smith told him about the cherry red heat as we all do, Frank said, "I never will remember your cherry red color and even if you put a basket of cherry's on the forge I wouldn't know which one to pick out for cherrys are different shades of red. However, if you go to the store with me and select a certain kind of red paint similar to your hardening red, that will help me out." A can of red paint was accordingly bought and Frank painted a piece of a shingle red and whenever he hardened his chisels he compared the heat of the chisel with the red paint on his shingle, and Frank got to be an expert tool dresser in a short time.

(See Editor's note regarding Mr. Kuhlman's suggestions on pg. 251).

The Legal Side of Collecting Accounts

Some knowledge of the Legal Side of Collecting is of Importance to the Shop Owner. This article tells of some of the Things you Can and Can Not do Legally.

What you can and cannot do legally in collecting an account is an important matter to consider. No business man in attempting to collect money that is rightly due him is particularly anxious to get into serious trouble with the law, and to not only lose the money that he should have from his debtor, but to be forced to pay out a good deal more than the account is worth, because of an ill-advised move on his part, or because of writing or saying something which the debtor can use against him under the law. It is important, therefore, that the business man know just how far he can go and still keep within legal bounds.

It is, of course, generally understood that a debtor cannot be dunned through the medium of a post-card. It is possible to write a message on a post-card soliciting payment of a debt, but the business man must be extremely careful in his language, and he must so word his message so that a third person reading the card will know nothing, whatever, regarding its real objects.

The post-card used in one of the schemes mentioned in a previous article is entirely within the law, and if used just exactly as given will not lay the shop owner, open to any legal action. However, a post-card worded as follows: "I am pretty well satisfied that you do not intend to pay what you owe. This is final. If I do not hear from you by the fifteenth I will be compelled to use drastic measures to enforce the payment of this account," was held by the court as a reflection upon the debtor's character and entitled the debtor to damages, which were of course paid by the man who sent him the post-card.

On the other hand, when you have sent a number of bills to a debtor, and he has failed to reply you may write a card referring to your several communications and asking him why you do not hear from him. However, it is best and safest not to refer to the nature of the communications which have preceded the post-card, and it is certainly not well to refer to the character of the debtor in any way.

In like measure it is important that nothing be placed on the envelope of the letter containing a dun, which may be construed as a reflection upon the character of the debtor. The wise business smith will observe the same with regard to what he placed on the outside of the envelope as he does in the matter of the post-card.

Another phase of the matter which a business man will remember in his efforts at collecting past due accounts is that he cannot legally refer to a debtor's character when writing to a third person. Supposing, for example, that Brown has guaranteed the account of Green at Jones' shop. Green is rather slow in paying and Jones has accordingly asked him to secure the signature of Brown on his orders for repairs and supplies. After Jones has made an effort to collect his account from Green, he finds it necessary to refer the matter to Brown as a guarantor of the account. It can easily be imagined how Jones would write a letter to Brown with reference to Green. Should Brown show this letter to Mr. Green, lt would be easily possible for Green to bring Jones into court on a charge of libel and blackmail.

Do not threaten a debtor unless you really mean to carry out your threat—he may draw you into court on a threat action. The average business man is sufficiently familiar with libel and libel suits to know that it is best not to express one's self too freely in a dunning letter.

What Can be Done Legally

Naturally of course, it is possible for the business man to resort to the law whenever a case warrants it, and when this stage has been reached, it is always best to consult your lawyer and get his intelligent advice, as to just what you should do next.

A series of three letters which precede a final recourse to the law is suggested by a prominent lawyer for the use of the average shop owner. The first letter is one which follows the bill which has gone some time before, and is simply a reminder of the account. The second letter is another reminder with a reference to the accommodation accorded the debtor, but which is worded in somewhat sharper tones, with the request that the account be paid at a certain date. The third letter in the series is the one that contains the real money-bringing idea. It refers to the two previous letters and also to the failure to receive a reply. It then advises the delinquent that a lawyer has been consulted and he advises legal action in the form of securing a judgment against the delinquent. It is, of course, possible that the judgment would have no terrors for the debtor, and reference is therefore made to the matter of advertising the judgment for sale in the local paper which is entirely within the legal right of the business man, and which threat generally brings the debtor to time as no one, no matter how hard a "dead beat" he may be, is particularly anxious to have his failure, in the matter of the payment of bills, published.

Of course it is best to consult with a good lawyer when refering to legal matters in a collection letter, for it is certainly cheaper to pay a consultation fee, than to run the risk of defending a libel suit in court.

The Lein Law

Another phase of the legal side of collecting is contained in the Lein Law which repair shop owners and blacksmiths in quite a number of states can now call to their aid. At the present time there are some twelve or fourteen states, which have Lein Laws for the protection of blacksmiths and vehicle shops. Among these states are Alabama, Illinois, Indiana, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, Oregon and Wyoming. It is well, however, if you are unfamiliar with the matter in your particular state to consult either the Secretary of State or a good lawyer on whether or not there is a Lein Law in operation in your state and also get legal advice as to just what you must do in order to pursue a claim under this law. In most of the states referred to, the Lein Law is operative both upon vehicle repair work and horseshoeing. Usually leins of this kind on horses and vehicles prior claim to any other leins which

may be made upon the property.

There are usually various forms and regulations to be carried out in pursuing a lein of this kind, and it is best to get the advice of a reliable attorney in pursuing a claim under this law.

It is usually easy to secure a copy of such laws that may be active aid to vehicle workers, blacksmiths and horseshoers in pursuing collection, and the fee usually charged for such copies is very small. Copies can generally be secured by addressing the Secretary of State, at the State Capital.

An Association for Legally Reducing Bad Debts

Another means of keeping debtors and particularly "dead beats" within bounds is the merchants association, or credit association as it is known in some localities.

As generally organized, this association consists of the principal merchants in a town or community. With a duly appointed secretary and other officers it arranges to hold meetings, to transact such association business as it has organized for and to protect its members from the practices of the "dead beats" and the habitually "poor payers."

But in its plan for protecting its members against dishonest debtors the association, its members individually and particularly its secretary(upon whom much of the work naturally falls) must use extreme caution to keep within legal limits at all times.

As generally worked out, the members of such an association usually agree to keep the secretary advised from time to time(usually monthly) of the individuals who are delinquent beyond a certain point upon their books. This information is filed at the office of the association and periodically (also usually monthly) the members of the association are supplied with the complete list of delinquents with perhaps some notation showing either how many merchants each owes or perhaps the actual amount owed.

Such lists made up in such a way are perfectly legal and an association working along that line is within the law. But there are many little side issues to an arrangement of this kind that are not proper according to law.

For example, the name of a delinquent who has disputed his account cannot be placed on such a list without possible trouble resulting. Should the name of some customer who has refused to pay his account because of some dispute, reach that list of delinquents; and because of such listing should that person be refused credit by any member of the association, the customer can certainly collect damages from every individual who was a party to the scheme.

It is therefore necessary that none but the names of actual delinquents be placed on that list—(such lists are usually known as "Black Lists"). Secretaries and members should be careful and thoroughly advised on this point. And when any doubt may occur it is best not to list a name. In any event never send in the name of a customer who has disputed his account.

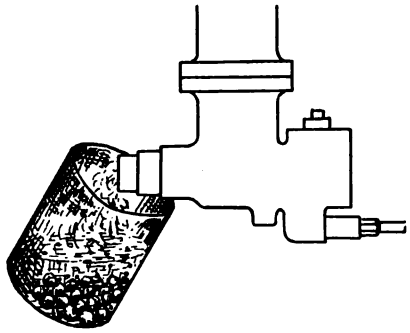
Another angle to such credit and association co-operation efforts, but one which is seldom if ever worked, is the "excellent idea" (in theory at least) to have each member of the association refuse to trade for cash with an individual whose name appears on the "black list." This, while it would place a tremendous club in the hands of the association members is not legal. It borders too closely upon conspiracy and would very likely lay the members open to legal action. All of this aside, of course, from the difficulty in forcing the individual members to live up to such an agreement.

However, the matter of exchanging lists of overdue accounts is entirely legal and an excellent means of regulating and reducing bad debts and credit risks. The plan is operated in practically all large centers and there is a free exchange of credit information among merchants in practically every town and city.

Starting the Tractor in Cold Weather

G. A. LUERS

To obviate the difficulties of starting the tractor on a cold morning the simple expedient explained below may be successfully used. Hold a small tin can under the carburetor opening into which several lumps



of carbide have been dropped with the switch on and the throttle fully open, some water is poured into the can. Then by pulling up rapidly on the crank, the gas generated from the carbide is drawn into the cylinders, and immediate starting of the tractor motor is the result. This means could be used to similar advantage on an automobile motor or a stationary shop engine when starting is difficult.

The Foot of the Horse and the Why of its Structure

L. G. GRAM

Beside being so largely a part of the entertainments of the world today, motion pictures and instant photography have also been the means of enlarging man's intimate knowledge and broadening his wisdom. For example instant photography has shown that the horse when travelling on level ground irrespective of his gait, touches his heels to the ground first when putting his feet down. This is of course in exact accord with the theory of the horse's foot action as described by most shoeing authorities and it gives added point to the finely made structure of the foot which is so admirably suited for its purpose.

Touching the ground first with the heel, especially at normal and fast gaits, makes necessary a structure of cushioning effect. This is most excellently accomplished by the series of soft and elastic structures found in the heel of the foot. Here, at the back of the foot, we have a wall that is somewhat thinner than at the toe. Then we have the horny frog and its counterpart, on the interior of the foot, which is known as the sensitive or fatty frog. These structures with the various, adjacent and connecting substances, make up a well arranged mechanism that is most excellently adapted to meet shocks and to avoid concussion.

And here again may be emphasized the importance of permit-

ting the frog to touch the ground as is intended in nature. It must be most apparent, in the shoeing of the horse, that the normal health of the foot cannot be preserved if the frog is raised off the ground and not permitted to carry on its natural office. This raising of the frog soon results in a drying out of the frog structures and in a shrinking of the normal heel conformation. If continued, the heel contracts, the frog attrophies and eventually the original office of the frog is entirely lost. If, when the foot has reached this condition, frog pressure is again established, the now hard, horny frog is likely to be driven up into the sensitive foot structures.

In the case of heavy pulling or when ascending a hill it is a well known fact that the horse then places the toe on the ground first. But in both of these cases the animal travels at a slow gait and concussion and shock are not so severe.

Blacksmithing for the Beginner

(Continued from page 245)

stock would equal a volume of 4x2-x1 or 8 cubic inches. Therefore, it would require 75½÷8=9-17/16 stock to form centre piece. Consequently the distance between the fuller cuts at A would be 9-7/16 inches and adding o this the 12 inches for the ends, the amount of stock required would be 21-7/16 inches.

Cherry Red—What it Means

(Continued from page 248)

Editor's Note—In writing the foregoing Mr. Kuhlman suggets that possibly some readers would be interested in securing the proper shade of red in order to know exactly the shade for tempering. He says:—"What do you think Brother Readers of this idea:—Don't you think it would be well if the Editor would supply the right hardening color put up by some paint maker? The color could be in tubes or small cans. A good many smiths and especially apprentices would be glad to buy a tube or can of hardening red together with a little booklet on "How to Harden and Temper Tool Steel."

The Editor is wondering in this connection if there isn't a wide difference in the various ideas held by smiths as to just what shade of cherry is cherry red. In other words are you sure Mr. New York State Smith that your shade of cherry red is the same as that of Mr. Kansas Smith. Suppose, those readers who are interested in this subject send in an example of what they consider "Cherry Red." They may find the color expressed in ink on paper or in paint on wood. The editor will be glad to hear from interested readers.

MAGI THE WISE FORGER OF METALS

A Fable With A Moral That Needs No Telling

In the City of Soloman the Wise there toiled at forge and at anvil a smith who was known in all the country for his wisdom and wise counsel. And his name was Magi—meaning Wise One.

And it came to pass that one day a man, who was no longer young, paused at the forge of the Magi speaking! "Oh, Magi—thou great and wise one—far have I travelled, much have I seen and greatly have I spent and yet gaze upon me!—naught have I to show for that which I have spent so lavishly. Tell me then, oh, thou Wise One, how may I conserve what little remaineth of my substance so that I may receive the most for that which remaineth still to be spent."

And the Magi answered him saying:— "As the metals of Tubal my Father, and of Thor my god, obey the hammer only under the influence of the flame, even is it so. Thou has sought for things which are easily exchanged for gold and silver, yea even clay. And in thy hour of reckoning has thou found these things changed even to clay. Seek therefore, in that which thou purchase that which cannot be obtained for gold, yea, even for much gold. For,—that which is bought and sold can be of little value unless it contain that which cannot be bought and sold."

And the Magi's listener was even as the door post in his ignorance. And from the black depths of his ignorance he again spoke asking:— "Oh, thou wise and mighty—even in far countries have I heard of thy wisdom, and today have I come to find it even greater than they say. But in my dark ignorance can I not define thy meaning. Pray, therefore, unfold for me what to thy mind must be as a page written in letters of flame."

And thus spoke the Magi—and his words are of great import even unto this day:

"Oh, dull and unthinking—knowest not that which is more than great riches? Seek substances which have the Honor and Integrity of their makers wrought into the very fabric of their being. Seek not nameless things but those which having a name must needs be in keeping with that name."

Which Class Are You In?

These verses, written with apologies to the author of the original poem, are printed for the benefit of Shop Keepers, Service Men, Shop Owners, Salesmen, Merchants and Successful Old Scouts so that they can properly classify themselves.

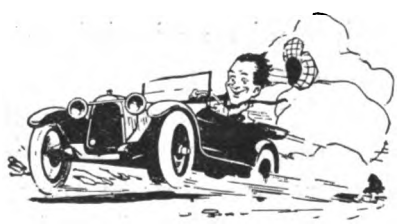
When a man comes in, and you grab his mit
As he wanders over to where you sit
And he asks you for a plug or ring
And he goes right out without one more thing—
Then you're a Shop Keeper.
By gad you're just a Shop Keeper.

When a guy blows in like a regular man
Says—"Can you help?" And you pipe—"I can."
And you work and sweat, and bang and slam,
Keep strictly mum just like a clam.—
Then you're a Service Man.
By gad you're a fine Service Man.

When you are as busy as you can be
And you keep shop things right up to G.
And you spend you're time in the place you run
And you hardly have time to take in mun.
Then you're a Shop Owner.
By gad, you're a good Shop Owner.

When you call at farm, home, factory and mill,
And you boost for your service, your work and your skill.
And you talk an' smile as you Work, Serve and Sell
And "cart wheels" and "sheckels" keep "ringing the bell."
Then you're a Salesman, A Merchant, a Successful Old Scout
And you don't need to worry for you'll surely win out.

High Spots



Just throw out your chest and Buck up. All good go-a-head men feel like failures at times.

Ol' Si Clone says: "Thars lots o' comfort an' contentment t' learn t' trust t' Providence especially of you've learned t' do yer darndess first.

An accurate set of books is necessary for the accurate running of business. A captain wouldn't think of running a ship without the aid of a compass.

A Steel Tape that when wrapped around the circumference of a circular object gives a reading of the diameter is said to be a recently produced tool.

"The Magneto" my son, said an experienced auto repair man" is a neat little piece of machinery that has something to do with electricity if you let it alone."

And now comes a motorless flight in a glider or motorless aeroplane, of over three hours duration. That seems like outdoing the birds at their own game. And still some folks maintain that we have reached the limit of developement.

"Them there revolving doors are certainly great inventions" said Sid Harnes upon his recent return from a visit to the big city." But the're a poor kind of a place to drop a dime." And Sid rubbed a certain part of his anatomy which had evidently been hurt.

Don't wait any longer. Get busy now on something that will fit right into these practical pages. You are glad to read the hints and kinks of other readers, and these pages are for just that purpose—The practical exchange of practical ideas, hints and kinks.

How about a Shoe Scraper for the back steps? Wouldn't it help the misses a bit if you made one during spare time? It can be made out of any cast off sheet metal and in almost less time than it takes to tell about it. Just try attaching one to the back steps and see if "she" won't be glad.

" How is it that your husband never drives?" asked the repair man as Mr. Ivory Dome's wife stopped for gas. "Oh, he can't change the gears, and I have to shift for my self "said Mrs. I. D., with a smile.

"Y'r prayers" answered Ol' Joe Grouch when asked what to learn first when starting to drive an auto.

Have you purchased you audiometer yet? Well, its an invention for photographing sound. Wonder what sort of a picture would result if you used the thing when some mallet-headed individual allows his motor to race, rattle and run for an hour or so under your snooze-parlor window just as you're trying to get back to sleep after pitching the boot-jack at the neighbors moon-baying hound!

It is fine to enjoy life as you go along and it is right too. But don't make a business or specialty of it. Ever notice what a sad failure that individual is, who makes a business of having a good time? Make a business of making your business give you an enjoyable time. Ever see a man who enjoyed business make a failure of it? A business which you enjoy carrying on will be carried on to success.

Tom Tardy is becoming quite a humorist. "How's business, Tom? "We asked as we stopped in at his tumble down shack the other afternoon. "Fine" called Tom sleepily from the depths of his arm chair. "I don't see many signs of it around here," we ventured. "Wal," returned Tom with a yawn and a stretch. "I ain't in the business o' work jes' at present I'm makin' a business o' gettin' a wink o' rest" and with that he stretched again and settled back for another snooze. We suggested that perhaps a bit of get-up-and-hustle would take the kinks out of his eyes. But only snores came from the arm chair.

LOOK AT YOUR WRAPPER

In order to serve our readers still better—in order to save time, trouble and annoyance we have for several months been printing the expiration date (month and year) right on your wrapper.

This is done for many reasons. It tells you each month just how your subscription account stands. It tells you just when to renew. It enables you to advise us promptly in case of error. Better look now on your wrapper to see if we have your date correct. Better look now and see if your renewal isn't due.

Work Shop Conveniences

G. A. LUERS

The Closed-Door Season is an excellent time to fit up new conveniences in the Shop, to put in new machines and to Re-arrange Shop Lay-outs for greater Efficiency. Here are a number of Suggestions that will add greatly to Work Bench Efficiency.

The average repair shop owner, when he has his benches in place, his vises placed and the machines located where experience has indicated they should be placed, considers everything ready for the go ahead signal. He however gives little or no thought, as a general thing, to the bench facilities for storing or keeping tools. Usually a drawer of two suffice for receiving in conglomerate mass each and every kind of tool that can be picked off the bench. In other instances, the hand tools are permitted to simply lie about the bench. Needless to say these systems or lacks of system, are not calculated to save time nor labor in the proper handling of bench jobs.

There are many different arrangements for the keeping of hand tools and supplies at the bench and each bench worker usually has his own pet scheme for keeping track of his own tools. Never-the-less, it is not wise, nor is it economy to toss hand tools into a bench drawer in the usual conglomeration of files, screw drivers, hammers, wrenches and what not. And at times the writer has seen even fine chisels put into the tool drawer with a lot of other tools. Needless to say, a chisel treated in this manner will not long remain fine.

The plan of tacking up a piece of leather so as to form loops for the insertion of tools is an old one and yet it is a very handy and yet simple means of arranging for handy tool storage. It has several draw backs however that will be readily recognized by any one who has worked before a bench so arranged.

A better arrangement for holding tools over the bench and so they may be readily accessible to the bench work is to place a thin wooden strip up on the wall back of the bench. This strip is held away from the wall by means of wooden blocks of increasing thickness as shown at X in the engraving. Thus arranged both large and small diameter tools can be held properly and conveniently by placing them in the slot of proper thickness. In this arrangement, pliers, pinchers, shears and similar tools are placed immediately over one of the wood blocks. The block then keeps the tool from dropping down too far for quick and easy handling, as one handle, of such tools, is placed on each side of the block.

In arranging for racks of this kind on the wall back of the bench, I think it an excellent idea to group tools of a kind together. In other words keep the files together in one part of the rack or in a rack above or below the other tools. Chisels, pliers, wrenches, hammers and similar tools if grouped may be easily arranged in a plan that can readily be followed when ever the tools are racked.

For the holding and handy storing of small parts the engraving shows a very simple arrangement fashioned from metal cans. Containers of uniform size are not necessary, but they will, of course, result in a better appearance. The cans are first trimmed as shown at Y in the engarving. If time permits and the shop owner is proud of his shop and its neat appearance the cans may be painted a uniform color. Black will of course be most suitable. This with neat white lettering indicating the contents of each box will make a small part arrangement for bench convenience that can hardly be improved upon and certainly not bettered for any less expense.

One idea that will be appreciated after this box container has been in use for any lengthy period is the simple precaution of punching several holes in the bottom of each container. These should of course be of such a size to prevent the parts from dropping through or even catching in the holes. And in the case of very small parts such as cotters, pins and the like, it will be best not to punch any holes. But if a few holes are punched in the bottom of those boxes whose contents are sufficiently large to prevent dropping through, the boxes can then be easily cleaned by brushing dirt and the fine particles of metal chips and the like, through these perforations.

A very convenient arrangement for taking care of small parts such as split rivets, coil parts, tire valve insides and similar items is illustrated in Fig. 2. This shows how the discarded covers of commutators can be conveniently arranged as containers for small parts.

The covers have the insulation and contacts removed. They are then mounted on the under side of the bench, near its outer edge, by

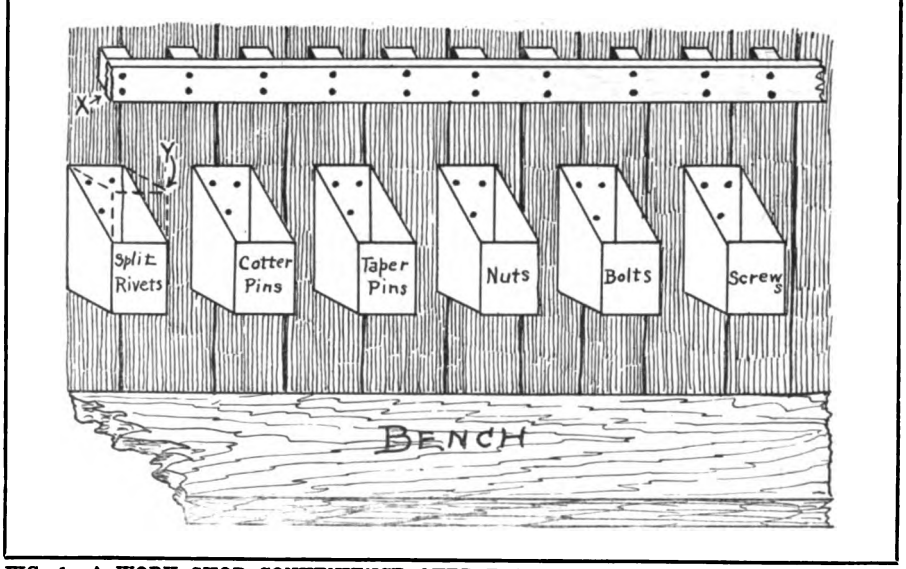


FIG. 1—A WORK SHOP CONVENIENCE OVER THE WORK BENCH THAT MAKES FOR EFFICIENCY, NEATNESS AND ECONOMY

means of a spacing sleeve and a round headed screw as shown in the engraving.

On the edge of the bench is tacked a small tab indicating the contents of each container. With this arrangement the small parts are not only kept neatly separate for convenience but they are also kept out of the way, the containers cannot be knocked over and the small parts spilled about the bench, and there is no danger of loss. Then also it is an easy matter to keep track of your stock of these small parts, when you keep them in one place and not scattered all over the bench or in several boxes or cans.

In the engraving Fig. 3 is shown an excellent arrangement for holding valves when overhauling the motor. As is usually the case in the average shop there is no arrangement for keeping the valves in the proper sequence or order when removed from the motor block. This simple suggestion holds them in readiness for replacement in correct order and avoids the delay of refitting valves which is necessary when the valves are interchanged.

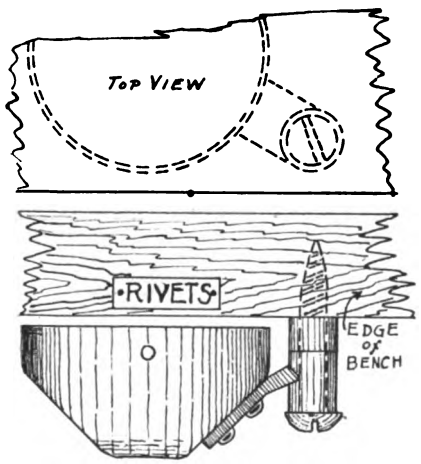


FIG. 2—ANOTHER SIMPLE IDEA THAT KEEPS SMALL PARTS SAFE AND HANDY

A block of wood one inch by three inches in section and about two feet long is neatly trimmed for the valve holder. The piece is now drilled with half-inch holes to hold the required number of valves. If for the valves of a four-cylinder block the holes may be drilled in one line. If for a six-cylinder block the holes may be arranged in two lines, though the block will then need to be wider. To facilitate valve replacement the cylinder numbers corresponding to the valves, may be indicated on the blocks between each set of valves. In placing the valves in the proper holes, the valves from the cylinder nearest the radiator are placed in the holes marked "I".

The method of attaching the block to the under part of the bench is shown clearly in the engraving. This permits the block to be pulled out from under the edge of the bench, the valves to be put into their respective holes and the block then pushed back under the bench and out of the way until wanted.

Cutting Tests for High Speed Tool Bits

The Bureau of Standards of the Department of Commerce recently completed sixty more tests of ½-inch tool bits made of several grades of high speed steel, which had been subjected to various heat treatments.

The steel used was the same for each test, containing .60% carbon, 3.5% chromium, 15.5% tungsten, and 1.6% vanadium.

The effect of the preheating temperature on the cutting qualities of the tools, as expressed by the pounds of metal cut, is interesting. This is shown in the table below:

Preheating (Time for cut 20 minutes)	Hardening (Time for cut 5 minutes)	Lbs. of metal cut per tool (4 tools tested)
1400° F.	2417° F.-oil	9.1
1500° F.	2417° F.-oil	10.1
1600° F.	2417° F.-oil	5.1
1600° F.	2417° F.-water	5.1

All testing conditions were the same.

The results obtained in using water for quenching were about the same as when using oil for this particular case.

Automobile Loadings Greatest On Record—Double Last Year's

Car Loadings of automobiles for shipment by the Michigan Central Railroad from Detroit plants this year have far exceeded all past records, according to comparative figures formulated by E. D. Bronner, Vice President in charge at Detroit.

A total of 55,045 carloads of automobiles were loaded in the first eight months this year, as against 25,724 in the same period of 1921, at the Detroit stations of the Michigan Central; an increase of 114 per cent.

August, 1922, was the banner month of history, with loading of 8557 carloads of automobiles, topping even the five preceding months, each of which passed the 7000-carload mark.

Shipments for the months of July and August, during the height of the shopmen's strike, were far in excess of the auto traffic of 1921. During July this year 2,988 more carloads of autos, or 73.37 per cent, were loaded on the Michigan Cen-

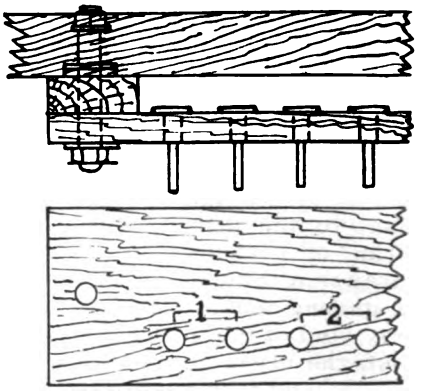


FIG. 3—A HANDY VALVE HOLDER THAT FACILITATES MOTOR ASSEMBLY

tral at Detroit than in July, 1921, or 7,060 carloads as against 4,072. In August the increase was considerably larger, being 105.99 per cent, with a total outbound traffic of 8,557 carloads this year compared with 4,154 cars in August, 1921.

An unprecedented increase of 497.6 per cent, or 3,379 carloads more than the 1921 figure, was shown in January, when 4,058 carloads of autos left Detroit as compared with 679 in January, 1921.

The comparative figures by months, with the percentages of increase, are as follows:

Month	1921	1922	No. Cars Increased	Percent Increase
January	679	4058	3379	497.64%
February	1740	5409	3669	210.85%
March	2948	7246	4298	145.79%
April	4580	7761	3181	69.45%
May	3914	7290	3376	86.25%
June	3637	7665	4026	110.69%
July	4072	7060	2988	73.37%
August	4134	8557	4403	105.99%
	25724	55046	29322	113.98%

August was the high-record month for the New York Central Lines taken as a whole, as well as for the Michigan Central, the total loadings of this traffic for this system of railroads being 15,867 cars, an increase of 498 cars over the previous maximum of June, 1922. The increase of August, 1922, over the same month of last year was 102.4 per cent, the loadings of August, 1921, having been 7838.

Heat Treating In Crucible Furnaces

Many of the Uncertainties of Heat Treatment as Experienced in the Earlier days of Steel Working are unknown to the User of Modern Steel Treatment Apparatus. The following account of the use of the Crucible Furnace in Treating Steel is both Interesting and of Practical Value. We are indebted to the Chicago Flexible Shaft Company for this account.

Heat treatment of steel in crucible furnaces is not an innovation, as the old steel masters knew of it and practiced it with varying results, dependent on their ability to judge the temperature of the bath. In those days pyrometers were either unknown or unreliable and Seger cones were relied upon for accurate results. The craftsmen of our father's days were trained to judge temperatures by color, and crucible furnaces using a molten bath did not readily lend themselves to this old method of judging temperatures, and the Seger cone could not be used. The top of the bath was generally covered with dross, or a slight film of oxide, thus making temperature judging rather difficult and generally too high. This charactertistic of crucible furnaces resulted in the production of overheated work and the process fell into disrepute, even though conceded to be an excellent method for heat treating.

A careful study of this type of furnace was made in later years, and with the development of the pyrometer to where it could be relied upon implicitly, crucible furnaces have come into their own, and are specified by many manufacturers for use in the production of exceptionally fine heat treated work.

Construction of Crucible Furnaces

Crucible furnace construction for the heat treating process is not simply placing a pot within a setting of brick and applying heat to it. Uniformity of heat is the prime object of the process, and this can be obtained only after careful design and experimentation; and again the flame should not strike the pot direct, for this will shorten the life of the pot considerably. The best design has been found to be the circular type. Such a furnace permits the placing of the burners so that direct impingment of the flame on the pot is prevented, and a swirling motion is given the flame, causing it to encircle the crucible at least three times before passing out the flue. This is true with either gas or oil fuel. With rectangular furnaces such economy is not realized, due to the short contact and high velocity of the gases in the combustion chamber.

In crucible furnaces pressed steel pots give greater satisfaction than either cast iron or cast steel, due to the greater ductility and higher relative heat conductivity of their thinner walls. The life of any pot is materially increased by proper regulation of the atmosphere within the combustion chamber. A reducing or soft flame is best.

Ovens vs. Crucible Furnaces

In comparing the oven type furnace with the crucible type, let us consider the different modes of transference of heat from the flame to the work.

In the oven furnace the heat is transferred by convection and radiation, as the furnace is so designed that the flame will not come in direct contact with the work. In the crucible furnace the heat is transferred by conduction, which is many times greater than any of the modes available in the oven furnace.

This is demonstrated by the example of one being able to hold the hand several inches away from a red hot object for quite a while, the heat being transmitted by radiation and convection, but knowing better than to touch the red hot object for fear of being severely burned, the heat being here transmitted by conduction. So great is the difference between the the two types that an illustration or demonstration is needed to convince the uninitiated before they transferred by conduction, which is using molten lead will heat the work up about 70 times faster than an oven furnace. It takes about 12 seconds to heat a piece of 3/16" steel in a lead furnace at 1450° F., while at least 15 minutes is required in an oven furnace maintained at 1450° F. Since the crucible furnace heats the work up so rapidly, it is imperative to preheat all work of uneven cross section.

Rapid heating is not the only advantage crucible furnaces have over other systems of heating steel. They heat uniformly, and this uniformity of temperature is throughout the entire crucible of molten salts or metals, and is a positive guarantee that the pyrometer indicates the exact temperature of the work. Non-uniformity in heating necessarily results in non-uniformity in cooling, which is the cause of most of the wraping and cracking in the hardening process, and hardening cracks are more often the result of uneven heating then defects in the steel, both of which are not inherent in the crucible heating process.

Overheating the work is without doubt the greatest weakness in the heat treating room, a practice countenanced rather too much by the foremen because the workman says, "O, I'll take it out when it gets to the right temperature I know when is right." Yes and No! but why have pyrometers at all? In crucible furnaces this excuse is not to be tolerated as the workman cannot see the work all the time, and it heats too rapidly for him to withdraw it at the "right time." It is an axiom of the heat treater that best results are obained by hardening a piece of steel at the lowest possible temperature, and always on a rising temperature, never a falling one.

The most important function of the crucible furnace, other than its delivery of rapid, uniform heat, lies in its production of work without any decarbonized surface or scale; in fact, when cyanide is used, carbon is actually added to the surface layer of the steel.

Uses of Crucible Furnaces

Crucible furnaces may be adapted to any requirements of the heat treating field, dependent entirely upon the man or organization. In the beginning they were used for heating only very small parts, where uniformity of "temper" was required, but larger furnaces have since been produced for handling large parts wherein uniformity of

hardness is essential at minimum expense.

Crucible furnaces lend themselves admirably to heat treating carbon steels, and similiar low temperature alloys hardening below 1600° F., using lead or some of the compounds in the market as the heating medium. For high speed steel barium chloride was formerly used exclusively, in spite of its shortcomings, but today this salt has been displaced to a great extent by other compounds. For hardening of high speed steel, however, the crucible furnace has fallen into disuse within recent years, being replaced by the oven type furnace and double deck furnace, due principally to the fact that high speed steel parts are generally not very large or numerous.

The use of the crucible furnace for tempering at any temperature below 1200° F., is quite common. For lower temperatures the oil tempering furnace is used. This furnace when a high flash point oil is used will operate as high as 650° F., nicely, after which a furnace of the rectangular crucible type, must be used with an alloy of lead and tin as the heating medium. Using the crucible furnace for tempering overcomes the many weaknesses of the color tempering process, removing the personal element and cutting down labor costs to a negligible figure, as thousands of parts can be tempered at a time.

Carbon steel is the most generally used grade and where this steel is to be hardened lead works very satisfactorily. Here are a few suggestions in using lead: In the first place, a hood must be installed over the furnace to carry off any lead fumes which may arise from the pot. Charcoal or old carburizer may be used to cover the surface of the lead and prevent oxidation and lessen the sticking of the lead of the work. In no case should any dross be thrown away, as it can be reduced back to the metal while red hot on top of the pot by means of charcoal.

It is common knowledge that when a piece of steel is heated in an oven furnace in which an oxidizing atmosphere is maintained, its surface is decarbonized for quite a depth. This cannot happen in a lead pot, and for this reason the lead pot furnace continues to be, as for years, the one furnace in which files can be successfully hardened.

Baths for Use in Crucible Furnaces

Many baths and compounds are on the market, any of which should be satisfactory, providing their melting points are correctly chosen for the temperature at which they are to operate. For example: If a drawing temperature of 720° F., is desired, a temperature too high for oil and a trifle too low for lead (M. P. 621° F.), as it would freeze all over the parts and be slow work, some tin could be added to lower the melting point to 450° F., or a mixture of potassium nitrate 2 parts, sodium nitrate 3 parts, melting at 450° F., could be used.

A table of the salts commonly used to compound these baths follows:

Salt	Melting Point F.
Barium Chloride	1580
Sodium Chloride	1418
Potassium Chloride	1346
Calcium Chloride	1328
Magnesium Chloride	1306
Lead Chloride	932
Cupric Chloride	928
Ferric Chloride	572
Zinc Chloride	504
Aluminum Chloride	356
Potassium Carbonate	1526
Sodium Carbonate	1317
Lithium Carbonate	1283
Potassium Nitrate	644
Sodium Nitrate	572
Calcium Fluoride	1832
Magnesium Fluoride	1664

Of the above salts calcium chloride combined with sodium chloride and admixtures of sodium carbonate are most generally used.

One of the most common baths is lead of commercial purity, which melts at 621° F., and may be used to 1600° F., satisfactorily. In order to prevent the adherence of the lead to the work it may be dipped into a solution made up of 1 pound potassium cyanide dissolved in 1 gallon hot water, and **thoroughly** dried.

Summary

1. Crucible furnaces for heat treating have been in use after a fashion for many years, their revival and widespread use today being occasioned by the perfection of the pyrometer, whereby the temperature may be controlled.

2. The construction of a crucible furnace is the result of considerable experimental work, the circular type being found most satisfactory.

3. Comparative merits of the oven type furnace when compared with the crucible type show the crucible furnace to heat the work at least 70 times faster without scale, decarburization or non-uniformity, which tends to produce better work.

4. High speed steel and carbon steel hardening and tempering are all done in crucible furnaces very satisfactorily. High speed steel hardening in barium chloride is being abandoned in favor of the double-deck oven type furnace, due to the preheating feature. Carbon steel, readily hardened in lead or any of the numerous salts, compounds or cyanided, is being carried out more than ever in the crucible furnace, because of its many desirable features. Oil or low temperature tempering is commonly done in a crucible furnace.

5. The use of lead as the heating medium for carbon steels is common practice.

6. Many salts for heating mediums are on the market, all of which are compounded from a certain series of salts, a table of which is given.

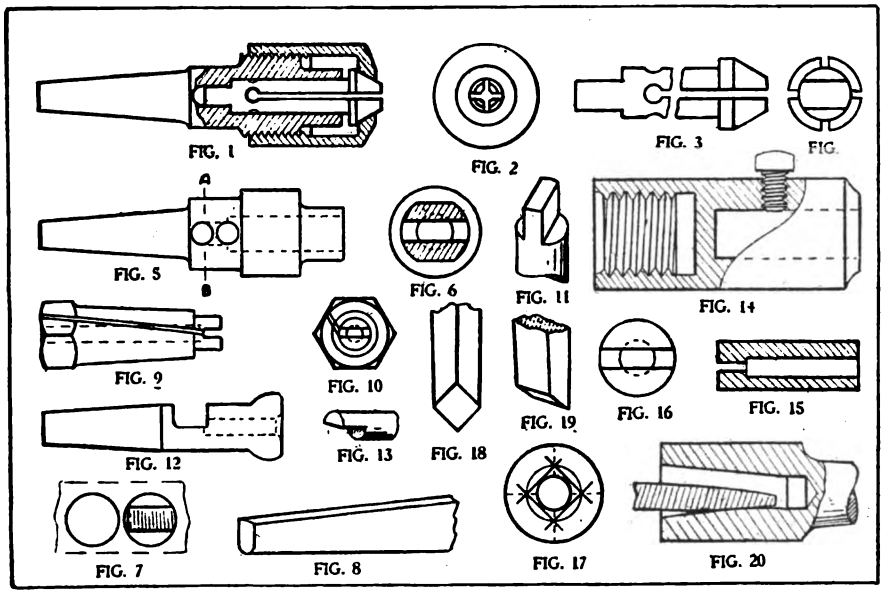
The use of the crucible furnace is now established as one of the most accurate and satisfactory methods of heat treating small parts in quantity, where scale or decarburizing cannot be tolerated or where an increase in the carbon on the surface is desired by cyaniding. The process is productive of accurate work, uniformly heated, even when unskilled labor is used.

Making Drill Chucks

There are several methods of chucking a set of small drills says A. R. English Work, and the simple methods are shown in the accompanying illustrations; they have been selected as being more suited to the requirements of the average mechanic. Fig. 1 shows a part section of a drill chuck for holding parallel shank drills. The chuck is intended to fit the lathe spindle in place of the usual lathe centre (thus it may be used in the headstock for drilling on stationary objects), or it may be fixed in the tailstock barrel and fed against revolving work. Dimensions are not given, as they will vary with individual requirements. The figure in question is reproduced half-size; it will be noticed that the drill is carried in easily-detachable solid spring dies with four sawn slots meeting four drilled holes at the ends of them. The shank of the die has a flat tongue, giving a positive drive by engaging in a slot in the body of the chuck. A screwed socket in contact with the coned

front end of the die compresses the spring jaws centrally on the drill.

The front end view is shown at Fig. 1. The spring die is made from a brand of steel that can be hardened and tempered; the object of a drilled hole at the end of each sawn slot is to prevent fracture, or further development of the slot as would happen if left abruptly sharp by a saw cut. Fig. 3 is a side view of the die and Fig. 4 a back view, showing the flat tongue formed by filing down a couple



Making Small Drill Chucks. Fig. 1.—Small Chuck. Fig. 2.—Front End View. Figs. 3 and 4.—Side and End Views of Die. Fig. 5.—Body of Chuck in Fig. 1. Fig. 6.—Sectional View of Body. Fig. 7.—Method of Drifting a Slot. Fig. 8.—Shape of Cutting Drift. Fig. 9.—Taper Shank Chuck. Fig. 10.—End View of Chuck. Fig. 11.—Tenon Formed on Shank. Fig. 12.—Simple Drill Chuck. Fig. 13.—Drill Filed to Fit Slot (Fig. 12). Fig. 14.—Large Drill Cnuck. Figs. 15 and 16.—Sockets for Large Chuck. Fig. 17.—Marking Off Square-hole Chuck. Figs. 18 and 19.—Chisels. Fig. 20.—Section of Square-hole Chuck.

of equal flat surfaces. When making the die or any portion of the chuck it is advisable to have the material at least twice the length of the finished portion, as this facilitates chucking between centres and holding in the vice.

Fig. 5 shows the body of the chuck, the screwed portion shown blank; the dotted lines show the internal hole and the slot when finished. The formation of this slot is effected by drilling a pair of holes through the body of the chuck, and of a diameter smaller by one-third than the longitudinal hole. The surplus metal between the holes leaves a slot, shown in section at Fig. 6. The section is taken on the line AB (Fig. 5). A pair of flats parallel with the slot and formed outside makes a convenient drive for removal by a spanner. All taper shank chucks and lathe centres generally should be so fitted with spanner flats. The usual workshop practice of making slots by hand labor is to use successive wedge-shaped cutting drifts to remove the metal between consecutive drilled holes. Fig. 7 represents a case in point; the shaded portion is the first wedge-shape drift rounded on the back and with cutting edges on the front. Fig. 8 shows a portion of the wedge in general view. It will be seen that driving the wedge or drift in will cut or burst out a portion equal to its width, and that a second or third, each slightly wider, will finish the slot, or at worst only leave a small portion each side to file out.

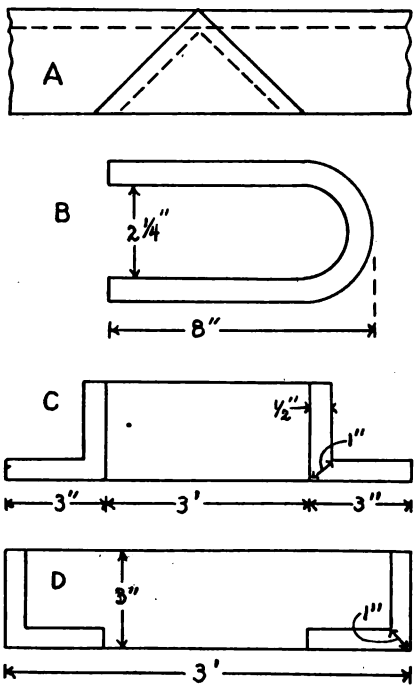
Another form of taper shank drill socket is illustrated in side view at Fig. 9, and back end view in Fig. 10; it is suited for parallel shank drills of ¼-in. diameter or more if the taper diameter is large enough.

In making, first of all turn and fit the taper to the correct angle, and when trying it in the taper hole of the mandrel, rub chalk on the taper part and grind it to the mandrel with medium hand pressure for one revolution; this will on removal show the hardest places of contact where the chalk has been completely rubbed off. Mount again in the lathe and run fast, easing these hard places with a fine-cut file, test again and repeat the operation if necessary. Now file the six flats for the spanner, and cut off the surplus metal used by the lathe "carrier." Mount the socket in the lathe headstock and the steel square centre in the poppet mandrel, and feed the latter towards the blank socket while running; this method will truly centre the socket previous to drilling, and the greatest care is required to get a true start for the drill. The drill can be held by a small carrier and fed by the tailstock centre against the centre in the end of the drill and with the shank of the carrier resting upon the top slide or upon the T-rest. Some mechanics prefer this type of chuck with a single slit or saw cut, and at a slight angle as shown in Figs. 9 and 10, thus causing it to spring in and grip the drill shank firmly. A positive drill drive may be obtained by forming a slot at the end and filing a tenon on all the drills of its size, as shown enlarged at Fig. 11.

The most simple form of plain hole chuck is shown in Fig. 12. After the chuck has been fitted and drilled as far the dotted lines it is removed and put in the vice, then a slot is filed down as far as half the diameter of the hole. The ends of all drills for this chuck have their ends filed down to half diameter, as shown at Fig. 13; the hole must be drilled a push fit for the rods the drills are made from, with this type of chuck.

Some machines are provided with a drill chuck to screw on the nose of the mandrel. This form of chuck is shown in part sectional view at Fig. 14, and is usually furnished with a parallel hole of ¼-in. diameter and a set-screw for securing the drills, which must have their shanks all of the one diameter irrespective of their size. Another method is to make two or three sockets having their central hole drilled to suit the rod from which any particular set of drills were made. One of these sockets is shown in section in Fig. 15; it has a slot for positive drive, also shown enlarged in Fig. 16, to receive drill shanks filed as shown in Fig. 11. The metal-turning lathe is occasionally required for woodturning, and the majority of bits and cutters for woodwork having tapered square shanks, it is convenient to have a chuck to suit them. Cutting and finishing the square hole is the only difficult operation in connection with its production, but it is rendered easier if the following method is followed: Having fitted the shank, turned up the outside diameter and

cut it off to the required length, carefully centre for drilling the centre hole, whose diameter is the size measured across the flats of the bit—not the angles—about 1/8 in. from the small end. While the chuck is still in the lathe set a point tool in the rest to cut a light circle on the face of the chuck and having a diameter equal to the shank of the taper bits, measured across the corners or angles near the big end of the taper. Divide this circle into four, centre pop, and connect with scribe lines as at Fig. 17; remove from the lathe and file two parallel flats on the body of the chuck ¾ in. long from the back end of the parallel part. This is for removal by a spanner, but primarily for securely holding in the vice when chipping down the angles with a diamond-point tool (Fig. 18) and trimming the side



MR. JAYNES ARTICLE ON HELPFUL HINTS IS JUST FILLED WITH PRACTICAL SUGGESTIONS

with a diamond-point and side chisel ground as shown at Fig. 19.

It will be found on cutting and filing out an internal square on this description there is always a tendency for the flats to become rounded or humped in the centre; therefore the tapered square file with a bit of its point broken off should be firmly held in the position as indicated in Fig. 20, when the metal can be filed off. The method is a little tedious, but necessary to obtain a flat surface, as shown above the file.

A Goodly Collection of Practical Hints

WM. JAYNES

Editor's Note:—Mr. Jaynes has been a reader of "Our Journal" for a great many years—he sends in the following grist of practical helps in appreciation of the practical help he has had from these pages. Mr. Jaynes article is just filled with good hints and we ask other of our practical and experienced readers to follow Mr. Jaynes lead. There can be no doubt of Mr. Jaynes ability as a practical smith and experienced craftsman.

Suppose we want to bend 3-inch angle iron, about ⅜ of an inch thick. If we cut out 6 inches of stock we leave nothing for welding so allow ⅜ inch on each side. If you wish a round corner it is ready after fullering edges to bend. If you need a square corner, make a staple of ⅞ inch iron as at B. Heat your angle and fill out the corner about ½ through the staple tapering from edge to inner corner. To weld, place a piece of 6-inch pipe upright over tuyere hole, and beat wet fine coal down all around. Now withdraw the pipe and you should have a 6-inch hole about 12 inches deep. Make a fire and then fill up hole with small pieces of coke; no flux is needed when the fire is clean. Make all bends before welding.

When making bends of 35% angle or 60% make one cut and then bend to correct angle, you can cut out what you need without making a mistake. Placing a firebrick on top of the weld helps to draw up the heat.

To Measure Angle Iron for Rings

When the flange is on the outside add twice the thickness of ring in the corner to the diameter and multiply by 3-1/7. For example take the ring at C. Here we have a three foot circle. The corner is 1 inch thick. Therefore we figure part or 36 inches plus 2 inches times 3-1/7 or a total of 149-3/7 inches.

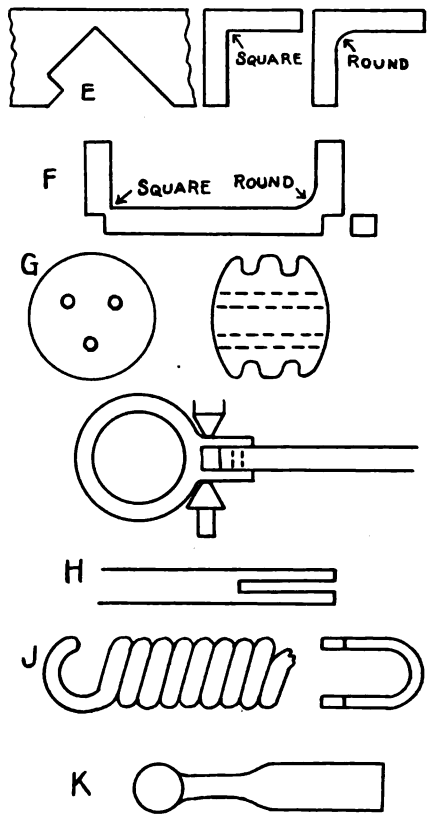
To measure angle iron for rings when flange is on inside; take 3 ft. and subtract twice the thickness of the corner and multiply by 3-1/7. This gives us 36-2x3-1/7 or 106-6/7 inches.

To leave a round corner on the welded side cut out the piece as shown at E. Turn the little piece right over and when welding with it, spread it out, and then a half round chisel will give the correct circle.

Square Corners of Square Stock

One way to bend square iron for axle is to cut half way through and bend leaving a square or round inner edge. Now weld in a piece in corner to suit as shown at F.

When I make dead eye straps for vessel chain plates, I always make a ring of 2x⅜ inch not welded. she size of my dead eyes and hold a piece of my hand the width of



THE SHOP OWNER WILL FIND MANY PRACTICAL HELPS IN MR. JAYNES ARTICLE

the chain plate eye. (See G in engraving). This has an eye to take a pin ⅛ inch larger. This method allows a good circle and draws strap tight. This strap is bent double and welded in one eye, sometimes ⅞ or ¾ inch.

Whenever you need a hot saw in your shop, just remove your emery wheel from the stand and place your 12 inch or larger saw on it, place a box with enough water in it to cover one inch of the saw and keep adding water as it splashes out. Also make a water tight cover to keep in all water leaving only a small space for hot iron. I am now splitting ⅞ inch iron, 3 inches on the end; a mighty slow job for anvil work, but only 3 or 4 seconds for the saw. (See H.) I made a cover to keep down all sparks and also put a balance wheel on the other end.

If you ever wish to shrink a wide

(Continued on page 261)

Tales of Trips and Tours

BY

"WANDERER"

The tales here related are the experiences of a traveller through the highways and by-ways of the country districts. In his wanderings about he meets many members of the craft, stops at many shops and has many experiences. The tales of his experiences are interesting and carry with them many practical suggestions. They run the entire range of craft activities as will be noted as you follow his tales month after month. The experiences he relates are Facts not Fancy.

New Parts for Old

Someone said at one time that there is nothing new under the sun, but I came across a new advertising stunt recently that is very new, at least it is to me and so far to everyone to whom I have told the story. And as for advertising stunts, the modern advertising man has to be up quite early to develop anything new.

This stunt was not developed or thought out by one of these modern publicity experts, nor by any of the super-experts with bulging brow and heavy goggles.

It was just a plain everyday general shop owner. A man whose father and grandfather were just plain blacksmiths. Hard working, honest mechanics who knew their trades and professions as few of even the modern super-experts know theirs. And yet in their day they were just plain blacksmiths.

And this man, coming from a line of smithing ancestors has worked out an advertising stunt that has made his shop the talk of the country side.

I don't know how the idea happened to be born, nor do I care, the fact remains that Charley Turner has put his shop on the map, so to speak, in a section of the state where competition is very keen.

At first thought, there doesn't seem to be much of an advertising idea in the offer to replace old parts of implements, automobiles, trucks and tractors free of charge. Nor does the offer to give a shoeing free to the oldest horse seem to hold much of advertising value. Yet that is what Charley Turner did and is doing with profit and advertising value.

Of course, were the idea just that and nothing more, Charley would no doubt, have abandoned the stunt long ago. But he has worked it out into a fine piece of advertising.

In the first place he has taken his local editor into his confidence. As I said, Charley came from an old line of smiths. His great grandfather was one of the earliest settlers in or near this present location. For years there has been a Turner Smith shop. And when Charley was old enough he too became a smith.

As an old family with many branches in the region, the local editor must know the Turners. And Charley made good use of that acquaintanceship.

He told the editor of his idea and frankly asked his help.

Like most smith shop owners, Charley was not blessed with a great deal of money for advertising purposes; or at least he didn't think so. However, it did not take him long to see that money wisely spent in advertising was really an investment and not an expense.

With a line of ancestors such as Charley Turner had, he was of course chained right up to the smithing business just as though he were the original Tubal Cain or King Solomon's right hand guest. And so it was most natural that the butcher, the baker and the corn stalk maker should come to "Turner's Shop" with their horses, and horse vehicles. And so it was most natural that when the auto came along that Charley should rather scoff at the idea of the new horseless carts and stick to his horseshoeing and horse vehicle work. For he was busy, kept two men all the time and why worry.

But—well, it was the same old story. When Charley woke up he found two garages in town, a battery and tire service station and—

TURNER'S FIRST ADVERTISEMENT ANNOUNCED HIS PECULIAR CONTEST IN A MANNER CACULATED TO SHARPEN CURIOUSITY

a greatly diminished trade in his chosen lines.

It was then he cast about for a remedy—a way to regain his lost ground. And it was then he went to his friend the editor of his town newspaper and told him of an advertising stunt that seemed rather foolish at first thought.

In Turner's first advertisement he simply made an announcement that each day until further notice he would present some service or some article free of charge to some customer of his shop. This, he further explained to the readers of his advertisement was for the purpose of fully acquainting them with the kind of service they could get. The first advertisement is reproduced in Fig. 1.

This started things going. At first there was just a mild interest, but as folks read the names of people they knew they were not long in looking for Turner's ad.

With the first announcement the Editor friend gave Charley Turner a nice story or write-up in the news column. The editor here talked up the origin of the Turner shop. How it had grown in service from that of a general smith shop to its present enlarged service, and then he told of the special free offers that Charley Turner was going to make. This write-up helped a whole lot.

When someone a bit more prominent in town and county affairs was declared a winner, the editor gave the matter news mention. When the winner came from an especially remote section of the county or from an adjoining county, this was also given special mention.

The second advertisement shown in Fig. 2 will show how the idea was worked out in simple wording, in a minimum space and how one advertisement naturally led to the next one.

In the second advertisement the offer is simply stated and then four items of service are mentioned. And those four items are tied right up to the offer.

In the third advertisement Fig. 3, the offer is one for horse owners and the fact that horse remedies sold is brought out. Also notice how Turner makes that free fan belt do its advertising duty. Can you imagine a man getting a fan belt free and not talking to his friends about it? Can you imagine his friends permitting him to get by without showing them that fan belt?

The advertisements as shown in Fig. 3 were pretty much standardized but occasionally Turner made a change when an especially old item of some kind was brought in and awarded the free service.

Thus when an old family carriage was brought to the shop it was made much of in the next days ad. The owners name was given, the year the vehicle was built and the thing worked up in special style. On another occasion an old farm wagon won a can of axle grease. This wagon had been built by Turner's grandfather, and this fact too was strongly featured.

Some of the offers made may be briefly mentioned as they may contain an idea for others:—

For the owner of the oldest mowing machine choice of binder twine or farm machine oil was offered.

To the owner of the oldest Buick Car was offered lubricating oil, a wind shield cleaner, or an inner tube.

And the mention of that inner tube reminds me—Turner also took several manufacturers into his scheme and one tire maker who wanted representation in Turnerville gave Charley several inner tubes to give away. Of course, in any offers the brand or make of the tube, oil, or other article was always mentioned. And when the winner was announced Turner never failed to mention in his advertising the matter of asking the winner about the item he won. This, of course made the advertising of interest to the makers of the advertised articles and helped Charley very materially in reducing expenses.

In commenting upon his scheme Charley says:—"It certainly has put us on the map here. It has told everybody just what service we render, it has directed attention to our shop and it has started folks to talking in a favorable way about us. You see, there is hardly anybody that doesn't like to see his name in print and that ad of mine gives somebody a kind gentle slap on the back every day. I suppose someday we'll run out of old things to dig up and give prizes to, but so far we've been pretty lucky. Of course, I keep my eyes pretty well open all the time and I very often see an old machine or tool of some kind and I aim an add directly at it. And occasionally I get fooled, too. Some weeks back for example I saw an old Reo in the old carriage shed of one of our

THE SECOND ANNOUNCEMENT EXPLAINED THE CONTEST AND OFFER. THIS SAME OFFER AND PLAN CAN BE WORKED ON A WEEKLY BASIS AS WELL.

well-to-do old timers just a little ways out of town. He happened to be one of the few old timers in this section who did not trade here—an old trouble with my father being the reason—and you can just bet that I made it a point to land that old Reo owner for a prize. So I planned for a couple of weeks in advance. I got some fine items from the jobbers to offer and two tubes from the tire house and while the prizes were somewhat more than usual, I figured it was worth it. In the meantime I gave the inside dope to my editor friend and he made it a point to tell the owner of the old car. But —here's the joke—right after my much desired customer comes along in his old Reo (it was an old touring car) one of the old one—lung runabouts comes coughing up to the shop. The owner said he had been almost all day trying to get here and of course he claimed a prize.

However, I saved the day by giving a prize to each of them, and you can just bet I made the ink fly the next day when I told of it in the paper.

"Yes it has cost something, to put it across. It has meant a lot of work. It has meant a lot of running around in order to do the thing right. But it has paid and is paying well. We have trade talking about us and coming to us and that after all is what advertising is for. But then I'm no advertising man and don't pretend to know a thing about it. All I know is that this particular scheme has worked for me and brought me business."

A Goodly Collection of Practical Hints

(Continued from page 258)

band say 5x⅜ inch try heating it all over and then cool off half on its edge, this will tend to upset the other half. Now reheat and dip other edge, and continue thus until brought to size.

How would you like to repair a coil spring making a shackle the same or a little less in diameter than spring. I did this on an Ajax rivet machine spring. With a screw on shackle it gives a more direct and even pull than the hook end. This is a good way if you wish to avoid heating the spring.

To make small shackles solid on the anvil, take a piece of ¾ inch or larger soft steel and turn in a lathe as at K leaving a ball which may be flattened to suit. Make a bottom swage for the anvil and a top to hold in the hand, heat both and place turned piece between them and hammer together. Now file the edges smooth.

Pep In Staid New England

New England and New Englanders are supposed to be rather conservative than otherwise in their activities both business and social. But there is at least one up-and-doing business house that even the breezy and pushing Westerners will have difficulty in equalling.

Chase and Bodwell over in New Hampshire are members of "Our Journal Family." They do horseshoeing, wagon and carriage work, implement repairing, automobile and truck repairing, tool and steel work and lawn mower grinding.

A fine general shop you will admit.

In addition they sell tires and tubes and auto springs and other accessories.

A logical line you will say.

And then to top it off and make their service and shop complete they sell electric washers, harness and blankets.

And last year they not only put in the electric washers but they sold eighteen of them. They also sold five sets of harness and two dozen blankets.

All of which to our way of thinking is going some.

And here is a sample of what can be done if the business go-getter will go out after business instead of being satisfied to calmly wait for things to come his way.

Metal Lapping

Lapping refers to an accurate mechanical process for producing planes with abrasive material says the Melting Pot. Lapped surfaces are both accurate and smooth, if care is taken in the operation. Lapping is often performed dry on a carefully prepared master surface called a lap. Laps are cast iron or tin impregnated with fine abrasive material. The work is rubbed over the prepared material until all unevenness is removed and a highly

(Continued on page 263)

OUR HONOR ROLL

THE DATE IS ON YOUR WRAPPER

The date upon which your subscription expires is now printed on your wrapper. Look for the date—then you'll know just how you stand on our records.

Look to your wrapper and then to the Long-Time Rates—they'll save you time, trouble and money. Note the rates below and the saving you can make. It is worth something to us to have you subscribe for several years in advance and we make it worth something to you. It is well worth your while to take advantage of these money-saving rates.

OUR LONG TIME SUBSCRIPTION RATES

	U. S. and Mexico		Canada		Other Countries	
2 yrs.	$1.60	save $ .40	$2.00	save $ .50	$2.50	save $ .50
3 yrs.	2.00	save 1.00	2.70	save 1.05	3.50	save 1.00
4 yrs.	2.50	save 1.50	3.20	save 1.80	4.20	save 1.75
5 yrs.	3.00	save 2.00	3.75	save 2.50	5.00	save 2.50
10 yrs.	5.00	save 5.00	7.00	save 5.50	9.00	save 6.00

These rates enable you to put your name on the Honor Roll with little trouble and at the same time to make a real worthwhile saving in money. Even on a two-year order you save 40 cents. (50 cents in Canada and Other Countries.)

If your name is not on this list make plans now to have it appear on the next list.

S. G. Sllar, Ala. ..... June, 1950
H. Pass, Minn. ..... Dec., 1941
E. Krehbiel, Colo. ..... May, 1937
The Fix-It Shop, Utah ..... July, 1935
J. W. Olds, Kansas ..... May, 1934
P. Cocks, S. Aust ..... Sept., 1934
J. Torrey, Mass. ..... Dec., 1933
D. Elledge, Nebr. ..... Mar., 1933
L. White, Vt. ..... Feb. 1933
R. Tompkis, Texas ..... Sept. 1932
Anton Olson, Minn. ..... June. 1932
Pat Martin, Nev. ..... June, 1932
David Miller, Pa., ... June, 1932
A. F. Mildebrandt, Mich. ..... May, 1932
Chas. Hubman, Colo. ..... Mar., 1932
Ed. Ankerman & Sons, Ohio ..... Mar., 1932
V. Z. Vanourek. Wisc. ..... Feb., 1932
J. Gamble, N. D. ..... Feb. 1932
Otto Dannemann, Minn. ..... Jan., 1932
J. E. Erickson, Minn. ..... Jan., 1931
Roy Brown, Mo. ..... Dec., 1931
Clint Gilland, Ark. ..... Dec., 1931
Weston Carriage Co., Fla. ..... Oct., 1931
C. Graf & Sons, Ohio ..... June, 1931
F. Victorino, Hawaii, T. H. ..... July, 1931
A. Rice, Pa. ..... May, 1931
C. Crossen, Ill. ..... Feb., 1931
W. Waldorf, Ore. ..... Feb., 1931
W. Watt, Kans. ..... Dec., 1930
W. Waldeck, Ind. ..... Nov., 1930
O. Colwell, R. I. ..... Oct., 1930
A. Reeve, Fla. ..... Sept., 1930
Frank Kodisek, No. Dak. ..... Aug., 1930
J. Huntington, Calif. ..... Aug., 1930
H. Sherman, Pa. ..... Aug., 1930
A. Ross, Scotland ..... July, 1930
E. Stroup, Ind. ..... July, 1930
C. Hawkins, Ore. ..... May, 1930
G. Lawrence, Mass. ..... Mar., 1930
J. V. Ober, N. D. ..... Feb., 1930
A. Danielson, Wisc. ..... Feb., 1930
Chas. Terwilliger, N. Y. ..... Feb., 1930
J. Sefcik, Kans. ..... Jan., 1930
J. Ennis, N. J. ..... Jan., 1930
E. Curtiss, N. L. ..... Jan., 1930
C. Fischer, Ind. ..... Jan., 1930
T. H. Joslin, Mass. ..... Dec., 1929
J. Gronlund, Conn. ..... Dec., 1929
R. Wilson, Md. ..... Dec., 1929
Geo. J. Lauer & Sons, Mo. ..... Dec., 1929
C. C. Lewis Co., Mass. ..... Oct., 1929
Fred Ruch, Mo. ..... Sept. 1929
C. Winslow, Calif. ..... Aug., 1929
N. Smithson, Tex. ..... Aug., 1929
M. Bernardi, Calif. ..... July, 1929
J. Wilder, Mo. ..... May, 1929
J. H. Schwartzman, D. C. ..... Mar., 1929
C. Vanblad, Pa. ..... Mar., 1929
A. J. Cook, Calif. ..... Apr., 1929
J. Bulley, Vt. ..... Feb., 1929
F. Price, S. C. ..... Jan., 1929
New Jersey Reformatory N. J. ..... Jan., 1929
Eugene R. Marshall, Wisc. ..... Dec., 1928
S. S. Albright, Calif. ..... Dec., 1928
F. Trelegan, Calif. ..... Dec., 1928
J. Wind, Ky. ..... Dec., 1928
M. Malenock, Pa. ..... Dec., 1928
E. Krueger, Wis. ..... Dec., 1928
Geo. V. Popp, N. Y. ..... Nov., 1928
J. Wurst, Fla. ..... Nov., 1928
H. Ellenbarger, Tex. ..... Nov., 1928
A. Brookman & Co., Vict., Aust Sept., 1928
J. Vaichetti, Colo. ..... Aug., 1928
D. Dyson, Cuba ..... Aug., 1928
T. Farrish, Wash. ..... July, 1928
Fred Sturgeon, Mo. ..... June, 1928
D. Rumsey, So. Africa ..... June, 1928
J. Uts, Ill. ..... June, 1928
C. North, N. J. ..... June, 1928
K. Reimer, Manitoba ..... June, 1928
W. Cronwell, Pa. ..... May, 1928
P. Schnedre, Pa. ..... May, 1928
John Laux, Okla. ..... Apr., 1928
J. Miles, Ky. ..... Apr., 1928
E. Harris, N. Y. ..... Apr., 1928
H. Hangse, N. D. ..... Apr., 1928
L. Bergouts, Pa. ..... Apr., 1928
S. LeClair, Vt. ..... Apr., 1928
John L. Schulte, M. ..... Mar., 1928
E. G. Jones, New Zealand ..... Mar., 1928
F. Ulrich, Calif. ..... Mar., 1928
J. Eyre, Nebr. ..... Mar., 1928
E. Wilner, N. Y. ..... Mar., 1928
H. Boger, N. C. ..... Mar., 1928
A. Simpson, N. D. ..... Mar., 1928
Waddington Farm, W. Va. ..... Mar., 1928
P. Costa, Terra Haute ..... Mar., 1928
G. Smith, New Zealand ..... Mar., 1928
A. Black, Calif. ..... Feb., 1928
L. Eisenhart, Idaho ..... Feb., 1928
A. Wible, Md. ..... Feb., 1928
W. Rogers, Md. ..... Feb., 1928
S. Hetem, So. Africa ..... Jan., 1928
N. A. Englund, Iowa ..... Jan., 1928
L. Larsen, Nebr. ..... Jan., 1928
J. Barnhart, Pa. ..... Jan., 1928
J. Burns, Conn. ..... Jan., 1928
S. Portelance, Quebec ..... Jan., 1928
Frank Wankum, Mo. ..... Dec., 1927
G. H. Esarey, Ill. ..... Dec., 1927
C. Forrest, Calif. ..... Dec., 1927
R. Leventon, Calif. ..... Dec., 1927
F. Vanneter, Calif. ..... Dec., 1927
J. Kirsten, So. Afr. ..... Dec., 1927
R. Keeney, Colo. ..... Dec., 1927
G. Travis, Ill. ..... Dec., 1927
E. Lewis, Iowa ..... Dec., 1927
J. Forschel, Tenn. ..... Dec., 1927
D. Meason, Scotland ..... Dec., 1927
J. Templeton, Scotland ..... Dec., 1927
G. A. Guensel, Texas ..... Nov., 1927
S. Frey, Ind. ..... Nov., 1927
A. Wilson, Iowa ..... Nov., 1927
Morley Garage, Mo. ..... Nov., 1927
B. Miller, Ark. ..... Nov., 1927
O. Roberts, Calif. ..... Nov., 1927
H. Fackiam, Wisc. ..... Nov., 1927
J. Staats, Mo. ..... Nov., 1927
W. N. Secofield, Mo. ..... Oct. 1927
Robert Murray, Calif. ..... Sept., 1927
W. Morrison, Calif. ..... Sept. 1927
W. Wilson, New Zealand ..... Sept., 1927
W. Morrison, Calif. ..... Sept. 1927
F. Bock, Nebr. ..... Aug., 1927
D. Lyon, So. Africa ..... Aug., 1927
E. Delay, Ill. ..... July, 1927
W. Gottstein, Aust ..... July, 1927
John Forest, N. B. Can. ..... June, 1927
W. Patterson, Okla. ..... June, 1927
W. Egly, Pa. ..... June, 1927
A. Gooding, So. Aust. ..... June, 1927
W. Geer, Pa. ..... June 1927
A. Mellum, N. D. ..... June., 1927
R. Wilson, England ..... May, 1927
J. Brenneman, Va. ..... May, 1927
C. Stebbins, Kans. ..... May, 1027
J. Devero, Iowa ..... Apr., 1927
F. Bruschi, Calif. ..... Apr. 1927
S Forman, N. J. ..... Apr., 1927
H. Dyressen, N. D. ..... Apr., 1927
M. Griffin, Conn. ..... Mar. 1927
E. LeClair, N. Y. ..... Mar. 1927
P. Flanagan, Calif. ..... Mar., 1927
J. Anderson, Calif. ..... Mar., 1927
F. Evarts, Calif. ..... Mar., 1927
J. Peterson, Iowa ..... Mar., 1927
F. Brackett, Mo. ..... June, 1928
G. Shoemaker, Pa. ..... Mar., 1927
C. Geiger, Pa. ..... Mar., 1927
G. Norton, D. C. ..... Mar., 1927
C. P. Robertson, So. Africa ..... Feb., 1927
Tom V. Ward, Ohio ..... Feb., 1927
T. Tillman, Calif. ..... Feb., 1927
J. Haught, Ill. ..... Feb., 1927
W. Pontius, Iowa ..... Feb., 1927
J. Howes, Md. ..... Feb., 1927
M. Goller, Pa. ..... Feb., 1927
F. Roschy, Pa. ..... Feb., 1927
O. Knisely, Pa. ..... Feb., 1927
L Stocker, Texas ..... Feb., 1927
Watson Clark, N. C. ..... Jan., 1927
J. J. Thompsin, Ohio ..... Jan., 1927
J. S. Bunker, Iowa ..... Jan., 1927
Feldmeyer & Schaake, Mo. ..... Jan., 1927
R. Hoover, N. Y. ..... Jan., 1927
C. Adams, Conn. ..... Jan., 1927
C. Radeleff, Iowa ..... Jan., 1927
H. Lamons, Aenn. ..... Jan., 1927
J. Schneider, Calif. ..... Dec., 1926
P. Kauth, Ill. ..... Dec., 1926
A. Grandadam, Ill. ..... Dec., 1926
F Harding, Iowa ..... Dec., 1926
H. Grimm, Utah ..... Dec., 1926
J. Smith, Wash. ..... Dec., 1926
C. Hall, Wash. ..... Dec., 1926
H. Mekler, Ill. ..... Dec., 1926
F. Bird, N. Y. ..... Dec., 1926
R. Sherman, Maine ..... Dec., 1926
C. Hardy, Mass. ..... Dec., 1926
L. Cordes, Mo. ..... Dec., 1926
R. Pogue & Son, Texas ..... Dec., 1926
H. Rickley, N. J. ..... Dec., 1926
A. Hallander, Calif. ..... Dec., 1926
J. Griffiths, Iowa ..... Dec., 1926
W. Swetnam, Ky. ..... Dec., 1926
F. Hoopengarnder, Md. ..... Dec., 1926
L. Turner, Kans. ..... Dec., 1926
W. Matthews, England ..... Dec. 1926
J. W. Lawson, Idaho, ... Nov. 1926
Byas, W M., Miss ..... Nov., 1926
W. N. Scofield, Mo. ..... Oct., 1927
Z. Damur, Sask., Can. ..... Oct., 1926
W. Branch, N. C. ..... Oct., 1926
Hanson & Marvin, Cal. ..... Oct., 1926
W. Branch, N. C. ..... Oct., 1926
F. Matsocks, Ark. ..... Sept., 1926
E. Jones, Wise. ..... Sept., 1926
Inglis & Son, Neb. ..... Aug., 1926
J. Clark, Jr., Vict. Aust. ..... Aug., 1926
L. Wesley, Ariz. ..... July, 1926
J. Buchner, Mich. ..... July, 1926
J. Dambach, N. J. ..... July, 1926
H. Mitchell, N. Y. ..... July, 1926
I. Boles, Ohio ..... July, 1926
F. Vavasour, New Zealand ..... July, 1926
O. S. Long, Ill. ..... June, 1926
Ralph Murphy, N. Mex. ..... June, 1926
L. H. Miller, N. Mex. ..... June, 1926
S. Butler & Son, Mich. ..... June, 1926
A. Schmitt, Nebr. ..... June, 1926
M. Broton, N. D. ..... June, 1926
J. Campbell, Oregon ..... June, 1926
F. Over, Pa. ..... June, 1926
A. Clark, Jr., Ct., Aust. ..... June, 1926
J. N. Jacobsen, Texas ..... May, 1926
C. Sager, N. Y. ..... May, 1926
H. Pirret, Oregon ..... May, 1926
P. Sowa, Oregon ..... May, 1926
D. Ackland & Son, Man. ..... May, 1926
J. Sinclair. W. Aust. ..... May, 1926
Geo. H. Wyman, N. Y. ..... Apr., 1926
M. A. Towner, Ohio ..... Apr., 1926
David Williams, N. Zealand ..... Apr., 1926
C Sex, England ..... Apr., 1926
P. Peterson, Iowa ..... Apr., 1926
G. Bowers, Okla. ..... Apr., 1926
E. Dignan, South Aust. ..... Apr., 1926
Wm. F. Snider, Ind. ..... Mar., 1926
W. F. Tippey, Mich. ..... Mar., 1926
J. Carswell, Ark. ..... Mar. 1926
C. Burton, Mass ..... Mar., 1926
W. Pochelu, Oregon ..... Mar., 1926
A. Bowman, Va. ..... Mar., 1926
W. Widger, N. Y. ..... Mar. 1926
W. Glenn, Colo ..... Mar. 1926
T. Moore, Vict., August ..... Mar. 1926
H. Brown, Va. ..... Mar. 1926
H. Barnes, Va. ..... Mar., 1926
G. Iller, N. S. W., Aust. ..... Mar., 1926
E. Jones, New Zealand ..... Mar., 1926
B. E. Campbell, Mass. ..... Mar., 1926
Edwim Slee, N. Y. ..... Feb., 1926
G. Torrey, Calif. ..... Feb., 1926
E. Schauppner, Nebr. ..... Feb., 1926
F. Trogdon, N. C. ..... Feb., 1926
A. Garver, Ohio ..... Feb., 1926
C. Jones, Pa. ..... Feb., 1926
J. Fox, Kans. ..... Feb. 1926
R. Dean, Texas ..... Feb., 1926
J. S. Rush, Ohio ..... Jan., 1926
J. Murphy, Calif. ..... Jan., 1926
O. Temple, Idaho ..... Jan., 1926
F. Kearns, Ill. ..... Jan., 1926
J. Murphy, Nevada ..... Jan., 1926
W. Post, N. Y. ..... Jan., 1926
J. McIntire, Pa. ..... Jan., 1926
N. Karolewics, S. D. ..... Jan., 1926
L. Messersmith, Idaho ..... Jan. 1926
J. Merritt, Calif. ..... Jan. 1926
J. Hess, Ohio ..... Jan. 1926
W. Pederson, Ill. ..... Jan. 1926
Powell Bros. & Whitaker, Eng. ..... Jan., 1926
H. White, N. Z. ..... Jan., 1926
F. M. Pedersen, No. Dak. ..... Dec., 1925
D. S. Kistlers, Mo. ..... Dec., 1925
Alfred Rasmussen, Wisc. ..... Dec., 1925
E. A. Pierson, Okla. ..... Dec., 1925
Nick Schumaher, Iowa ..... Dec., 1925
Geo. Jones, Ore. ..... Dec., 1925
H. E. Hiers, S. C. ..... Dec., 1925
M. Rawlins, Calif. ..... Dec., 1925
J. Hulvey, Ill. ..... Dec., 1925
P. Nelson, Minn. ..... Dec., 1925
J. Devine, N. J. ..... Dec., 1925
S. Wright, N. Y. ..... Dec., 1925
E. Lain, N. Y. ..... Dec., 1925
W. Jones, Texas ..... Dec., 1925
Williams & Turner, W. Va. ..... Dec., 1925
A. Spence, B. C. ..... Dec., 1925
N. Buchanan, Ont. ..... Dec., 1925
M. Kennedy, Tasmania, Aust. Dec., 1925
H. Jonnes, England ..... Dec., 1925
W. Snyder, N. Y. ..... Dec., 1925
J. Skiff, Pa. ..... Dec., 1925
F. Cronk, N. Y. ..... Dec., 1925
J. Singer, N. Y. ..... Dec., 1925
H. Edwards & Sons, N. Y. ..... Dec., 1925
G. Strait, N. Y. ..... Dec., 1925
E. Monroe, N. Y. ..... Dec., 1925
L. Loch, N. Y. ..... Dec., 1925
L. Rajewsky, Minn ..... Dec., 1925
W. Bolle, Ill. ..... Dec., 1925
F. Carlson, Ill. ..... Dec., 1925
W. Seamans, Ky. ..... Dec., 1925
J. Wriey, Mo. ..... Dec., 1925
J. Malley, N. J. ..... Dec., 1925
S. Haslett, Ohio ..... Dec., 1925
C. Seidles, Pa. ..... Dec., 1925
W. Robertson, S. C. ..... Dec., 1925
H. Collins, Ohio ..... Dec., 1925
G. Hanshaw, Okla. ..... Dec., 1925
W. Bate, Conn. ..... Dec., 1925
R. Shipley, Iowa ..... Dec., 1925
W. Nattress, N. M. ..... Dec., 1925
J. Sammerlee, N. Y. ..... Dec., 1925
D. Rhymes, Texas ..... Dec., 1925
L. Heath, Calif. ..... Dec., 1926
E. Wright, Ill. ..... Dec., 1925
C. Frazier, Ky. ..... Dec., 1925
G. Leuts, Ohio ..... Dec., 1925
J. Sebesta, S. D. ..... Dec., 1925
P. Oram, England ..... Dec., 1925
F. Wortell, Calif. ..... Dec., 1925
E. Thomas, N. Y. ..... Dec., 1925
H. Miller, Wash. ..... Dec., 1925
M. Bates, N. Y. ..... Dec., 1925
J. Woods, Oregon ..... Dec., 1925
W. Arsford, Pa. ..... Dec., 1925
J. Howell, Mo. ..... Dec., 1925
J. Morrow, Pa. ..... Dec., 1925
A. Darling, Sr., N. Y. ..... Dec., 1925
J. Goebel, Kans. ..... Dec., 1925
C. Ramsch, Ohio ..... Dec., 1925
R. Noble, Jr., Ont. ..... Dec., 1925
C. Lynch, Oregon ..... Dec., 1925
H. Clausen, Pa. ..... Dec., 1925
Neles, Bros., Calif. ..... Dec., 1925
H. Lefler, Mich ..... Dec., 1925
D. Bullinger, Mo. ..... Dec., 1925
A. Potter, Conn. ..... Dec., 1925
R. McMains, Calif. ..... Dec., 1925
W. Jordan, Maine ..... Dec., 1925
R. Fisher, Pa. ..... Dec., 1925
P. Kaimuloa, T. H. ..... Dec., 1925
H. Hesse, Kansas ..... Dec., 1925
F. Hinkey, Ohio ..... Dec. 1925
N. La Duke, N. Y. ..... Dec., 1925
Bob. McIntyre, Nebr. ..... Nov., 1925
James MacNab, Scotland ..... Nov., 1925
G. C. Ironside, B. C. Cand. ..... Nov., 1925
A. Wassmuth, Idaho ..... Nov., 1925
G. Ilisley, Mass. ..... Nov., 1925
A. Speir, Ohio ..... Nov., 1925
W. Clepper, Texas ..... Nov., 1925
J. Mallett, Queensland, Aust. ..... Nov., 1925
J. Dribble, South Aust. ..... Nov., 1925
W. Schaid, Wis. ..... Nov., 1925
J. W. Lawson, Idaho ..... Nov., 1926
Peter Vondenbosch, Ill. ..... Oct., 1925
D. Fraser, N. J. ..... Oct. 1925
L. Krause, Ind. ..... Oct. 1925
R. C. Lewis, Pa. ..... Sept., 1925
Peter Weise, Iowa ..... Sept., 1925
E. P. Gates, Mass., ... Sept., 1925
John K. Hawn, N. J. ..... Sept., 1925
Nugent-Covey Wagon Co., Calif. Sept., 1925
M. Pople, N. S. W., Aust. ..... Sept., 1925
J. Wilkinson, Queens, Aust ..... Sept., 1925
C. Williams, Victoria, Aust. ..... Sept., 1925
Reynolds Bros., Pa. ..... Sept., 1925
F. Krens, Calif. ..... Aug., 1925
D. Allen, Mont. ..... Aug., 1925
G. Fisher, & Bro., Ohio ..... Aug., 1925
W. Dixon, Ohio ..... Aug., 1925
F. Shupe, Pa. ..... Aug., 1925
W. Wright, Va. ..... Aug., 1925
Jacob Holzapfell, Pa. ..... July, 1925
A. D. Holroyd, Iowa ..... July, 1925

finished surface results. Cylindrical laps, both external and internal, are used for finishing cylindrical surfaces and holes. These laps are cast iron or lead and generally are used with emery and oil.

Incandescent Colors and Temperatures

	Fahr.	Cent.
Black Red	990	533
Dark Blood Red	1050	565
Dark Cherry Red	1175	634
Medium Cherry Red	1250	676
Full Cherry Red	1375	745
Light Cherry, Scaling	1550	843
Salmon, freely	1650	899
Light Salmon	1725	940
Yellow	1825	995
Light Yellow	1975	1078
White	2220	1203

Benton's Recipe Book

A new type of belt conveyer is made of thin steel about one-twenty-fifth of an inch in thickness and in any length up to 250 feet. The advantages of this type of material for conveying by means of a belt are obvious.

A New Cutting Metal whose edge is not softened even when at a bright red heat is made up mainly of chromium, molybdenum and tungsten. It is used at higher speeds and feeds than any metal thus far employed in the making of cutting tools.

The tarnishing of lamp reflectors may be prevented by applying a light coating of alcohol in which a little collodian has been dissolved. First clean the deflector thoroughly and polish to just as great a brilliancy as possible. Then when it is clean, bright and free from all finger marks apply the alcohol-collodian solution smoothly and evenly. This same practice may be followed with highly polished metal surfaces. The protective coating is easily removed with a little warm water when necessary.

Strange how easy some chaps are. We heard just recently of a smooth tongued stranger who was gathering in a nice sum of money by selling to the shop owners down in a certain section of Pennsylvania, what he called a "tempering and hardening powder." We investigated the thing, got a sample of the stuff and found he was selling just ordinary salt with which he had mixed some coloring matter such as red ochre to disguise his "Magic Powder." Of course, we all know that salt and water make a good solution for some steel working operations but there is no need to pay any oily-tongued stranger a big price for some colored salt that you can purchase cheaply at the grocers.

Brassing Small Iron Parts, is the job that puzzles an Iowa subscriber who wants to be known as "Brassy". Well Brassy. the brassing of small iron parts can be done in so many ways and there are so many formulas for brassing articles of iron that we could devote the entire column to this one subject. But judging from your request you undoubtedly wish some simple means for brassing just a few articles, and here is a receipe that will no doubt fill your requirements:— Make up a solution of one quart of water, one-half ounce of sulphate of copper and one-half ounce of protochloride of tin. Drop the articles in to this mixture and stir until the desired color is obtained. This same mixture may also be used to brassing small articles of steel.

Several Useful Kinks from the Melting Pot

To find the area of a circle, multiply the square of the diameter by .7854.

To find the area of a triangle, multiply the width of the base by one-half the perpendicular height.

The side of a square multiplied by 1.128 equals the diameter of a circle of equal area.

To find the area of the section of a flat bar, or the area of a rectangle, multiply the width by the thickness.

To find the number of cubic inches in any bar, multiply the area of its section in inches by its length in inches.

November 11th to Thanksgiving Day is the Annual Roll Call of the American Red Cross

This worthy organization deserves the support of every thinking person. Its work needs no press agent, its purpose is well known. During the Roll Call Period in November be prepared to renew your membership in this worthy service for humanity.

Queries-Answers-Notes

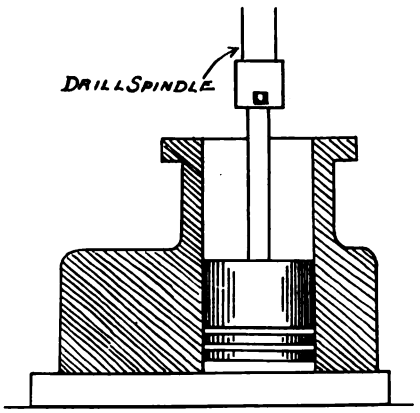
THIS department is the place for discussing shop and business matters. Here you may ask for information on any topics or matters that interest you; bring to the attention of the progressive craftsmen of the day the subjects that should have their attention. You are requested to make use of this department as often as desired.

In these days of "strikes to the right of us, strikes to the left of us" and the halting of industry's forward march it is well to remember and to reflect upon the saying of America's greatest American. "I refuse to assent to the view that either the owners of the property or the workers have interests paramount to the geneal interest of the public at large."

Automobile Springs and Drill Work:—I have been a subscriber to the American Blacksmith for fifteen years. I am a mill blacksmith and have found some very good articles in the magazine. I think every blacksmith should be a subscriber to it. I have changed my work and am now fixing automobile springs for trucks and making six point drills. I would like a little information on tempering springs and putting collars on the drills, three and one-fourth inches from the shank end. These drills are from two to eighteen feet long. They are air drills.

W. H., Rhode Island

Wants To Temper Rock Drills:—Have been reading "Our Journal" for some time and have gleaned from it information which I have put to daily use. I consider the Question and Answer Department the most valuable pages of the Journal. I am out to take a shot at it



CYLINDER LAPPING IS A SIMPLE OPERATION ON THE DRILL PRESS

by asking for information as to sharpening and tempering two kinds of rock jumper drills. The star and one that I don't know the name of. It is shaped like a piece of split stock—the female scraf of a split weld. I do not know how to sharpen or temper either of them They are to be used against wery hard rock.

L. C. F., Pennsylvania.

A New Zealand Letter:—I should not like to miss a number now as I have come to look upon your paper as a most valuable asset more especially now that the motor traffic is getting so large one is constantly called on to handle awkward jobs in that line. I think it is unnecessary for me to say what I would like to see in the Journal as you seem to deal fairly well with all subjects as they say "Everything comes to those who wait," I see something in every number that is of special interest. I notice the constant cry that good all around smiths are becoming scarce in your country. I think the same applies here. The young fellows all want to become motor mechanics and they think blacksmithing is to hard and almost unnecessary. The consequence is one finds a lot of so called mechanics who hardly know the difference of one metal from another and a lot of smiths who have taken on the game late in life because they thought any fool could do it and perhaps they could tack on a set of shoes in some way or another.

Another difficulty in getting good young fellows is the matter of wage. When I commenced the trade 16 years ago I received seven shillings and 6 pence ($2.00) a week with two shillings 6 pence ($.50) raise a year, but now they want one pound five shillings ($6.00) or one pound 10 shillings ($7.30) with 10 shillings ($2.43) increase.

A. A. Anderson, New Zealand.

The Waterproofing of Blueprints is sometimes very desirable and a very simple means of accomplishing this is by soaking two pieces of muslin in melted paraffin. The treated cloth is allowed to cool until the paraffin hardens, the cloth being hung up so as to dry as flat and smoothly as possible. To treat the blue prints, place them between the two pieces of muslin on a smooth flat surface and pass a warm iron over the cloth. This melts some of the paraffin on the cloths and as it is obsorbed by the paper the prints are waterproofed. This also tends to make the blue prints more durable and may be an excellent means of lengthening the life of prints that are subjected to a great deal of handling.

Lapping a Cylinder on the Drill Press: I desire to lap out the scores in a cylinder block and as it is rather a long job I am wondering how I can do the work by power instead of by hand. I have power in the shop and would like to have some suggestions for doing this work. Can some reader or the Editors tell me how to go at it?

L. C. B. New York

In Reply:—In as much as L. C. B. says he has a power equipped shop we take it for granted that he has a power drill press available and the operation of lapping cylinders can and is done very easily and well on a drill press.

The cylinder casting is of course firmly clamped to the drill press table, or if a large block it is held firmly on a bench or stand below the drill head, the drill table being turned aside.

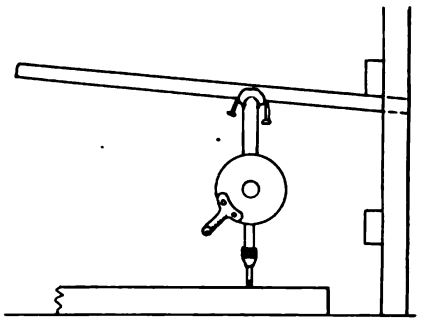
An old piston may be used for the lapping operation and this is fitted with a dummy connecting rod the upper end of which should be made to fit the cluch on the drill press.

In operation, the back gears of the drill are put in and the drill spindle revolved slowly. At the same time the hand feed lever of the drill press is operated so that while the piston is revolving it at the same time is raised and lowered to grind through the entire length of the cylinder.

The engraving illustrates the method of using the drill press for lapping cylinders.

S. S. S.

An Emergency Press Drill— I had occasion to use an idea recently that worked out so satisfactorily that I am sending it in for the use of the entire family. Located as I am in the midst of a



A SIMPLE LABOR-SAVING KINK WHEN USING A BREAST DRILL

thickly settled farming section I am very often called upon to make hurried trips to make repairs right in the field and on the farms.

Recently we had a call from one of our regular customers asking us to hustle down with the repair car in order put the threshing outfit into shape again. We put the repair kit into the jit and soon were busy at what was really a minor job as far as our work was concerned. But during the development of the repair two holes were required to be drilled very accurately in order to fit two broken sections together. We had only a breast drill for the operation and as everyone knows this is not an easy tool to use nor is it especially easy to drill an accurate hole with it. I therefore sought some means of applying a leverage to drill and used the following idea. I placed the piece to be drilled at the base of the ladder usually found in every barn for climbing to the loft. Under one of the rungs I then slipped a stout piece of wood. With a spike one each side of the upper end of the drill to hold it in place I now started and finished my drilling work with little or no difficulty.

This is a simple stunt and one that may appear almost childish but it was such a labor saver in this emergency that I am sure others will be glad to know about it.

A. G. Dressler, Indiana.

VOLUME 21 NUMBER 12

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

DECEMBER, 1922

BUFFALO, N. Y., U. S. A.

E. D. Corson, President
G. A. Castle, Vice-President

Member The Associated Business Papers, Inc.

A. W. Bayard, Secretary
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Correspondence solicited on all subjects connected with auto, truck and tractor work, blacksmithing and general repairing. Always give name and address when writing.

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Do Not Give Money To Agents Whom You Do Not Know

There are many unauthorized agents and unscrupulous collectors representing themselves as agents, and collectors for American Blacksmith, Auto & Tractor Shop, and we warn every one of our readers against them. Under no circumstances give money to any agent who is unknown to you. It is a very simple matter to send money order, check or stamps direct to Buffalo, and it is always best to send your order and remittance direct.

Contents December 1922

A Year From Today

A prominent advertiser asks the following pointed question: "Will you be in business a year from today?". And then he points out the value of service in connection with the promotion of a general repair business.

The mortality or, in other words, the "death rate" among business establishments in the automobile field is extremely high, and the reason for this can generally be summed up in the phrase "improper service".

At no time in business history has it been more necessary for the shop owner to be thoroughly "on the job" than at the present time. Generally speaking, the rural shop is not subjected to the intensive competition that his city brother has to contend with, but the owner of the rural shop must nevertheless be constantly on the alert to serve the customers that come his way. The better you serve them the more customers you will have to serve. Someone has said that the satisfied customer is the best advertisement. And this is not to be denied especially when you serve your customers in such a manner as to make them go out of their way to tell about your excellent service.

The kind of service you give determines where you will be a year from today.

A transparent rubber that has the elasticity of ordinary rubber and the transparancy of glass has been perfected.

A FEW BOUQUETS FROM MEMBERS OF THE FAMILY

We always like to hear the comments of people "who know." Our friends who have known us for several years are generally pretty good judges of our character and good or bad qualities. And so also, the men who have read "Our Journal for some time are the best judges of its contents and its practical value. Here are a few extracts from letters taken at random from a recent days mail. ,

The first comment is that of a good member of our family of readers in the state of Iowa. Mr. Omrie Peters writes:—

"I am much pleased with the Journal—The only way I can see to better it is to publish it more often."

And with that comment Mr. Peters backs up his letter with a nice check that pays his subscription for three years in advance.

The second letter comes from bonny Scotland. (A good many of "Our Folks" are located in that bonny land.) Mr. John Robertson in sending on his renewal (which incidentally pays him up to 1927) writes:—

"Many thanks for sending the paper so regularly. I have never missed a single copy even during the war. The articles are just what I like and I would not do without it on any account."

And now comes a letter from a reader who has been a member of the family since 1918,—Mr. Wilbur C. Harris of Pennsylvania.

"Having been a reader of your much valued paper since 1919 I will to tell you of its immense value on many occasions. Through the extreme simplicity of its lessons and explanations, it has at many times solved matters of vital importance for me. I find myself looking forward to each new issue. I still have each and every copy preserved and often refer to them for information."

And thus we say:—When you wish to know something about anything ask the folks who know. "Our Folks" know "Our Journal." "Our Folks" know their business.

It Takes More than a smudgy nose, a well-torn pair of greasy overalls and a vocabulary like a mule driver to make an automotive mechanic.

"The Changing World"

BY JOHN T. McCUTCHEON

THE TIN WASH PAN BY THE BACK PORCH PUMP—

HAS LOST ITS TERRORS IN THE MODERN FARM HOME.

This is the last of a series of cartoons by John T. McCutcheon, published here through the courtesy of Armour Fertilizer Works, Chicago.

Keeping the Shop Busy in Winter

O. A. WALTERS

The Winter months are generally slack ones for the average shop. If the Shop Owner can show a profit during his Winter Season, Spring, Summer and Fall will take care of themselves. Here are several suggestions for Boosting Winter Business.

Mr. Dibble drove up to the gas pump honked his horn a few times and Jim Carney the proprietor of the "Sudden Service Shop" ran out to serve him.

"Good morning, Mr. Dibble" was Jim's cheery greeting. "How many today?"

"Oh, better give me ten and a quart of oil" answered Mr. Dibble.

"All right-o" and as Jim proceeded to carry out the order the following conversation took place.

"Seems to be eating gas pretty freely, isn't she?" began Jim. "You haven't had her in the shop since we ground the valves last spring and the cylinders were somewhat out of round then and the way she sounds now and the distance you've gone this summer and fall I should say she was considerably worse now. You ought to have her all checked up—bearings must be loose and needing some adjustment and a general overhauling would put her in good shape again. Better bring her in during the winter; some time when you can best spare her, and let me give you a winter overhauling job. That will tighten her up all around, make her good as new and you'll find she'll run on about half the gas and oil that you are now using."

"That's not a bad idea at all, Jim." returned Mr. Dibble. "But what will that nick me for—how much will it cost me?"

"Of course, that will depend upon what the car needs," responded Jim. "But you know me. Mr. Dibble. You know we are not in the habit of imposing upon our customers or in slapping on any extra expense. On an overhaul job we usually go at the work immediately, for we tell you when to bring in the car. We then take the job down, see what it actually needs and then we will go over the whole thing with you and give you a price on the work. In that way you will know just what it will cost you, what is needed and if there are any items you consider unnecessary you can tell us so. On the other hand if you want any additional work done we are ready to do it."

"Well, that sounds fair and square" replied Mr. Dibble. "When can you get at it?"

"How will Christmas Week do?" Came back Jim, promptly.

"That will suit me fine, Jim. Better put me down for that time." And Jim's customer pocketed his change after paying for the gas and oil and with a wave of his hand drove away.

Jim had no sooner gotten back to the shop when Mr. Hanley drove up to the shop door. He dismounted from his car just as Jim came out of the shop door to great him. (Jim is a great believer in meeting customer's more than half way.)

"Good morning, Mr. Hanley. What can I do for you?"

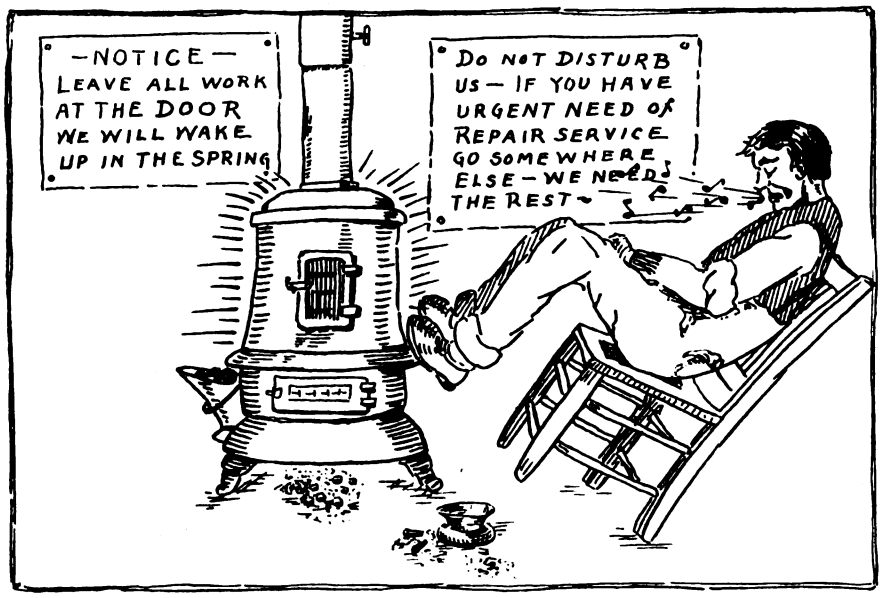
"Well, Jim, the old bus seems to have the influenza or grip or something; can't seem to get the usual pep out of her. Have had a devil's own time getting over here and I wish you would look her over. I'm going on down to the mill and will be back sometime this afternoon." And with that Mr. Hanley walked down the drive.

As soon as Hanley departed, Jim called one of his men and instructed him to look over the Hanley car and give it a try out. "Look 'er over pretty thoroughly Tom, She hasn't had her valves ground for a long time and if I'm not mistaken you'll find the compression pretty

weak. If you can fix 'er up temporarily do so, but I think she really needs a general overhaul."

And with that Jim went back to his office.

In the afternoon when Hanley called for his car. He found it in the parking yard beside the shop and as Jim saw him come up the drive he hurried out to meet him. "We've got 'er fixed up for you Mr. Hanley, but you had better bring 'er in for a winter overhaul as soon as you can spare it. We shot some of the carbon out of her put in a little heavier oil but you won't cure her or get real pep out o' that motor until she has a good overhauling and a general checking up."



PARKED FOR THE WINTER, SHOWING HOW NOT TO RUN A REPAIR BUSINESS

"Well, that's what I thought was necessary Jim. But I can't spare the old boat right now." replied Hanley. "How soon could you get at it and how long will it take?"

"We could get at it next week if necessary," returned Jim. "We are finishing two jobs this week and have several we can work on, but they are 'laid up' jobs so we can get at your car right after Sunday. And if she doesn't need anything that we'll need to get from the factory, we can have her out again in about a week."

"Will she be all right until Monday?" asked Hanley.

"Yes, she ought to be all O. K. for a couple of weeks if necessary," said Jim.

"But the sooner she's fixed up right the better it will be."

Well, I'll bring her in Monday", promised Hanley. And with that he drove down the parking way and onto the road.

Jim immediately entered the Hanley car into his schedule of overhauling jobs and had no sooner replaced his order book in its accostomed place when he heard the persistent honking of an auto horn at the gas pump. Hurrying out he found Mr. Sharp.

After taking care of his gas and oil wants and while making change Jim casually inquired. "How's she running, Mr. Sharp?"

"Not so good, Jim. Seems as tho' that gas you get now isn't as full of pep as it used to be. How does it test?"

"Same as always Mr. Sharp. In fact in some ways the gas we're getting now should be showing up better in your motor. Perhaps the motor needs looking over. Better bring it in some time soon and I'll check it up for you."

"Nothing doing," came back Mr. Sharp quickly. "All you chaps think about is to slop a nice fat charge for overhauling onto us poor drivers. You think we're made of money. There's nothing the matter with this car except that bum gas you sell. She may need an occasional carbon cleaning but she's all right."

"Well now just let's see?" said Jim. "You know me well enough Mr. Sharp to know that I am not in the habit of doing work that isn't necessary and you also know that we are not in the habit of charging for work we don't do Now just how long is it since you've had the carbon burned out of the car?"

"Why, it was July I think. You did the job and she certainly was full of pep when you cleaned her out."

"And since then" continued Jim, "you've been down through the state on a two weeks tour. You've had the family out for a few days at a time and you've been getting all kinds of gas and oil at the different garages and gas service stations. That mixing of different grades and kinds of oil and gas means carbon in the cylinders. It means scoring of the cylinder walls and it means a gradual wearing of the cylinders out of round. Four months of driving as you have been going must wear on the motor, even if yours is well made and well built."

"Why you'd have me think the old boat was falling apart." Cut in Mr. Sharp. "You're like some of these doctors that make you feel as tho' you had one foot in the grave."

"Well, that may be, but you know as well as I do that a machine cannot operate without friction and friction means wearing surfaces, and wear in a motor must be taken up or it will rack itself to pieces," and Jim went into the mechanical details of the neglect of wear and tear on a constantly used machine.

Continuing Jim said. "Now, just take your motor for example. You say that it's not running so good. All right. There must be some reason for that. Surely the motor is not just laying down on the job to please me. Then you say it must be the gas. You know the kind of gas you are getting here and you know that it is standardized as no other. Now, let me make you a proposition:—When you can spare the car for a few days bring her in. We'll check 'er up for carbon, valves, cylinder wear and bearing take up and if I can't prove to you that she needs an overhauling and refitting you need not pay a cent. On the other hand I'll tell you just what is needed, tell you the cost and you can then instruct us to do what you think is necessary."

"Well that sounds fair Jim. I'll bring her in next week. I'm going down to the wife's folks for several days and I'll leave the car with you during that time," returned Mr. Sharp. "Guess you have sized her up pretty well, Jim." And with a nod Sharp started down the road.

"Of course, I've sized her up" said Jim to himself as he entered his cubby little office room at the

front of the shop. And he entered another overhaul job in his order book.

Then he picked up a box of cards from his desk and after thumbling them over made entries on the cards bearing the names of Dibble, Hanley and Sharp.

"That little stunt is certainly going to turn this coming winter into the profit column instead of the loss column."

The stunt Jim referred to is a report-card system which enables him to know something regarding the condition of practically every car that comes into his shop. Every car that he is called upon to work on to any considerable extent at any time is represented by a card. On this card is entered a brief report of the condition of the car, the motor, tires, mileage of car at date of examination and a report that includes generally everything of importance about the machine. With this record he is able to tell just when a car is likely to need attention, overhauling and adjusting.

For example; a car is brought in for some major or minor repair. While in the shop you have an excellent opportunity to check up on cylinder wear and scores. You can note the condition of valves or tappets; the clutch; the gears; the rear axle; the tires; the spares, and can note generally the various mechanisms of the car. If bearing, are loose or noisy it is an important point to make as these will eventually become worse.

With this data entered on cards you have first hand information that will lead to business the minute you see prospects of a slump or slack time.

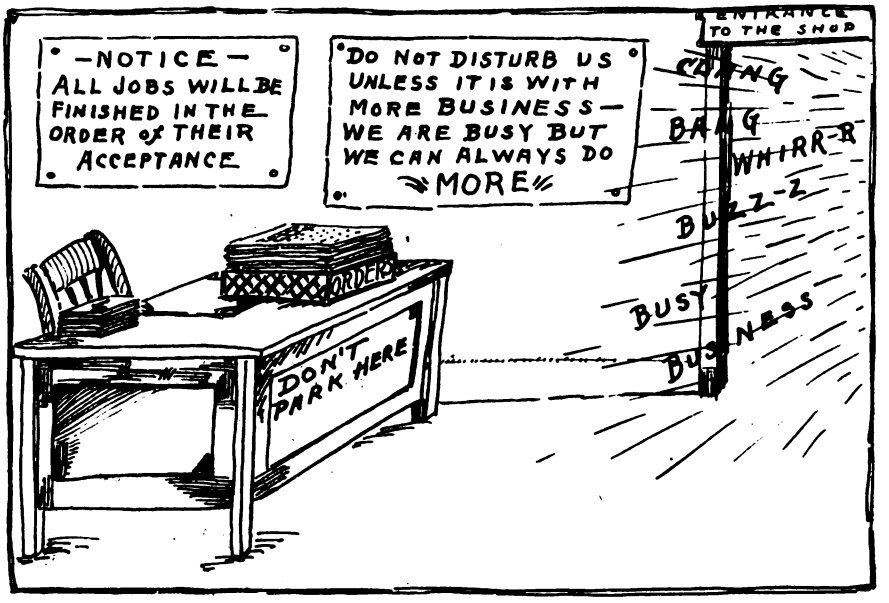
By means of letters, and personal calls you can secure business just when you need it most and you can push the matter just as hard as necessary to keep busy.

The arguments for doing overhauling in winter are, of course, the lessened use of the car; and then that you have more time then and can do a better job. You can also do the job cheaper during your slack period.

Time and space are not quite as valuable in winter as during the rush and bustle months of spring and summer and all together it is an excellent idea to fill in your time on work of this kind.

Any shop owner can go after this business and he will be limited only by his energy to go out and get the jobs.

It is an excellent idea to partition off a small section of the shop where this overhauling work can be done properly. A reasonable amount of up-to-date equipment is of course necessary and with the proper equipment the shop-owner will make more money than he usually does in the busy season. But it takes backbone and active solicitation. A shop owner who is more fond of warming keg bottoms then he is in wearing out shoe leather will not make much impression in securing winter business.



BUSY FOR THE WINTER SHOWING HOW A REPAIR BUSINESS SHOULD RUN

An average winter overhauling or rebuilding job will run all the way from forty to two hundred and fifty dollars depending upon the make of car, the amount of work necessary and the parts to be replaced.

But these jobs must be solicited They will not fall into the shop owner's lap while he is taking his winter afternoon's nap. On the otherhand, they are well worth going after.

Saving Time in Changing Demountable Rims

G. A. LUERS

Any suggestion that will save time in the changing of tires will be of considerable help and value to every shop owner. Many tires are changed daily in the average automobile shop and a minute or two less time for every tire will help the work along, make for greater efficiency, and the time generally consumed in tire changing usually impresses a customer with the efficiency of the shop which he patronizes.

In our shop we make a practice of leaving the lugs adjacent to the valve stem in place while removing the demountable rim. Of course, if the rim is deformed or extremely difficult to remove, this cannot be done, but on the usual demountable rim these lugs can be allowed to remain.

The addition of a drop or two of oil applied to each lug and also a drop or two on the split-rim catch will make these parts turn with less effort. In the case of badly rusted lugs and rims that are also covered with rust, a rust-penetrating oil can be used. There are several of these now on the market and this oil can be procured from your supply house.

By the use of these two suggestions faster work and less labor in the removal and application of tires will result.

Compressed Air for Cleaning

For cleaning both machinery and work, compressed air is both rapid and efficient suggests the Melting Pot. It is much easier to clean out the centers of a piece with an air jet before placing it in the grinding machine than to wipe them out with a piece of cotton waste or a wiping cloth. In cleaning machinery, an air jet of from 50 to 75 pounds pressure will remove dirt more rapidly than it can be done manually, provided, of course, the machine is cleaned at frequent intervals so the dirt is not given an opportunity to become firmly imbedded.

The Lead Burning Torch

DAVID BAXTER

Another Item of Shop Equipment that will Increase Profits for the Shop Owner is the Lead Burning Torch. In this article Mr. Baxter describes the Torch, the Work it does and how to Operate it Properly. This Article describes another new Oportunity for Shop Owners.

The general repair shop who caters to all classes of repairing including the finer and lighter grades of work, should include in his regular shop equipment one of the modern "lead burning torches". He will find this new tool especially useful if he does not possess an oxy-acetylene welding torch. And if he does operate a welding plant in connection with his regular work he will find it advantageous to have one of the lead burning torches also, because he can do the finer grades of mending with the smaller torch a great deal easier and better than he can with the welding torch. Also, he can use the same gas supply for both torches.

If the shop man already knows how to operate an oxy-acetylene welding and cutting torch he will find it easy to learn how to operate a lead burning torch. For the latter is in reality a minature gas welding torch. The chief difference being that he is handling heat in but hundreds of degrees when he is using the lead torch, whereas the temperature of the welding flame runs up into thousands of degrees; approximately 6300 degrees. And this is the main reason why the smith should have both torches.

It is often difficult to do such fine work as light soldering with the welding flame on account of the great danger of spoiling the parts or badly oxidizing the metals. And when fusing lead with the welding flame it is hard to prevent burning the metal.

It is well to say right here that the lead burning torch has been misnamed from the very start because when doing lead work the operator employes all his skill to prevent the lead from burning. In fact a bond wherein the lead is burned is far from satisfactory; it is weak and poorly fused. Burning the lead is the thing the expert operator guards against more than any other one thing.

The name "lead burning" has however, become so affixed to the process, and, as the torches is advertised thus, we will continue to refer to it that way in this discussion, although autogeneous soldering or plain "lead welding" would be more appropriate as in many of the details the "lead burning" process is identical with the gas welding process.

There are several styles of the lead burning torch on the market. Some burn fuel gas and take their oxygen from the air. Others burn acetylene gas and take their oxygen either from atmospheric air or compressed air. And still another styles uses the same acetylene welding. Depending upon circumstances, probably neither one has any advantage over the other. Although the oxy-acetylene lead burner is no doubt the best all around an account of its portability; it is readily installed in any shop and yet may be moved from place to place outside.

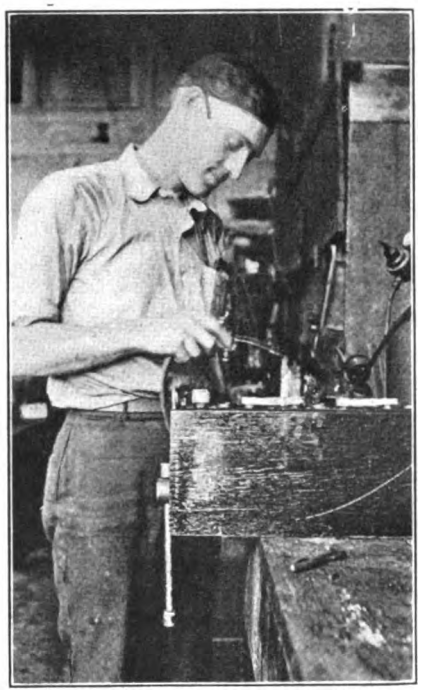


FIG. 1—USING THE LEAD-BURNING TORCH TO SOFTEN THE SEALING COMPOUND ON A STORAGE BATTERY

The oxy-acetylene lead torch is virtually an oxy-acetylene welding torch on a small scale because it has the same accompaniment of gauges, regulators and hose, except that each of these is lighter and more suited to the finer work. No great amount of gas pressure is ever utilized, so the different parts of the lead burning equipment are not so rugged as the welding outfit.

The lead burning flame has three stages and their intermediates are the same as that of the big welding flame. And they are almost as important in the lead burning or soldering as they are in ordinary fusion welding. Like the big torch the safest and best flame is the one which has neither element in excess. An excess of oxygen in the lead-burning flame has a tendency to oxidize the molten metal the same as it does in the welding flame. While the flame which carries too much acetylene is just as harmful on account of insufficient heat; it will not melt the lead properly and will leave it impregnated with impurities.

Take for instance the burning on of storage battery connectors; if the flame carries too much oxygen the lead of the connectors is oxidized or burned. The oxide will form in flakes throughout the body of metal to cause a poor bond. One which is shorted or at least a poor conductor of electric current. It also lays the bond open to further oxidization by the oxygen of the atmosphere; as this corrosion will soon eat the very life out of the lead connector.

As battery work is one of the important uses of the lead burning torch, the operator should remember how essential it is to keep his flame neutral. Even then the lead battery-castings are easily damaged through burning. If the neutral flame is held too close to the metal or is held motionless too long in one spot it will oxidize the metal in spite of strict neutrality. And this is also true in other lines of lead work.

It was hinted in the beginning that the operator who has had training in the handling of a welding torch will find this invaluable

on lead fusion work, but he must remember the vast difference in temperatures. The manipulation of the lead burning torch is practically the same as the welding torch.

FIG. 2—ANOTHER USE FOR THE LEAD-BURNING TORCH IS IN ATTACHING NEW BATTERY CONNECTORS

It is well to keep the flame constantly in motion during the progress of the melting. The flame is advanced or retarded according to the rapidity and melting condition of the lead. Or, it is revolved and oscillated to keep the bath molten or to supply new metal. And like the welding flame the lead burner flame is often used to sweep or guide the flow of molten metal.

The one great difference is that lead melts easier and is more susceptible to oxidization than the usual run of welding jobs. And for this reason the manipulation of the lead-burning torch is necessarily more delicately deft and quick; seemingly requiring higher skill.

In detail the lead-burning torch is lighted about as follows:—First, the regulators are set for correct pressure according to the recommendations of the torch manufacturers. Then the acetylene cock of the torch is opened and the escaping gas applied to the lighter or to a lighted match. The acetylene flame spreads out in a long yellow brush smoking at the end. This is entirely unfit for any kind of soldering or lead work; it is too large and is not hot enough. When the oxygen is turned on the flame immediately shortens and turns to a light blue without smoke but with long, sharp, flickering tongues. It is still unfit for lead work.

Now the oxygen and acetylene valves are carefully adjusted one after the other until the blue flame tongues become very short and until a tiny white cone of flame appears in the center of the outer flame. This outer flame flickers somewhat but the small cone burns steadily and is comparatively blunt. For the average torch it is usually less than a quarter of an inch long and is known as the working flame or neutral flame. It should not only be obtained at the beginning of the melting process but should be maintained through out the entire job.

If the aceylene is decreased too much or the oxygen is increased too much the cone gets longer and sharper and this indicates the oxidizing flame which should not be used on lead or solder work.

We have now covered the main features of the lead burning process and the flame regulation. Let use see how it is applied to specific instances wherein it is most useful.

The process is used principally in battery and radiator repairing; such as the assembling of new battery plates and attaching them to the post straps; attaching new top connectors, heating cell jars; and removing the battery sealing compound.

On radiator work it is used to remove or attach upper or lower tanks; to solder leaky tubes or leaks in the tank; to solder tank castings in place; to remove or attach braces and brackets. The flame is also useful in tining the surface of the lap seams and other radiator parts in preparation for the sweating process. And for removing old or excess solder the lead burning torch can scarcely be beat.

The lead burning torch is better than a common soldering copper in a great many instances of common soldering. The metal may be applied in a great many instances in long even filets or spread out smoothly with the torch flame, a great deal faster and more continuously than with a soldering copper, handling either wire or bar solder with equal facility.

Take as an example of storage battery work; the removal of the sealing compound from around the cell covers. As is indicated in Fig. I, the lead burning flame is merely passed back and forth along the strip of compound until it becomes soft enough to scrape out with a screw driver or other handy tool. Care is taken not to apply the flame until the compound ignites. In fact the better way is to hold the torch in one hand and the scraper in the other; then as fast as the compound melts it is scraped out from between the cells.

This is an advantage over the slower process of steaming the battery to soften the substance. It will sometimes harden before it can be all removed when the steaming method is employed. But with the flame it is melted as the work progresses.

In Fig. 2 another battery repair is indicated, for which the lead burning torch is almost indispensible. This is the attaching of a new terminal connector to the plate or post. First, the post is trimmed to fit snugly into the round hole in the connector. Then a bar of solder is taken up in one hand and the torch in the other. Both articles are brought in contact with the connector at the same time but the flame is played around in the hole on top of the post first

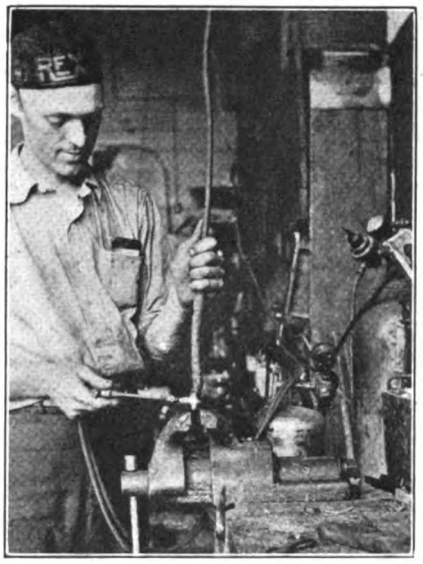


FIG. 3—REMOVING A TERMINAL CONNECTOR FROM A WIRE CABLE WITH LEAD-BURNING TORCH

while the solder bar waits on the edge of the hole.

When the top of the post melts and flows smoothly into a pool at the bottom of the hole the flame is transferred to the end of the bar of solder. A quantity of the solder is melted off and flowed into the molten bath. Then the flame is alternated from the solder to the connector, gradually bringing the pool of metal up to the top of the

hole. Care is exercised at the same time to see that the connector metal around the sides of the hole is melted and flowed with the added metal. This is essential to make a good conductor of electricity of the new joint. If the added metal does not become a part of the connector and post, the conductivity will be lowered.

When the last layer has been added the flame is played around over the surface to give it a smooth, neat appearing finish. This is done rapidly and skillfully to prevent oxidization as much as possible. The flame is almost continually in motion during the entire filling process; thus minimizing the oxidization.

Cleanliness in this and in other battery or lead burning jobs is very necessary. All lead surfaces to be melted together should be scraped, filed or brushed with a wire brush until the bright new metal is exposed. This cleaning will minimize the chance of the interposition of oxide and permit a more thorough mixing of the two

FIG. 4—USING THE LEAD-BURNING TORCH TO REPAIR RADIATOR LEAKS

metals. The filler bar should also be bright and clean, especially the part that is fed into the melting pool.

The metal is built up a layer at a time but each added layer becomes a part of the previous deposit.

Another use for the lead burning torch is illustrated in Fig. 3. This consists of removing brass terminals from wiring cables. The flame is played upon and around the brass part until it is hot enough to melt the solder with which it is filled an into which the end of the cable has been bedded. When this solder has been melted it is easy to pull the cable out. It is quick and handy compared with other methods.

New terminal castings may be attached to cables in much the same manner. A quantity of solder is melted into the cup and kept in a melted state while the end of the cable is being inserted. The lead burning flame is played over the surface of the brass during the process. The ends of the cable must be clean and perfectly dry before it is placed in the terminal. Moisture is liable to cause an explosion of molten lead.

Fig. 4 shows another style of soldering torch and indicates one example of radiator repairing. This is the cleaning of a lower tank seam preparatory to applying new solder. The flame is played back and forth along the seam. As fast as the solder melts it is vigorously brushed aside with a stiff bristle brush. The old solder is removed and the surface left bright and clean. The work is executed rapidly to prevent the heat from being conducted to other soldered parts of the radiator.

This is perhaps the greatest drawback to this method of repairing radiators. There is great danger of melting the solder in other joints besides the one being repaired. Many radiators are literally a mass of soldered joints and the novice in repairing them will often start a dozen leaks while endeavoring to stop one; particularly when this one is located in one of the water tubes.

In the example pictured here, the radiator is placed flat and level after the old solder is removed Then the new solder is flowed between the laps of the seam. Then the upper lap is heated and held down until the solder sets and adheres to both sides. Nothing but the torch flame is used to melt and flow the metal .

From the examples given above, the beginner should now have a fair working idea of what may be done with the little lead burning torch in spite of its insinuating name. It only remains for him to practice in order to master its simple code. Other uses should be self evident. The shop owner can soon work out many different ways to keep it busy if he gives the matter a little thought and keeps in mind the capacity and limitations of the tiny flame.

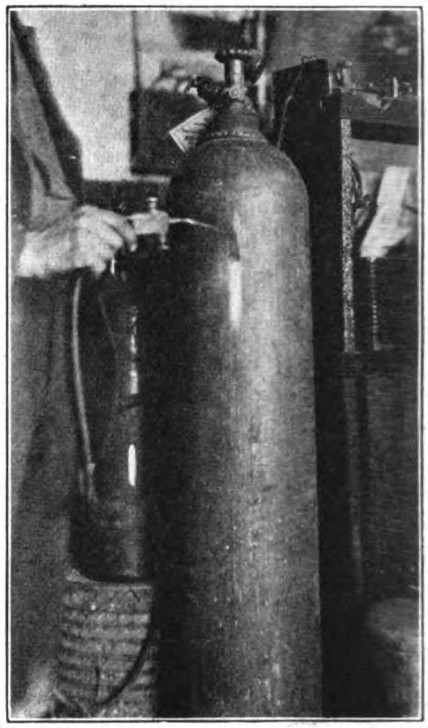


FIG 5—A TYPE OF LEAD-BURNING TORCH WITH ACETYLENE FAME

Repairing Neatly Done

Customer:—"You said if anything ever went wrong with my car you'd fix me up?"

Repair Shop Owner:—"Yes, yes—what do you need?"

Customer:—"Well, it looks now as tho' I'd need a new nose, a weld in my arm and a straightening of a rib or two."

Some Consolation

Apprentice:—"You say it will take me about two years to learn the trade thoroughly—and then what will I have for my pains?

Veteran Craftsman:—"Liniment."

In Prairie Center

The motorist could not imagine what he had done, so quite amazed he asked the constable, who had stopped him.

"Well, Constable, what law am I violating?

"Wall-ll" drawled that worthy representative of the law, "I don't just know yet, but I'll look y' over—y' must be violatin' sum law—y're drivin' an autermo-bile ain't y'?"

A collapsible cello is said to be a recent innovation in the musical world. The persistent cello player can now move into the neighborhood without disclosing his weakness when the moving van is emptied.

If Collections Are Slow try putting some pep into them by offering your customers five percent for cash.

Right Now is the time to get several of those good craft books for profitable winter reading. If you don't know just what books you want ask the book department for suggestions. They will be glad to help you.

How Do You Figure Profits?

J. N. BAGLEY

Most Shop-Owners are in Business for Profit. But many are not making the Profit they figure on. This article by Mr. Bagley may contain just the Suggestion you need to put your Business on a Profitable basis.

In the spring of 1884 Soda Springs was named and staked out. The combined general store and post office made up the business portion of the place. In the fall of '85 the railroad made a survey and included "The Springs" in their list of towns. Excitement ran high and many new-comers took up their abode in "The Springs." Among those who came was one Joseph Wier, the blacksmith and wheelwright, commonly known as "Uncle Joe". Joe was the type of fellow that every one liked, a whole-souled, hardworking man. He helped many through the hard years that followed, by doing their work and waiting many, many months for his money much of which he never did get. Uncle Joe while up in years is still in business and probably will be until the guardian angle bears him o'er the raging main. Work as hard as he may, somehow he seems to keep about even with the world.

Recently I happend to be in his shop when a customer came in, after some special parts he had ordered and when the customer asked the price Joe dug up his invoice, which called for $10.00 even. He added 10% to this charge and gave the parts to the customer.

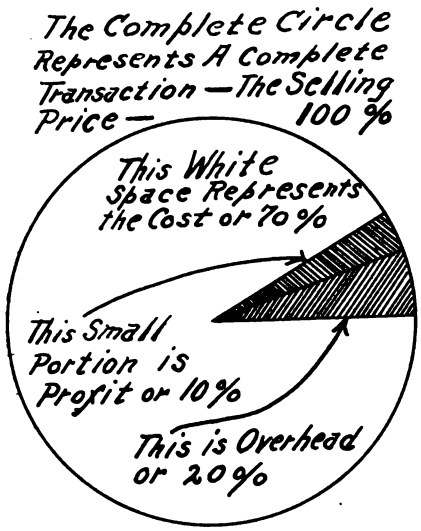
After the customer had gone out I asked Joe how he could do business that way. "What Way?" he asked, rather surprised. I answered:—"Handle $10.00 worth of merchandise for $1.00 and pay the transportation charges in the bargain," "Why I figure 10% profit on every thing", remarked Joe.

"I then asked Joe what his overhead expense was and he didn't know, neither did he know how much his business would run for the year. So there was not much of a foundation to start from, but I estimated his overhead at 20% to be safe and figured the 10% that he seemed to feel was gospel and law with him and found that he should have had $14.28 instead of $11.00 to make the 10% that he wanted, making a difference of $3.28 on the transaction.

Many shop owners to-day do not figure their profits correctly and wonder what's wrong with business when the trouble is with themselves entirely.

In this article I will try and outline a method that will, if followed, insure the shop-owner the profit he should have on the merchandise he handles. It is not a complicated trick to figure profits in this manner after the method is understood and we will try and make the method clear enough that any one can understand it thoroughly.

The first thing we must do is find the amount of sales for the year



THE PROFIT PORTION IS THE SMALLEST SECTION OF THE CIRCLE

also the expense for the year for from this we determine our average over head expense in percentage. We assume, for example, that the sales for the year amount to $25,000 and the expense for the year is, say $5,000, we must divide the $5,000 by the $25,000 which gives us in decimals .20.

We find that to do $25,000 worth of business we are at an expense of $5,000 or 20% must be figured as overhead expense. This 20% must be considered first of all and whatever percent of profit is to be figured must be in addition to the overhead expense or added to it; as 20% overhead plus the 10% profit makes a total of 30%. But here is where many again differ. For instance, Jim Smith will say, if the goods cost $10.00 and the overhead is 20% that 20% of $10.00 is $2.06 making $12.00 covering the overhead and 10% of $10.00 is $1.00 the 10% for profit, therefore, Smith will sell the customer the merchandise which cost him $10.00 for $13.00, which on the face of it all looks very good, but this is the anticipated profit instead of the actual profit.

Take for example an article that cost $1.00. You wish to make 33-1/3% and add 33-1/3% profit but in reality is but 25% **on the selling price.**

The rule for 25% on the selling price is to add 33-1/3% to the cost. For 35% on the selling price add .538% to the cost. You say how can this be? It doesn't look right. But, wait, and we will go at it a different angle and see how it looks.

We must admit that 100% equals the sale price for there is nothing else to equal it and all component parts are measured as 100th of this 100% for there is nothing else by which they may be measured.

Now then the overhead expense we find is 20% and we want to make a profit of 10%. We have accounted for 30% of this 100% which represents the sale price, therefore, the cost of the goods in percentage must be the difference between 100% and 30% or 70% or in other words the $10.00 worth of merchandise Joe handed out is 70% of the sale price which sale must be represented by the total of the 100%.

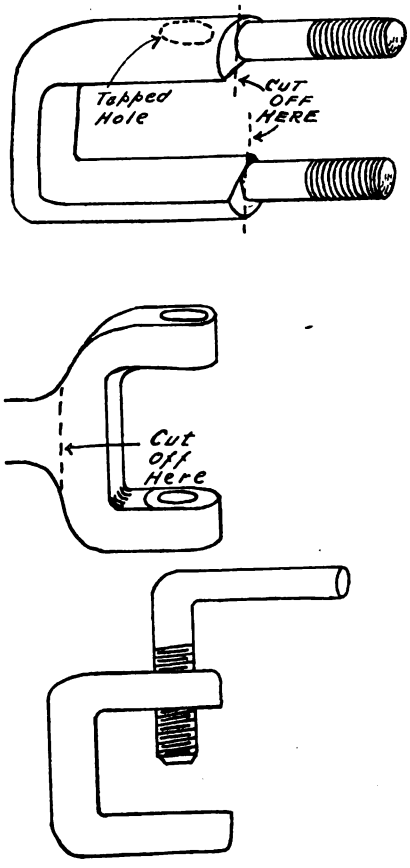
Now, if we take the cost which is $10.00 and divide it by 70 the percentage it represents, we get $14.28, the amount which Joe should have gotten for the goods he sold for $11.00.

For another example take a part which cost $3.50. Overhead expense, 20% plus profit of 10% totals 30%. As the part cost $3.50 it equals 100% less 30% or 10% it equals 100% less 30% or 10%. Then we divide $3.50 by 70, (the percentage it represents,) and get $5.00 or the selling price of the part.

Shop-Made Clamps for Small Work

G. A. LUERS

The average general repair shop has frequent need for clamps of various sizes for the small jobs such as drilling, riveting, filing and sawing. Large clamps are generally in plentiful supply for the average shop but they often



SHOP-MADE CLAMPS FOR SMALL WORK

prove too large on fine work and where a smaller clamp would be much more efficient. When clearance space is limited, or on small parts, the following described clamps will be found very efficient. To meet the situations as outlined these small clamps can be made up by any practical mechanic as illustrated.

The first of these clamps is made from a U-type spring fastener as shown in the illustration. The threaded ends of the clip are cut off and one arm of the remaining U-shaped piece drilled and tapped to accommodate a lever screw.

Another style of clamp may be fashioned from the yolks of brake and steering rod connections. These broken ends are trimmed as indicated in the illustration and one arm of the U-shaped piece tapped for a screw of proper size.

Clamps of this type can be made up during spare time and as the material used is generally to be found in the average scrap heap, the shop owner is put to little or no expense.

Let's Start a "Rebuilding Pays" Campaign

Rebuilding DOES Pay all down the line. It Pays the Car Owner the Repair Shop Owner, the Jobber and the Manufacturer.

Rebuilding Pays the Car Owner because it puts his car back in economical, reliable running order —uses less oil and gas and gives less trouble. It is expensive to run a dilapidated car.

Rebuilding Pays the Repair Shop Owner because he sells his shop services, keeps his men busy paying a profit. He sells all the parts and accessories necessary: Gaskets, Spark Plugs, Distributor Parts, Coil Parts, Magnetos, Generators, Starter Parts, Pistons, Rings, Valves, Gears, Bushings, Shackle Bolts, Springs, Tops, Top Materials, Upholstering and Windshield Parts.

It includes repairing, repainting, refinishing and upholstering, all depending on how thorough a job he has sold. Each rebuilding job means a fifty to a four hundred dollar sale, of which a good percentage is profit.

Rebuilding Pays the Jobber because he sells the repair shop owner practically all the accessories mentioned above. It opens up a chance for him to also sell the dealer the shop equipment that he must have to do the work successfully.

Rebuilding Pays the Manufacterer because he makes these parts and accessories and he makes the shop equipment.

Rebuilding Pays Because it is the Only Logical Solution of the Used Car Problem.

One dealer says, "'Trade In's' have taken away the profit on new car sales. We get loaded up with old cars of questionable value." Another says, "Practically all our sales are 'Trade In's'. We have got to make big allowances or we don't get the business and often lose money."

It is a fact;—the used car is a problem—too por to run—too good to throw away. "REBUILDING PAYS". It's the only solution.

From the Accessory Jobber's and Manufacturer's View Point.

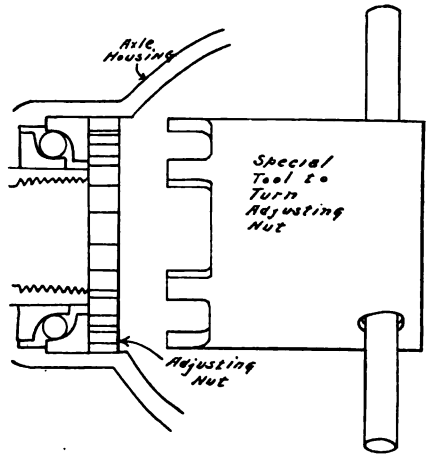
If the dealer sells a new car, they, the accessory men, get nothing, or, at most, an order for a bumper or spot light. If he sells a rebuilding job;—that's a different proposition. Here's where they score. They sell him practically everything that he uses on the job, plus the tools and equipment for doing it.

Rebuilding Pays is the Shop Owner's Slogan.

Here is the way I would advocate using it: Secure a dozen or two display cards or signs reading "REBUILDING PAYS", with nothing more on them. Display these cards or signs in the window, office, from the ceiling or walls of the garage and shop, or any other prominent place in or outside the building. In addition, use the slogan in your ads, letters, posters, etc.

To reap the benefit of a campaign of this sort it is, of course, essential that the shop do thorough, reliable work, the only kind of REBUILDING that **actually does pay.**

"Rebuilding Pays" as a slogan is brief, therefore, forceful. It doesn't tell the whole story. It leaves part of the motorists imagination, but seeing it displayed in connection with a garage or repair shop he at once knows that it refers



AN EASILY MADE TOOL FOR TURNING SLOTTED NUTS

to **car rebuilding** and it will start him thinking.

If the same force is put behind this that has been put behind the "Ask 'Em To Buy" movement it will mean a lot of extra satisfactory business.

Moth proof wool is said to be a recent development in Great Britain and we may now see a strike among moths deprived of what they must certainly have supposed was their rightful food.

A Special Tool for Turning Slotted Adjusting Nuts

G. A. LUERS

The adjusting nuts for ball and roller bearings are sometimes located inside the axle housing or the transmission of the car. When so located it is impractical to turn these with the usual spaner wrench and some other means must therefore be employed. The practice of using a chisel or a screw driver and a hammer to turn these nuts for adjustment is not to be recommended. A very serviceable and efficient socket tool can be made as shown in the accompanying illustration. This tool consists of a short length of steel tubing with four or six prongs which can be filed in or cut into the edge of the tubing with a hack saw. A hole through the body of the tubing allows for the insertion of the turning bar and thus facilitates the adjustment of the tightest nuts with little delay and no trouble.

Three Mysterious Cases of Engine Trouble

H. H. KUHLMAN

This past season I have had three cases of engine trouble that, while very easy and simple to remedy, were baffling to several garage men and still contain an air of mystery about them.

They were all of the same nature and the remedy, when the cause was located was easy. The owners of the cars complained that the engines would refuse to start at times. Other times the engines started easily but would stop without warning on the road. Several garage men had been trying to find the trouble but without results.

Every engine on those cars started and run perfectly and I was unable to find anything wrong, until I looked at the strainer under the gasoline supply tank. To my greatest amazement I found enough stuff to build a crow's nest, (As a fellow would say). There was hair, wood splinters, paper, broken cork and other things which retarded or shut down the flow of gasoline. I am still wondering how all this stuff got into the gasoline tank.

Few Are Fired—They Discharge Themselves

Once upon a time a shop owner acquired an ox and a horse to work the treadmill which operated the machinery in the shop.

One evening after a particularly hard day the ox said to the horse:—"Horse, we have finished a most strenuous day—it has been exhausting work and I am dead tired. On the morrow, let us pretend illness. Our master will not compel us to work when ill and we can lie here and rest for a day."

But the horse, true to the fabled stories of faithfulness and loyalty that have come down across the centuries would have none of it.

"No," said the horse. "Our master treats us fairly. He feeds us well, provides a clean place for us to sleep and cares for us in sickness. We must in turn operate his machinery so that he can do his work. You may pretend you are ill if you wish but I will work as well as I am able."

And so the ox feigned illness when the shop owner came to put the animals to work. Their owner therefore placed feed and water beside the ox, saw that he was comfortable and then put the horse to work alone.

All day long the ox lay comfortabally on his bed of clean straw and contentedly listened to the grind of the treadmill.

At night when the horse came in after his day's work the ox questioned him. "How did the work proceed today and what did our master say of me?"

"The work was hard today," replied the horse, " and as I had to work the treadmill alone we did not accomplish as much as we should have."

"Did not our master refer to my absence or illness?" again asked the ox.

"No," replied the horse. "He said nothing of you—he was too busily engaged with the work."

"Then I think" said the ox, "I will again play off sick tomorrow. It is certainly fine here in the soft, clean straw with nothing to do but to doze and blink and chew one's cud. You had better join me."

But the horse would not desert his master. And so on the next day the shop owner again placed feed and water beside the ox, saw that he was comfortable and again put the horse to work alone.

At night the ox again questioned the horse regarding the work. And the horse said: "The work seemed harder today and though both our master and myself labored with greater effort than ever the work seems to pile up more and more."

"Did our master refer to me?" asked the ox.

"He said nothing about you to me," returned the horse, " but when the butcher came in for some work he had done, our master had a long talk with him about the price of ox-meat."

The next time you find a man "lying down on the job"—let him read this story and then ask him to tell you the moral.

There's Work to do

(With apologies to George Lounsbury)

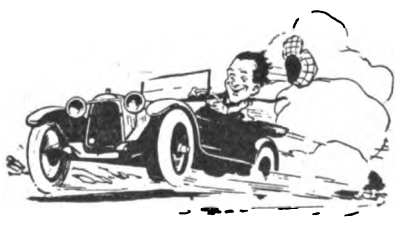
Old Man McJunk across the way to current scares has fallen prey; from morn to night he fumes and frets and all his other jobs forgets. He spends his days in fear and fright and fumes and stews throughout the night, and nearly has coniption fits for fear we'll all be on the fritz. No more he whistles cheerful songs nor hustles round with wrench or tongs. He has a cheerless face and sad—some undertaker will soon be glad.

I sit at night in slippered ease; all day I blithely work and please my patrons with a cheery tale as I do their jobs and take their kale. For strikes and wars I care no groat, they cannot get my pesky goat. This country will not go to pot; such fears as that are simply rot. There's no use feeling sad and blue, especially when there's work to do.

And down the street there's Flivver Jones, who feels things comin' in his bones. He thinks that other auto shops will open up like corn that pops. "Disaster's hangin' o'er our head—I really wish that I were dead. More shops" he moans, 'will bust us all; Our profits now are far too small. This new gazook who's movin' in will cut his prices down like sin, and we will have to meet his rates on sparkless plugs and springless plates. I might as well shut up the place and let the county feed my face.'

But I am not like neighbor Jones. I have no time for weeps or moans. I am not scared by shops anew, in fact I think we need a few. He may cut prices that is true—perhaps he'll cut 'em right in two. But I'll keep right on fixin' cars, and takin' coin and good cigars from patrons that are treated fair and charge a rate' won't curl their hair. And I'll do business right along and life well be one gladsome song. This fear of competition keen is only for the slot machine. Don't let it throw you in a stew, especially when there's work to do.

High Spots



Some men work harder to keep a soft job than they will to get a good job.

"It Don't take but a Mighty Small Smile to break up some mighty big clouds" ses Ol Si Clone.

The way the Shop Keeps its Owner depends most upon the way the owner keeps the shop.

O' Si Clone ses: "Gold fish air fine looking in the parlor fish pond but I ain't never found 'em listed on the menu card."

Not very Much Left of nineteen twenty-two. If there is anything you don't want left undone for this year better get busy right now.

Time was when a man reached 'round to his hip his hand grasped a gun, and the stuff they carry on the hip today is even more deadly.

"Look before you sign your name sounds to us like a purty good motto in these days of smooth talkers and city slicker" Se Ol man Eck Sperience.

Yes, give advice if folks ask you for it, but don't expect 'em to follow it after you give it, especially if it is just exactly what they should do.

"Stop—Think—Act"—how's that for a safety slogan? We found that in a shop the other day and it struck us as being pretty good and well-suited to pass on to "Our Folks."

Speaking of Safety Slogans reminds us of a slight change made in that well known "Stop, Look and Listen" of the railroads. Someone changed it to "Stop, Look and Live" and again we are struck by the appropriateness of it.

The Latest Packing Case for a Motor Car says a British exchange, is intended to be used as a garage for a car. Can you see the fine advertising value of a stunt of this kind? Imagine our own Henery F. for example announcing "Garage free with every Ford."

How About Placing Several Boxes of sand in and about the shop as fire extinguishers? Sand is an excellent medium for extinguishing flaming oil and it is an excellent precaution to have several boxes of this cheap and easily secured material handy in case of emergency.

THE TALE OF A DOG

Square Nut: "Did you hear about the blacksmith's wonderful dog?

Hex Nut: "No, what of him?"

Square Nut: "Well, the dog is very very clever—everytime the blacksmith throws a hammer at him he makes a bolt for the door.

Would You Hire a Railroad Engineer to build a house for you. or would you call in a man experienced in building construction, Yet some folks continue to turn their cars, trucks and tractors over to socalled mechanics who know about as much of these machines as the average two year old does of Greek. Your sound, practical experience in mechanics. with the help of "Our Journal" and a few text books will enable you to give better service to the car, truck and tractor owner then the average so-called auto-expert ever thought was possible.

Again We Warn You of the oily tongue of the sharper. It is always at work. And he doesn't except repair shop owners when he picks out his victims. Be carefull of the strangers who represent themselves as subscription solicitors and collectors. Don't subscribe to any paper unless you are certain that your visitor is an authorized representative, and even then it is best to send your money direct to the magazine. "Our Journal" is not now employing any special representatives. If any man or woman (yes sometimes the fakers wear skirts) tells you they represent "Our Journal" show him or her the door and call the dog. It is always safest to send your money right in to the office at Buffalo, N. Y.

Proper Collection Records Help Collections

You cannot keep after Delinquents Efficiently unless you keep Proper Collection Records. This article tells you How to Keep a Simple Record for Collecting Accounts Efficiently.

There is no doubt that many small, slow accounts are actually lost through inattention due in large part to poorly kept records on the one hand and to no records at all on the other. The time has long since past when memory can be trusted in order to accurately and successfully follow-up unpaid accounts. It is imperative that some records be kept of delinquent accounts and collections, and while a great many shop owners realize this, they have felt that a thoroughly efficient system is too expensive for them to adopt both in first cost and in the expense of upkeep. This belief, is, however, far from the fact, as it is the lack of such a system that is truly expensive.

The proper kind of collection records will bring the required accounts to your attention automatically. If the debtor's account is over due it should be brought to your attention at regular intervals. When a debtor promises to make payment on a certain date, the promise should also be remembered at the right time. Experience has proven that no ledger system, either the old style, loose leaf, or cards, will produce these results, except with a time cost so great that few men can spare it. The right method is to keep a separate card record of all accounts that are past due, and to keep this record properly duplicated that is, there should be an alphabetical card record giving all the ledger data as well as notation of promises to pay in the future, and there should also be a card record which will call the attention of the business man to each of the accounts at the right time and upon such dates when they require special attention.

At first thought, it might seem that such a system would still be more cumbersome as well as too expensive, but this idea is based on the supposed necessity of installing regular card filing cases, ordering specially printed cards and overlooking the slight amount of time actually required to keep up such a record, as well as the time saved in having the data wanted in handy form. While a regular filing equipment including specially printed and ruled cards is a fine thing to have, yet it is quite possible to get the same results with a couple of proper sized boxes and cards cut from old stock that can be found at any printer's.. It is thus possible for the smallest business to make us of the most efficient business methods without the usual high cost for expensive equipment.

The important points in keeping these records is to have a method of keeping the cards as nearly automatic as possible. When the monthly statements are made out, each over-due account should be entered on the duplicate card system mentioned. The form shown will be found convenient. This card shows at a galnce a past due balance of $251.10 and a promise to pay on February 20. It is a handy record to refer to in case more credit is requested before settlement is made, and no printed card or special ruling is required in order to carry out the idea.

At this same time this card is made out, another one should be filed which will come up automatically for attention on February 20th. This card may simply have the name of the debtor on it, so that attention will be called to his account at exactly the right time. On past due accounts where no promises have been made the card should come up weekly until some definite arrangement has been secured. Where a clerk or bookkeeper is employed, it should be his duty to bring these cards to the proprietor daily with statement and memorandum as may be necessary.

In the absence of a regular clerk or bookkeeper, it should be made a matter of first importance for the proprietor of the shop himself to take up the cards daily as well as to attend personally to the making of the proper notation and the proper filing. The time required is so little that it is merely a question of getting into the habit. There is another way of handling, that some shop owners prefer when taking personal charge of the collection file, and this is known as the Signal System. Various colored Clips are utilized, each color representing a different day in the week. Where this system is used a file with data and month card is unnecessary, as the clip is placed on the card in the alphabetical file with a different colored clip to indicate the particular week in the month that the day clip refers to. However, this is not merely as simple nor as effective as the date and month file, but it is certainly better than making no effort to bring accounts up for attention at the proper time.

In taking care of these records it is important that one or two rules should be made and rigidly adhered to. The person having charge of

Mr. Slow Pay - 39 Jones Rd.

Charges			Remarks	Payments		
1/1	160	80	2/5 Prom. Bal. - 2/20.	1/5	100	00
1/7	240	30		1/15	60	00

A SIMPLE CARD FILE WILL KEEP COLLECTION MATTERS BEFORE YOU AT ALL TIMES

these records should be made entirely responsible for them, and should be instructed to take no card out of the file except for the purpose of making the proper notations upon them, and the card should be returned to the file and in their proper place just as quickly as possible. Permitting the cards to be taken out of file indiscriminately and allowing them to lay about the office or shop cannot help but result in their being lost, thus resulting in incomplete records.

Miscellaneous Letters and Schemes

A letter used very effectively by a small town shop owner in collecting accounts from his brother merchants reads as follows:

You have a business of your own; isn't it true that some debtors are so pressistently slow as to make you wish sometimes that you had never taken their orders? You know how good it feels when a man pays up promptly—how it makes you feel like extending him favors. Let me feel that way about you.

Another letter used by a large business house, but which can be used as effectively by the business smith, is the following one:

Yes it's another bill.

You are tired of getting them, aren't you?

And frankly I am tired of sending them.

Why not save each other a lot of trouble? Mail me your check for that $12.00 today. You will be saved more time and trouble, and I will be saved time, trouble and postage.

The above letter may accompany the third or fourth bill going to an honest but slow paying customer.

Another letter which has proven an excellent one in getting payment of an account from that group of debtors which are usually described as fairly well-to-do, but slow or careless in taking care of their obligations. Debtors of this kind are sometimes permitted to run accounts for an unreasonable length of time, through fear of offending them and thus losing their trade. The accompanying letter is one that has been used very effectively on this class of delinquents:—

Your account at the present time amounts to $59.00. I appreciate your patronage, and trust that I may be favored with a continuation of your work. At this time I am trying to clean up all of my accounts as I am preparing to make a change in my bookkeping methods, and I would thank you very much to look up this bill. I'd not want you to take this letter as a dun but simply as a reminder and I know you will welcome it as much as we will welcome your check for the above amount.

A scheme which was worked successfully by an Ohio shop man collected an account which he had already charged to profit and loss, and upon which he had exhausted practically every scheme and stunt which he knew anything about. The delinquent happened to be a young man recently married, and the son of an old and well known citizen of the town and a customer of this particular shop. Naturally the shop owner, particularly anxious to serve the younger man, believed him to be of the same caliber as his father. He found out very shortly, however, that the young man was anything but reliable in his promises to pay, and after the account had run for quite a number of months, the shop owner thought of the idea of collecting the amount through his father. It would have been unwise to approach the father directly with regard to his son's delinquency, so the repairman made out a bill in the father's name and mailed it in the regular way. Naturally, of course, the young man's father called at the shop within a few days to remonstrate with the shop owner and to ask for an explanation. This of course was quickly made and apology made for sending the amount to the father, and he in this way brought the matter to the father's attention without seemingly intending to do so. A profuse apology on the part of the shop man had its effect upon the father and the final outcome of the apparent mistake was the payment of the account by the father and a continuation of the young man's trade along more conservative lines.

In closing this series of articles let us remember that collections properly pursued, win business. The delinquent customer who is reminded of his delinquent account every time he comes into your place of business, whether you speak of it or not, does not feel the same welcome when he enters your establishment as does the customer who keeps his account paid up. The man who is persistently slow in settling his bills with you is inclined to take his trade somewhere else, when his account becomes over large or has run over long.

You can do much toward keeping these customers coming steadily to your shop, by following up collections persistently, firmly and courteously. If a customer takes his trade to some other shop because he has an unpaid bill at your establishment, don't under any circumstances let the blame fall upon yourself because of carelessness in soliciting collections or lack of persistency in your collection methods.

Editor's Note:—This is the last of this series of articles on Collecting a new series will start next month in which letters and other methods of collecting accounts will be suggested and detailed. In the meantime, if you have any collection troubles let the Editors know about them and they gladly discuss the matter in these colmuns for the good of all readers. No names will be published in connection with these discussions. If you have a letter or scheme that has collected money tell the Editors about it.

How Ford is Able to Turn 'Em Out So Quickly

The methods and plans of assembling Ford cars as used in the Ford plant are based on two principles as follows: First:—a man shall never need to take more than one step if it can be avoided and; Second:—a man need never stoop over. These principles, of course, necessitate placing the tools in such a way that they come to hand when needed, at the proper level and in the proper sequence, and also that the work progresses or moves along on the same level.

The first experiment along this line was conducted by the Ford Company in April, 1913, when flywheel magnetos were assembled in this manner, basing the general plan on the overhead trolley used by the Chicago packers. The net result, after some modifications and subsequent speeding up, was to cut the assembling time for this unit from 20 minutes to 5. That is, one man did the work formerly requiring four. When applied to the motor, one man was able to do the work of three.

Where and What Would You Be if you depended upon yourself alone for new methods, new ideas and new hints and kinks? What would you know today if you simply depended upon your very own experience and observations? We are one and all dependent upon our fellows for broader knowledge and wider experience. And just as we learn from our fellow workers and brother craftsmen so they also learn from us. A liberal exchange of ideas, hints and practical methods makes for a better general knowledge of the trade, the business and the men in the craft. Let us all get the habit of giving of our experience and knowledge for the general good—for the general broadening of the craft and its members.

Every Fair Minded Business Man knows that poor work is profitless. Yet some shop mechanics and some shop owners too, go on year after year turning out careless, slipshod work and then wonder why they do not succeed.

Tales of Trips and Tours

BY

"WANDERER"

The tales here related are the experiences of a traveller through the highways and by-ways of the country districts. In his wanderings about he meets many members of the craft, stops at many shops and has many experiences. The tales of his experiences are interesting and carry with them many practical suggestions. They run the entire range of craft activities as will be noted as you follow his tales month after month. The experiences he relates are Facts not Fancy.

How Sam Thomas Sells 'Em Christmas Cheer

"What do' y' mean—Christmas trade?" retorted Joe Harris when Sam Thomas in response to Joe's query said he was getting ready for his Christmas trade.

"Y' don't mean t' tell me that you expect to' do any Christmas business in this dump!" Continued Joe. "Why y' won't do enough business from now 'till spring t' keep a gold fish in fish flakes." And with that Joe settled down on one of the boxes that Sam had just received from the drayman.

"Well, you aught to know" came from Sam as he looked up from his unpacking of the newly arrived cases. "You were in business when I was serving my apprenticeship." And Sam arranged another pile of bright cartons and boxes on the accessory counter.

"Y' bet I ought t' know." Came from Joe between puffs of his newly lighted pipe. "Why sum years I closed up the old shop after Thanksgivin' Day and didn't open up again till long about the last o' February. Usually worked over at the Marsh Mills in the meantime. Why y' can't make enough during the winter months t' keep a rabbit alive. I know, ain't I tried it. Didn't I plug along in that old shop o' mine for years an' then hev' t' quite and git me a steady job over at Marsh's?" And Joe emphasized his remarks by pounding his first upon the case next to him.

And then after a temporary catching of breath he again returned to the original line of argument.

"Christmas trade" he began derisively. "Why Sam, y' don't mean t' tell me y' can sell toys an' smokin' jackets, holliday cigars and fancy neckties in this place and compete with the stores on Main street! Y' must be gettin' foolish in yer young age."

At this point Sam straightened from his labors, deposited another pile of gaudy boxes on the show case and began: "Yes—I'm preparing for my Christmas trade and what's more, practically all of the stock you've watched me unpack here will be sold as Christmas presents too. And as for smoking jackets, fancy neckties and Christmas cigars—who said anything about them, or toys, either. I didn't say a word about competing with toy stores or necktie shops. What I'm going to sell to my Christmas trade is my regular line just as I have for five years past, and as you seem to be so set on my not making enough rabbit food for a pair of gold fish let me tell you that my Christmas sales carry a greater percentage of profit than any sales made during all the rest of the year."

At this point Sam had finished with his unpacking process and after drawing up an empty case to the counters edge he proceeded to open the packages and cartons that he had piled upon his counter and show case.

"Don't try to josh me" started Joe as Sam proceeded to unwrap the parcels of green and red and holly decorated boxes. "I wasn't born yesterday, remember. I was in this business of running a repair shop before you were and I tried 'bout everything on the program t' make the shop and the sidelines pay."

"Well, y' may have tried hard enough, Joe" came back Sam. "But I never could see how a man could make anything pay that he treated as a side line. There isn't a thing in this shop or in the store either that is considered a side line. Everything I do and everything I sell is a main line. I don't treat anything as a side line and I don't allow any of my men to treat anything or anybody as a side line."

Up to this time I had kept a discreet silence, but now seeing that the discussion was likely to get away from the subject of Christmas trade I interposed! "Well, tell us about this Christmas trade hobby of yours Sam. I'd like to hear the story for I'm pretty sure there is something worth while back of your very pointed remarks."

"Well, let me begin from the beginning" and Sam attacked another pile of packages.

"Several years ago a chap named Thornton gave me the idea of selling shop things at Christmas time. Thornton was an old-time smith with more pep, spunk and modern ideas than the average New York salesman thinks he has. I served part of my apprenticeship with Old Ted Thornton and a finer, cleaner, straighter man never drew the breath of life. He was the one who started the shop and store idea. He was the one who suggested putting a bit of holly ribbon or red and green paper on some of the articles sold about the shop and thus sharing in the Christmas trade. And ever since then I've been getting a fair share of the pile of money that is spent for presents at Christmas time.

"Now take this set of spark plugs for example" and here Sam took a neat box from the pile on the counter. It was decorated with a holly design and appeared more like a box of bon bons than sparking contrivances. Opening it Sam continued. "There is no reason why that cannot be made a pleasing Christmas gift as well as anything else. And when it comes to preferring cigars or spark plugs the majority of men will choose the spark plugs every time. For you know the quality of the average Christmas cigar that is purchased by a man's wife.

"This is a set of good make—it is neatly packed in a holly box and with the little presentation card that goes with it the whole thing will make a complete gift

A Bunch of wild neckties will make him See Spots But a SPOT LIGHT will make Him See Safely

THE SPOT LIGHT SHOWS UP THE CHRISTMAS NECKTIE

and one that will appeal to the motorists wife. It will certainly go a considerably greater distance toward pleasing friend husband than a box of Christmas smokes that couldn't be sold to anyone but a woman."

"But tell me how you get your ideas across?" I suggested, for I was willing to concede the excellence of the ideas but I could not see how it could be put over or how customers could be sold on it.

"It is very simple" returned Sam, now holding up a motometer which he had just removed from a neatly decorated red and green box. "This doesn't look much like a Christmas present to anyone who is thinking of presents in the form of candy and toys. But some one of these days I am going to see Mrs. Jones, or Mrs. Smith or Mrs. Brown. Their husbands each drive large cars. They can afford a motor temperature indicator and they cannot afford to have their motors put out of commission. When I see either of those women I am going to speak of Christmas and Christmas presents. I am going to suggest a motometer for Tom, Dick or Harry's present and I will sell at least one out of three.

"You see," continued Sam. "The repair shop owner in a town like this is in a very peculiar position. He knows his customers intimately. Beside doing business with my customers I meet them at church, at lodge, at village affairs and I know their families. I can talk to my customers as no big city shop or garage owner would dare to speak. I know their sons, and daughters. When son comes in with the flivver or truck, I again bring up the subject of Christmas presents and it certainly doesn't take a great deal of gray matter to suggest something for son to give dad.

"Of course, each case has to be treated individually and a man has to know his trade and his customers well. Then too these will help." And here Sam unrolled a bundle of posters and hangers which he took from beneath the counter.

"These will be hung up in the shop and garage and in the windows of the office so they can be seen from out doors. Beside that every one of my customers will receive two letters on the Christmas idea. The first of these letters will be addressed to Mr. Customer's wife and will suggest a number of suitable presents and will give prices. These items will range all the way from fifty cents to fifteen dollars. And they will include spot lights, motometers, stop signals, chains, tires, and pretty near everything that can be hung on a car. The second letter will be sent to Mr. Customer himself and this will list such things as car heaters, foot warmers, car robes, warm driving gloves and similar items that are intended to make driving a comfort to the women generally. And let me tell you man it will mean business for this establishment."

Here Joe again came into action. "Well, it sounds almost reasonable" he said still reluctant to give in to Sam's idea. "O' course, with all thet work o' talkin' t' the women and gittin' out a lot o' fancy talkin' letters and then trimmin' up them things in them thare gaudy boxes, why most anybody could fool a lot o' women into spendin' a lot of their husbands hard earned money. Maybe it is all right Sam, but I don't believe I'd a' done it when I was running shop, even if I'd a thought of it."

At this, Sam warmed up a bit. "Why you old moss back—To hear you talk you'd think that business was something to be ashamed of. I want you to know that there isn't a thing goes on in this whole place, either in the shop out there, in the garage next here or in this store that won't stand the searching eye of the most exacting judge. If the several plans for securing business that I have just outlined are not clean, honest and proper than the the man who pilfers the poor box is an angel and the person who supports a charity is a scoundrel for so doing."

Joe hardly knew how to take Sam's retort and in the interval of tense silence during which Sam finished his unwrapping process

A Trick Pipe will jar His even temper But a Bumper will save many Jars

THE BUMPER JARS THE TRICK PIPE FOR A CHRISTMAS SURPRISE

and proceeded to make a pleasing display of his new goods on the show case, counter and shelves I again interposed.

"It sounds like very excellent business to me, Sam. You surely have the right idea when it comes to boosting for business. That sign there however, reading: 'A Christmas Suggestion' doesn't look complete to me. Didn't the printers make a mistake?"

At this Sam took up a spot light, polished it up with his handy "shammy". Set the spot light on a little stand made for it, placed the sign, to which I referred, back of the spot light and then placed a price ticket on the lamp.

"There, is it complete now?" Asked Sam as I viewed his work.

"Fine!" was my exclamation. "I guess you know what you are doing all right."

And with this I thumbed through the half dozen other card signs at Sam's invitation.

"May be you'd like to look through the other signs in this pile" said Sam in handing them

over the counter. "There may be some there that are a bit too conservative for friend Joe but I think they will appeal to you."

The first after the "Suggestion" sign read:—"Why buy him cigars he can't smoke when an auto-cigar lighter will make him happy."

Another one read:—"Any he-man would rather have her buy him a Safety Signal than a safety razor for Christmas."

A fourth read:—"A bunch of wild neckties will make him see spots, but a spot light will make him see safely."

Still another was worded as follows:—"A trick pipe will jar his even temper, but a bumper will save many jars."

"Say, those are great, Sam" said I laughing at the humor of the cards. "They will give people something to think about and everyone of them preaches the gospel of a useful Christmas. I can see now why you are so serious about this Christmas idea. It is really a smashing good business stunt and then too you are getting folks to think rationally of gift giving. Just as the Sane Fourth has given way to the insane kind so you are boosting for a rational Christmas with sensible gifts."

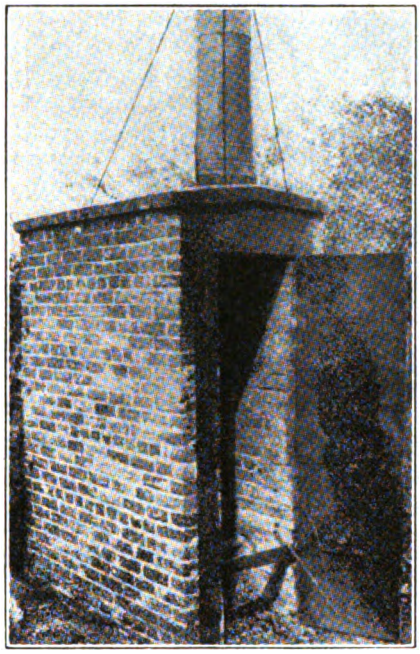
From all of which you, Mr. Reader can take a lesson with profit to your own business.

A Spark-Proof Furnace for Heating Tires

In response to several recent requests we are pleased to publish here a description of a tire-heating furnace planned, built and described several years ago by Mr. A. S. McArther. This furnace may be built as a separate unit as pictured or it may be built against the shop wall and outside with the door to the furnace opening into the shop, as suggested by L. M. J., Indiana in his query. We are republishing Mr. McArthur's description of this furnace as it appeared in these columns previously.

In the matter of setting heavy tires I was in a quandary for several years for some way of heating them without endangering the town from open fires. Finally I studied out and built a brick furnace which I have since used with great satisfaction. Thinking that a picture and description of it might be interesting to your readers I submit the following.

Foundation, cement; furnace, 29 rows of brick; ash space 5 rows; fire place, 20 rows; top deck, 2 rows; roof, 2 rows. The inside is 18 inches wide and takes a tire 4 feet 9 inches in height. Built in with the fifth row of brick are two heavy iron cross bars for the tires to rest on. Level with the top of the doorway are four or five flat iron cross bars on which rests a piece of sheet iron fitted neatly to the brick in width and extending from the front to within eight inches of the back of the furnace.



A SPARK-PROOF FURNACE FOR HEATING TIRES

This forms a top deck or baffle in the draft where all the sparks fall; they do not make a second turn. The smoke has to enter the top deck at the back and come forward to the front before going up the chimney.

On the top of the twenty-seventh row of bricks are built in five or six flat iron bars or rafters, crowning about two inches. These are overlaid with sheet iron (except the opening for the chimney) and covered with a row of brick. On this row is set the base for the chimney. Then the last row of brick is laid, projecting all around for appearance, and the water-drip finished over all with a good coat of cement, which leaves the roof waterproof.

The chimney is 12 inches in diameter and 6 feet high, stayed with three guy wires, as seen in the illustration.

The door frame is 4-inch band iron. The top corners are held firmly by back plate riveted across the joint. Level with the bottom of the tire space is a 2 by ½-inch iron riveted firmly to the back of the frame. The three doors are made of No. 12 gauge sheet iron and are 12 inches wide, lapping 1½ inches on the brick wall, hinged with butt hinges, put on with ¼-flat head stove bolts, countersunk door is swung on three hinges. The doors are hinged, latched and completed before attaching the frame inside, nuts on outside. The top to the furnace.

The chimney base is made of 12-gauge sheet iron, bent to an oval, edges meeting evenly and held by inside plate and countersunk bolt, nuts inside. On end is split up 1½ inches, about every 1½ inches all around. These split pieces are then bent out to a square, open at top and set in on top of this flange, holding it firmly in place. The chimney pipe is common galvanized iron, two lengths.

In the doorway is seen an iron poker with a special hook on the end. I open the second door and if the tires are heating too much in one place I grip the edges with this hook and pull them around. I do not need, therefore, to open the top door until I want to take out a tire. I find, too that this method requires only half the fuel.

As reinforcement for the brickwork I had 14 stay-irons placed in the wall lengthways and four or five crossways at the back end.

Long stay-irons are made of old steel buggy tire, rounded up and threaded to a half inch at one end and 1-inch square bend at the other end to hold against the brick. The short stay-irons are ⅜ inch round, with a washer and nut on each end.

To begin building, the first thing needed is a false door frame. Use 1-inch board, 7 inches wide, make it the same width inside as furnace, that is, 18 inches, and place it in position where you wish the front of the furnace, plumb it both ways and stay it firmly with a brace at the top. Then build the brickwork to it. As you work up and want to use a stay-iron bore a 9/16-inch hole where needed and run the threaded end of the iron through this hole until the hook at the other end comes against the brick, and so on until finished. Then remove your false frame intact, lay it evenly on top of your iron frame and mark all those holes on your iron frame. Then bore those holes 5/8 of an inch. Now place your frame

into your furnace, screw up the nuts, and your frame and doors are all held solidly and firmly, and the furnace is ready for use. In fitting the doors to the frame leave a good 1/8 inch between the doors for expansion, and also 1/8 inch between the door and the frame.

No. 12 gauge iron can be purchased in sheets of 30 by 72 inches from any hardware dealer. One sheet being all that is necessary for a furnace.

The brick used was ordinary good, hard building brick. Should I build another furnace, however I would allow four rows of brick for the ash space and three rows for the top deck. My furnace, counting my own time cost me about $25.

BLACKSMITHS TEACH TRADE TO ORPHANS IN NEAR EAST

Americans Organize Blacksmith Shops in Near East

America which is rapidly abandoning her smithies for garages and transforming her horseshoers to motor mechanics, is producing village blacksmiths for the Near East. The necessity grew out of the need to shoe ox teams which American relief workers were transporting wood for the Near East Relief orphanages. It developed with the additional necessity of making by hand every form of tool from a hammer to an ax, for not only have most of the blacksmiths been killed, but the country has been stripped of all iron and steel things by invading armies.

Rising to the emergency, relief workers recruiting the few available blacksmiths as instructors and organized a smithy for some of the older boys among the 25,000 orphans quartered at Alexandropol, frequently referred to as the orphan city because the juvenile population out numbers the adult ten to one. The smithy is now not only shoeing the oxen, but is also providing sorely needed tools for the orphanages and relief warehouses. What is probably much more important, the children are trained for the work of reconstructing destroyed villages.

Boys are now making everything from hinges to ox-carts. It has been found that after six month's apprenticeship the boys are qualified to shoe oxen. Although the natives are interested in the tractors sent over by the Near East Relief for use on the Alexandropol plain, oxen will continue to be the chief motor power for the steep hillside farming.

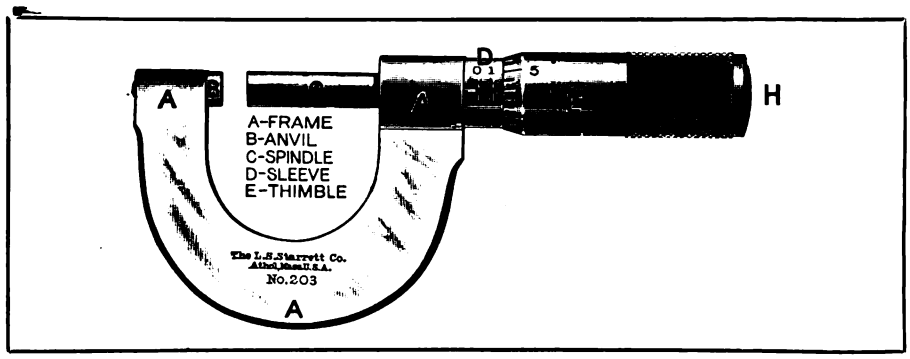
Blacksmiths will probably always play a very important part in the life of the Near East where horses, mules and camels are the chief motor power. Creating blacksmiths is only one of the many important phases of Near East Relief work. Approximately 100,000 children are being clothed, fed and educated by generous-hearted Americans to take their part in the rebuilding of the Near East. This number will undoubtedly be greatly augmented because of the Smyrna disaster, and the exodus of hundreds of thousands of old men, the women and the children, panic-stricken and homeless refugees from Asia Minor and Eastern Thrace.

How to Read a Micrometer Caliper

Several recent requests from readers for information on micrometer calipers indicates that a description of how to read a micrometer caliper correctly would be of interest and practical value to our readers.

The accompanying article on the subject is published through the courtesy of the L. S. Starrett Company, manufacturers of these and other fine tools.

The spindle C, is attached to the thimble E, on the inside, at the point H. The part of the spindle which is concealed within the sleeve and the thimble is threaded to fit a nut in the frame A. The frame being held stationary, the thimble E is revolved by the thumb and finger, and the spindle C being attached to the thimble revolves with it, and moves through the nut in the frame, approaching or receding from the anvil B. The article to be measured is placed between the anvil B and the spindle C. The measurement of the opening between the anvil and the spindle is shown by the lines and figures on the sleeve D and the thimble E.

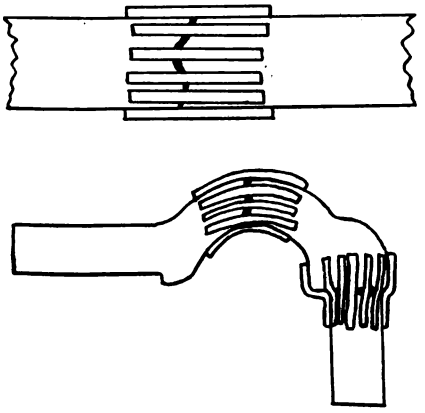


THE FRAME AND SLEEVE OF THE MICROMETER CALIPER ARE STATIONARY WHILE THE SPINDLE AND THIMBLE ARE CONNECTED AND REVOLVE

The pitch of the screw threads on the concealed part of the spindle is 40 to an inch. One complete revolution of the spindle therefore moves it longitudinally one fortieth (or twenty-five thousandths) of an inch. The sleeve D is marked with 40 lines to the inch, corresponding

to the number of threads on the spindle. When the caliper is closed, the beveled edge of the thimble coincides with the line marked /o/ on the sleeve, and the /o/ line on the thimble agrees with the horizontal line on the sleeve. If the caliper is now opened by revolving the thimble until the o line on the distance between the anvil B and horizontal line on the sleeve, the distance betwen the anvil B and the spindle C is then 1/40 or .025) of an inch, and the beveled edge of the thimble will coincide with the second vertical line on the sleeve. Each vertical line on the sleeve indicates a distance of 1/40 of an inch. Every fourth line is made longer than the others, and is numbered 0, 1, 2, 3, etc. Each numbered line indicates a distance of four times 1/40 of an inch, or one-tenth.

The beveled edge of the thimble is marked in twenty-five divisions, and every fifth line is numbered, from 0 to 25. Rotating the thimble from one of these marks to the next moves the spindle longitudinally 1/25 of twenty-five thousandths,



MR. GAZA TELLS BENTON HOW TO REPAIR MALLEABLE PARTS

or one thousandth of an inch. Rotating in two divisions indicates two thousandths, etc. Twenty-five divisions will indicate a complete revolution, .025 or 1/40 of an inch.

To read the caliper, therefore, multiply the number of verticle division visible on the sleeve by 25, and add the number of divisions on the bevel of the thimble, from 0 to the line which coincides with the horizontal line on the sleeve. For example, as the tool is represented in the engraving, there are seven divisions visible on the sleeve. Multiply this number by 25 and add the number of divisions shown on the bevel of the thimble 3. The micrometer is open one hundred and seventy--eight thousandhts. (7x25=175+3=178.)

Benton's Recipe Book

Quick Action

The response to my suggestion in the October number has demonstrated the fine loyalty and interest "Our Folks" have for "Our Journal." Copies of October had hardly reached members of the family when recipes and letters started coming in. It is just fine to see such co-operation and I hope that you good readers keep up the good work.

Many readers have written to say that they consider this column one of the most interesting and valuable departments in "Our Journal" and with the help of "Our Folks" we can make it of increasing importance, interest and value.

So, good folks, send in your recipes for publication. I want to give each and everyone of you credit for at least one good, tried formula or suggestion. There is room in this department for a great many formulas and recipes on all subjects connected with repair shop work and I want you Mr. Reader to send in at least one good item.

One of the first readers to follow my suggestion in October was Bro. J. M. Gaza of Kansas. This good member of our family of readers sends in a receipe for tempering plow lays. I am glad to give his letter space here:—

> In the October number you ask for receipes and here is one for luck. This is a receipe for tempering Plow Lays:—Take 50 gals. of rain Water; 50 lbs. of common salt; and 10 lbs. of potash. Heat the lays to a dull red and plunge in point first.

Bro. Gaza also submits a method of repairing malleable iron that he calls "Stripping." He is strong in his praise of this method of repairing malleable iron parts and I am pleased to give it to "Our Folks" just as Bro. Gaza explains it.

Come again Bro. Gaza. We want more such hints. We are glad to know that there is more material for the Column and hope you will not wait long to send it along.

It would be interesting to know if any other members of the family have used Bro. Gaza's method of "stripping" for malleable repairs.

We have had all kinds of talk on welding and brazing but nothing on repairing malleable iron and how to braze it so as to be as strong and in seven places out of ten far stronger than originally. I, myself call this method stripping. I have been doing this stripping on malleable iron for about eight years and have had only two pieces to give away on me. But there was a reason for this as the pieces were subjected to more than new malleables could begin to stand. With all the welders I run across I have found only one man that knew how to do this work.

Here is the way I go at it:—I take the broken malleable and clean it with emery wheel or file and chissel as may be necessary. Depends on the shape as in some cases you can get at it with an emery wheel while at other times a file and chissel has to do. It must be cleaned bright so it is free from rust, grease, paint and sand. Then I cut strips from round Bessimer steel in sizes from 3/16 to ½ inch depending on the size of the malleable and shape the strips to meet the shape and strength of the malleable. The strips are cut from one to two or two and one-half inches and in some cases four inches long. Then I put my malleable on leveling plate and fit it up as it should be. Now I lay a strip across the brake and braze it on with bronze using a brazing torch. When it is brazed, I take a second strip and lay it about 1/8 to 3/16 of an inch from the first one and braze this one on. I proceed in this way until I have enough strips to stand the strain. If you can't put enough on one side put another batch on whatever side you can 'till you have it strong enough.

You will have to figure the number and size of the strips it will take and also on how many sides you can braze. In fact you will find that you have to lay strips wherever the shape of malleable will allow. Remember that this is an expensive job. In my experience, however, farmers don't care so much for the cost if you can prove to them that you can do it to stand the strains so the binder, mower. tractor or car can go to work in just a few hours from the time they break down. Of course, you will find that stripping isn't pleasant work by a long shot. It is hard and mean in every way. You cannot work at it too long without a stop. I can stand the work for about an hour and a half before the fumes begin to work on me. My helper can stand it for about thirty minutes. The last long run I had a year ago was for over three hours. That cost me seven weeks lay-off and a doctor bill. My price on stripping is from $1.00 to $1.15 per hour plus the supplies necessary:—bronze, gas and steel.

Later on I will send more dope on malleable work and the kinds of fluxes for cast welding.

Who is next?—This good batch of material from Bro. Gaza should start some other good readers to thinking of their good repair stunts and methods.

Here' A Suggestion for the Christmas Season—get a new subscriber to "Our Journal"—that will bring an entire year of good cheer to the new reader, it will bring you a six month's credit on your own account and it will cheer us as little else could. Try a triple delivery of Christmas cheer in this way.

Queries-Answers-Notes

THIS department is the place for discussing shop and business matters. Here you may ask for information on any topics or matters that interest you; bring to the attention of the progressive craftsmen of the day the subjects that should have their attention. You are requested to make use of this department as often as desired.

How to Read a Micrometer:—Will you kindly give me simple and easily understood directions for reading the micrometer? L. H. P., Indiana.

In Reply:—An article in this issue gives full and complete directions for reading a micrometer caliper. We trust that this article will give our Indiana reader the information he requires. S. S. D.

Remove Mower Wrist Pin:—We would be pleased to hear from some of the readers of "Our Journal" on their method of removing and replacing wrist pins on mowers. W. P. Norris & Son, Indiana.

Closed and Open Circuit:—What is the difference a closed current and an open circuit? P. Wand, New York.

In Reply:—Mr. Wand evidently refers to the open and closed circuit interruptors used in ignition systems. The open circuit system consists of a single non-vibrator coil, timer and distributor. In this system the contact points are normally open. The cam is attached to a shaft usually driven from the cam shaft, and must therefore be set so that the high point on the cam will raise the arm so that it will make contact at the proper time. The spark does not occur at the spark plug when the contact is made but when the contact is broken.

On the other hand, in the closed circuit system the contact points are normally closed and the high point on the cam raises the interruptor, thus opening the points with a single operation. Thus the closed primary circuit of the coil is interrupted and hence its name "interruptor" as it is often called. The closed circuit ignition system using a non-vibrator coil and a closed circuit interruptor in connection with a distributor is the modern battery and coil ignition system S. S. D.

Installing an Air Compressor:—I am considering the installation of an air compressor and would like to have some idea on the points to consider in connection with the purchase of such a machine. There are quite a number of these machines on the market and inasmuch as I have no experience with these machines I would like very much to have the Editor or readers give me all the information they can that will assist me in putting one of these machines into use.

J. F. W., New York

In Reply:—There are quite a number of air compressors on the market for use in the repair shop and garage. There are two types of these (1) the air cooled compressor and (2) the water cooled compressor. It is recommended that where an air compressor is used continuously the water cooled type be installed. It is well when purchasing the compressor to secure one that is over-size rather than to small, as you will find as a general rule that business will grow rather than diminish after the installation of an air compressor, and it is rather hard on a compressor to be operated continuously as is necessary when it is under-size for the work it is intended to do.

Air compressors are driven either by a belt from a line shaft or by an electric motor. There are many self-contained types on the market, these machines including an air compressor, a motor for operating the compressor and a tank for the storage of the compressed air.

Again, these machines may be purchased either portable or stationary, and your selection of the type proper for your use will depend upon your individual conditions. The portable type may be moved to different parts of the shop or garage. It is usually operated by an electric motor which is supplied with current by an attachment plug which may be screwed into a lamp socket anywhere about the shop.

If a stationary compressor is installed it is well to locate the compressor on a firm foundation and at such a point where the pipes will not need to extend for any great distance. It should also be located where fresh air will be drawn into the compressor and not where it will draw in gasoline fumes, smoke or soot. It is an excellent idea to draw the air from outside the building and through an intake that is well screened. In connection with the location of a stationary compressor it should be borne in mind that the storage tank will need to be drained at frequent intervals. This is because of the fact that the vapor from the air condenses and facilities for easy draining should be made.

All connections for the air pipes should be made absolutely air tight and joints in the pipeing should be made by using shellack or some other mixture in order to secure absolutely air tight joints .The size of the pipe will, of course, depend upon the type and size of the compressor. The size recommended by the manufacturer should be used.

The outlet pipe leading from the storage tank should be connected into the tank at as high a point as possible in order to avoid water condensation reaching the tires.

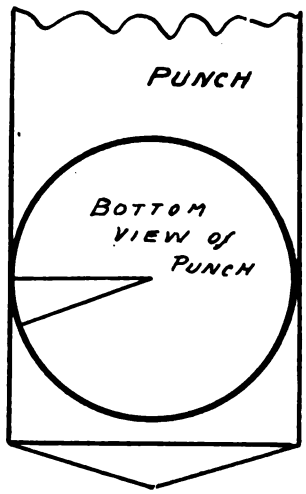
If you have not previously offered your customer free air service you will find it an excellent business booster. There are of course, many motorists who will take advantage of your free air service without patronizing your shop or without buying accessories. However, free air service brings a great many motors to your door and enables you to keep in touch with many more prospective customers than you would otherwise have. S. S. D.

Maker of Harrow Part—I have a harrow in for repair and cannot find out where it is made. There are several end clips on the bar which are broken and gone. The number on these clips is "2H19". I would be very much obliged to you if you could let me know where this harrow is manufactured and by whom.

John W. Meixner, Wisconsin.

In Reply:—The repairs mentioned as bearing the simbol " 2H 19" we believe can be supplied by the Madison Plow Co., Madison, Wisconsin,—I. H. C.—Illinois.

An Improved Punch:—In a recent issue Mr. G. A. Luers described a punch for cutting bolt and rivet holes. I made one very similiar to this last winter but I made the cutter of somewhat different shape. Instead of flat punch as shown in Mr. Luer's design I made the cutter as



MR. SIGHERS SUGGESTS AN IMPROVED PUNCH

shown in the accompanying engraving. With a punch or cutter in this shape the material will be sheared out of the sheet and the punch will work to a center—punch mark and there is no chance of it slipping on the material to be cut.

In my device I also located the lever so as to be operated from the front of the machine. In this way one man can operate the punch alone.

George Sighers, N. Dakota.

Laying a Concrete Floor:—During the coming Winter we plan to lay a new floor of concrete in the shop. We feel that we can easily do this ourselves during the slack season. Will you kindly give us some points on this work? Also tell us something of the suitability of concrete and how to mix it, lay it, and the proper tions to use. H. K., Canada

In Reply:—For the average general repair shop, cement concrete is generally acknowledge to be the best material for floor use.

Machine workers generally, however, do not like cement floors as it is rather hard on the feet of machine operators or men who are compelled to stand for any length of time before machines or beside the forge. Wood in many ways is an excellent floor material, but is inclined to rot in a short time.

In planning your floor it would be an excellent idea to re-arrange your machines and equipment, and at the points where

men are compelled to stand for any great length of time we suggest your arranging depressions in the concrete so that wood inserts can be used for the men to stand upon.

Draw up a plan, which should be drawn to scale. Place each machine just exactly where you want it to be permanently. Take careful note of pipes and drains throughout the entire plan and then arrange for the laying of the foundation that will be in thorough keeping with the work it is to do. In other words, do not attempt to economize on the foundation beneath your concrete.

It is well to bear in mind just how the floor should be drained before even starting your foundation. Sometimes it is convenient to give the entire floor a slight pitch in one direction. In other cases it is well to have the floor drain two ways. The number of drains installed will, of course, depend upon the size of the floor. It is well to have one or two too many than to have a floor drain slowly or improperly.

If procurable, cinders make an excellent foundation material. These should be spread carefully with due regard to the placing of the drains and to the slope of the finished floor. The cinders are well tamped and spread to a depth of from 3 to 4 inches below the intended surface for the finished floor.

Strips of two by four are used to lay out square sections and these are spaced 6 or 7 feet apart. The strips are held in place by stakes and the alternate spaces are filled first. The cross pieces are now taken out and the remaining spaces filled. This will enable you to work around the first squares without stepping on the filling material or using boards.

The proper proportions of cement and gravel for the base of the floor and for placing on top of the thoroughly tamped cinders is one part cement to five parts of good quality gravel. If crushed stone is used, use one part cement with two and one-half parts good sharp sand and five parts of stone. The proportions for the top dressing are one part cement to two parts good sharp sand.

MR. BRODRIBB OF AUSTRALIA BUILDS MAIZE THRESHERS

In filling in with the gravel and cement bases the wood forms are employed, and this mixture should be used to fill in up to within ½ to ¾ of an inch of the intended floor surface. This cement and gravel formation is throughly tamped and the top finishing dressing immediately applied. The top dressing is well smoothed and struck off with a perfect straight edge resting the ends of the straight edge on property spaced wood strips.

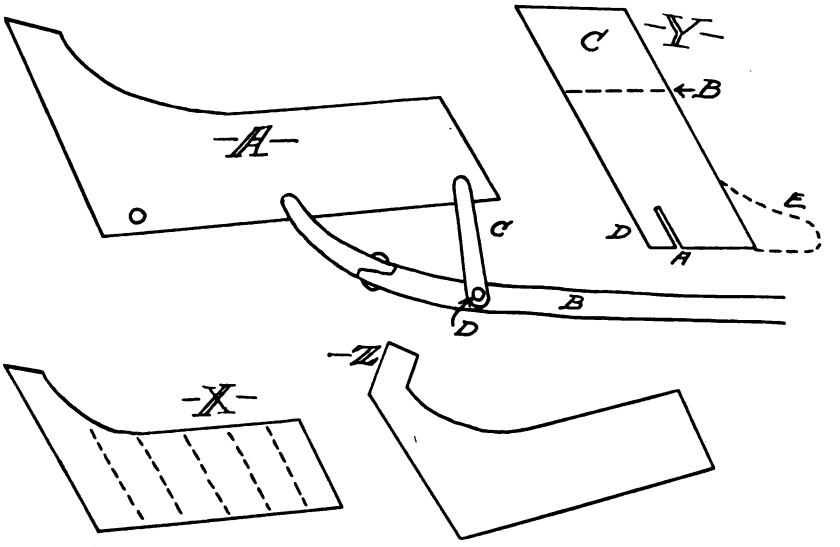
After striking off the top dressing allow the work to stand for an hour or so for the excess water to settle before the final trowelling is started. , S. S. D.

A Corn Thresher—A Plowshare Tongs Some Plow Pointing Hints—From an Honor Roll Reader.—I am sending money order for subscription to "Our Journal" I may as well tell you that I intend to keep my name permanently on the "Honor Roll." I would not do without "Our Journal" even if it cost three times as much.

Besides my other work I also build maize threshers and I am sending you a picture for publication of my first machine which has been working satisfactorily for about five years.

The handy tongs for holding plow shares is shown in the illustration One jaw has a tip which passes through the bolt hole in the share from the countersunk side. The other jaw has a half circle cut out to correspond with the tip. Both jaws are offset sufficiently you will easily see what amount when you place on share to hold share properly. A hook is pivoted losely on one of the tong handles to also engage a bolt hole. In the engraving: A represents the plow share; B the handles of the tongs; C is the hook to stop tongs from moving sidways and D is rivet to allow hook to swing for different holes.

In using the tongs place hook C in hole fartherest from the point. Then put tip



SOME PLOW POINTING HINTS BY MR. BRODRIBB OF AUSTRALIA

on jaw in next hole or if preferred in one near the point. Then put tip on jaw in next hole or if preferred in one near the point. Put a link on handle. Hook C cannot come undone as long as the jaws are closed. By having rivet D nearer the handle ends a greater variety of shares can be handled.

When pointing a plowshare either Massey-Harris, Deer, Oliver or Scotch Clipper, I cut the wing of any worn out steel share into strips as shown at X: each strip is one point. I now take one of the strips (Y) and after splitting at A I draw thin and it will widen steel to the shape shown by dotted line at E. Draw the edge C, but I prefer not to allow it to widen there. Bend near B so that C comes near the end of the slot at A. Now heat the share and point to be repaired and place the share between the bent steel. Drive it on more or less according to the amount of point decided on. Top D snugly to bottom of landside of share and E snugley onto wing of share (on ground side.) Tap C down snugly on top side of share and drive a bluff punch partly through point and share at the same time to hold it on while welding. By punching the hole partly through at a place where you intend to thin the share down it will be an easy matter to get rid of hole.

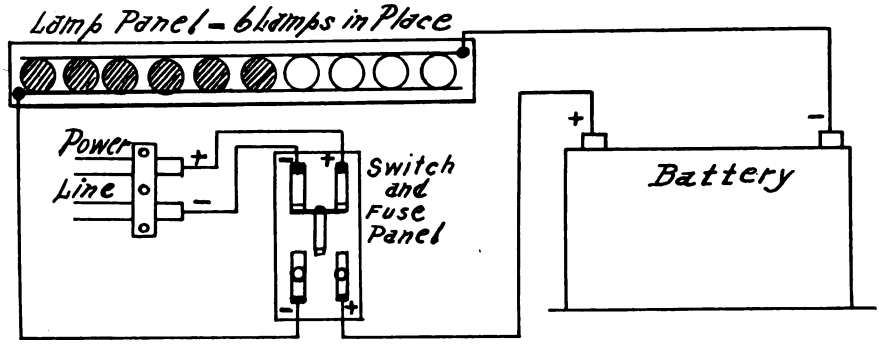
I find it a good plan to put the rough point on as shown at Z and by the time it is drawn to the correct thickness to match wing it has come to land sufficiently. If it has not it is a good deal easier to hammer share to land than to hammer it to furrow. Harry Brodribb, Australia.

Wants to Charge a Battery:—Will you kindly give me full instructions on how to charge a battery from a 110-volt D. C. circuit? How many lamps will I need to use as a resistance? I will greatly appreciate your giving me this information.

F. W. White, Mass.

In Reply:—The charging of a battery from a 110-volt circuit is really a very simple operation. The amount of resistance to use depends upon conditions. If

only one battery is to be charged from a direct current circuit, a very convenient resistance can be made by using lamps of proper size and rating. A proper arrangement for this purpose is shown in the accompanying engraving. You will note from the illustration that any number of



CHARGING A BATTERY FROM A 110-VOLT D. C. CIRCUIT

lamps within the range of the resistance board can be put into the line. If 110-volt 100-watt 32-candle power lamps are used, each lamp will allow one ampere of charging current to pass through the battery so that the number of lamps used will depend upon the charging rate of the battery.

As shown in the illustration, six lamps are in place on the resistance board. These will accordingly allow six amperes to flow through the battery. If 32-candle power lamps are not available, 16-candle power carbon filiment lamps may be used. However, when using these it will, of course, be necessary to use twice as many.

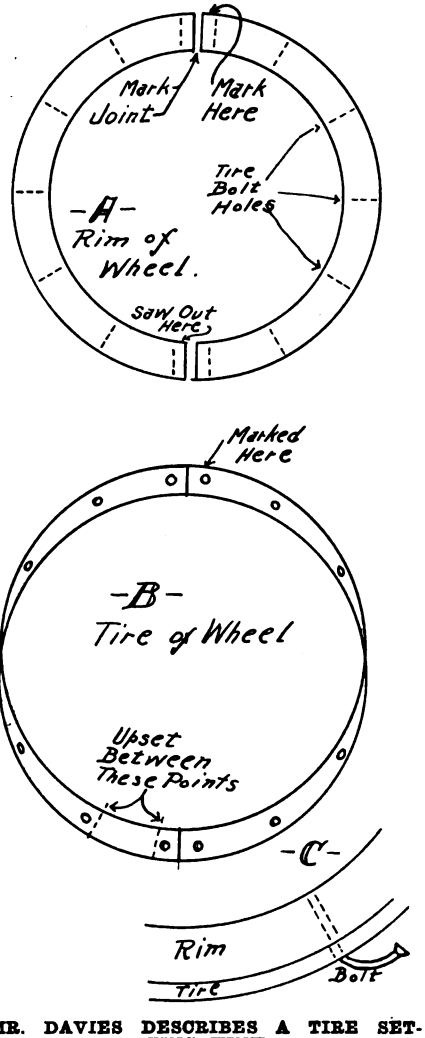
It is well to bear in mind in connection with the use of a lamp resistance that carbon filiment lamps draw more current than the more efficient tungsten or other high efficiency lamps. S. S. D.

A Talk on Prices—Figuring Torch Welding Prices—A Tire Setting Kink:—I am writing to say that I have no kick coming at our good old paper. It would be difficult indeed for me to say which part of it I like best, as everything is O. K. and very few things that are going on in the auto and blacksmith trade are left out.

I am glad to notice that prices everywhere are much better than they used to be and it is up to all of us to keep them up. We were never making enough for the "slagging" we have to do in our daily work. The prices here in this part of Canada are now, iron shoe, and featherweights for set up to No. 4, $3.00 over that $4.00. Reseting $1.50 to $2.00 and other work in proportion. Setting toes $1.00 each. Cutting down buggy wheels with old tires $15.00, wagon 2-inch tires $25.00. I have been at the good old trade for 20 years now and am still going strong. I do some aceteylene welding which I find pays very well.

Would like to say in reply to Bro. Lambrecht, Ill., that the prices charged for welding vary considerably according to the different jobs and the distance a man is from a gas supply house. I figure up cost of gas and air per foot and add about 2 or 3 cents a foot for profit and add freight both ways. I then add time at grooving casting, time for welding, and time for joining or finishing. I charge $1.00 an hour for self and $1.25 for engine and emery grinder. I also figure welding rods, fluxes and preheating material. I have gotten $5.00 for a frame and again $4.50; it all depends on how difficult it is to get at it. Cylinder blocks vary from $15.00 to $40.00 depending on nature of break and make of car. Another item to be figured in welding costs is the investment in the welding outfit as it has to be paid for.

Here is a little kink on setting buggy tires. Most of us very likely know of it but some I think will not as I saw an old smith setting tires the other day. His



MR. DAVIES DESCRIBES A TIRE SETTING KINK

bolts in the tire came about an inch out of place and the kink I think will over come most of the work of reboring the whole felloe as he had to do. We mark our wheels and the tire at the point of the felloe see engraving. I take out all bolts as nearly every wheel has to have a little taken out of the rim at the joint We take out what is necessary at the joint opposite to the one marked. Now we must be very careful on which side of the joint we cut the rim and when we upset the tire do the upsetting on the same side of the tire as we cut the rim. (see B.) and as near as possible to the joint-hole as we can. The result will be that only one hole will have to be bored out, unless the tire is extra loose and then we may have a few half holes to contend with; but by putting a slight bend in the bolt in the direction of the hole (see engraving at C). the bolt will drive through with out damage Wm. Davies, Canada.

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Battery Agency Profitable:— Many readers of American Blacksmith, Auto & Tractor Shop are finding the agencies for Storage Batteries very profitable, not only is there money in the sale and exchange of Batteries but, an agency naturally brings battery repair work which is also very profitable. The Wickey Battery Company still have some good territory open for live agents and readers will find it profitable to get in touch with this company. The Wickey Battery is offered as a semi-dry, non-freezable battery and an agency offers many profitable opportunities for the live repair shop owner. If you haven't a battery agency now, write to the Wickey Battery Company, 700-724 Exchange Ave., East Chicago, Indiana, and mention American Blacksmith, Auto & Tractor Shop.

Clipping With Electricity:—Clipping is no longer the hard arduous job it used to be years ago. Now all one need do is to turn the terminal on an electric cord into an ordinary electric lamp socket and turn on the switch. The electric clippers manufactured by the Gillette Clipping Machine Company of New York are time, labor and money savers. Horses, mules and cattle may be clipped; sheep and goats may be sheared and it may also be used for grooming horses, mules and cattle. Clipping horses and cattle is another means of adding to the shop owners profits and with one of the Gillette machines installed the shop owner can not only command this work in his neighborhood but it will be the means of bringing other work also. Write to the Gillette Clipping Machine Company at 129-131 W. 31st. Street, New York City and ask them for price list and descriptions of their electric and hand power clippers.

Profit in Sharpening Mowers:—There is little money in the job of sharpening lawn mowers by the ordinary hand-and-file method. The job is a long, hard, hand operation and the final result far from satisfactory as a general thing. The Brown Manufacturing Company of greenville, Tennessee are placing on the market a new grinder that sharpens the lawn mower accurately and successfully and with the least amount of labor. No hand work is necessary with the Brown Grinder. The work is done by an electric motor and the terms upon which they sell this efficient little machine enables you to practically make the machine pay for itself. Of course, now is the time to install one of these machines. When you have it rigged up ready for work get out in the flivver and pick up a half dozen of the dull mowers in the neighborhood and get busy. It is easy money if you go about it right. Ask the Brown Mfg. Co., of Greenville, Tenn., for their terms to readers of "Our Journal."

A New Clipper:—Here is a brand new tool originated, and made by the well known Champion Tool Company of Meadville, Pa.

This new tool is well named by the makers as te Utility Clipper. It is drop forged and is so shaped that the handles are thrown above the level plane so that a cut can be made with the work in practically any position. It will cut flush to a flat surface, is excellent for cutting battery terminal posts and for cutting bolts preparatory to removing fenders. It has no equal. The heads are interchangeable and easily changed for new ones when worn.

Every repair man will find uses without number for this new Utility Clipper. It is a time and labor saver in battery works and is almost indispensible for use in dismantling autos and trucks. Write for description of this new tool to the Champion Tool Company of Meadville, Pa., and mention American Blacksmith, Auto & Tractor Shop.

Mr. Donnelly Knows His Customers:—A Representative of the American Blacksmith, Auto & Tractor Shop recently had the pleasure of meeting Mr. Michael Donnelly, head of Donnelly and Company the well-known firm of Jobbers and Heavy Hardware Dealers, at Philadelphia. And now we understand why this blacksmith supply house has grown so rapidly in a comparatively few years. Mr. Donnelly has built his business from the ground up and although there are many hundreds of customers, he manages to retain a close personal interest in all of them. Of course there are limits to any man's activities but it will be a long time before a person can do business with Donnelly and Company and not know a Donnelly. The reason is that there are three sons, all chips of the Old Block, and they are all of them associated with Father. The Donnellys' are certainly interested in all matter pertaining to the good old craft and are always glad to hear from readers of "Our Journal". Address them Donnelly & Co., 4th & Vine Sts., Philiadelphia, Pa.

A Useful Chart Free:—A useful Chart for the Horseshoer is being offered readers of "Our Journal" by the American Horseshoe Company of Phillipsburg, N. J. This chart shows all sizes and kinds of toe and heel calks in their exact dimentions. It is printed on heavy paper and will be sent free to readers of American Blacksmith, Auto & Tractor Shop. Just as the doctor and the lawyer display the diplomas and certificates of their profession, so should the practical horseshoer display the charts illustrating the science of his profession. This chart issued by the American Horseshoe Company enables "Our Readers" to give their shops a professional atmosphere and the chart will not only be of practical value to the shoer but it will also prove of interest to the shoers patrons. When you send for the chart mention the fact that you are a reader of American Blacksmith, Auto & Tractor Shop. The American Horseshoe Company is located at Phillipsburgh, New Jersey.

DICK SELLER'S OPPORTUNITY COLUMN

Here you will find interesting comment on trade literature and business activities. If you desire copies of any of the literature mentioned, write direct to the firms indicated or to the Subscribers Service Bureau who will gladly see that you are supplied.

Subscriber's Service Bureau American Backsmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

Wives and Anvils do not at first thought seem to have anything in common yet the Columbus Forge and Iron Company in their advertisement in the April issue brings out observations that cannot be denied either with reference to wives or anvils. Of course any anvil will wear out if it is used long enough, but we wonder if there is any reader of "Our Journal" that has been able to wear out a Trenton all by himself! In the face of those "Seven Points of Superiority" mentioned in the Trenton advertisement, it would surely seem impossible. If you aren't acquainted with Trenton Anvils and Indian Chief Solid Box Vises, better ask about them. The Columbus Forge and Iron Company will be glad to send anyone who mentions "Our Journal", some interesting literature on where to buy their anvils and vises. Address them at Columbus, Ohio, or ask the Subscriber's Service Bureau to take care of your request.

Readers will be pleased to note the Electrical Equipment Service now offered by the Fuerst-Friedman Company of Cleveland. This company deals in all kinds of electrical equipment. It buys, sells, repairs and exchanges, and is ready at all times to give readers of "Our Journal" prompt and efficient service backed by a twenty-years' experience.

If in need of anything along electrical lines, motors, generators, transformers, switch boards or anything else get in touch with this company telling them what you want. Address them The Fuerst-Friedman Company, 1257 West Third St., Cleveland, Ohio, mentioning "Our Journal, or the Subscriber's Service will gladly see that you are supplied with any information.

To tell the condition of the lubricating oil in the crank case is the business of the Lea Visco-Meter.

Everyone who knows anything about autos, trucks and tractors, knows that the oil in the crank case must be changed regularly in order to properly lubricate the motor. To show whether the lubricant in the crank case is safe or unsafe, the Lea Visco-Meter, which is in reality three instruments in one, has been constructed. This indicator or oil dilution gauge gives motor temperator readings, shows whether there is sufficient oil, or whether the oil pump is operating, and it also shows the condition of the oil in the crank case. At first thought, it would seem that this must be a rather complicated device, but it is really a very simple instrument. There are no working parts or springs, and there is nothing about it to get out out order.

The value of an indicator or gauge of this kind must be apparent to every practical automotive mechanic and repair man and the opportunities for the sale of such an instrument to the owners and operators of automobiles, trucks and tractors, is practically limited only by the numbers of these machines.

"NEW BOOKS."

"Construction of Radio Phone and Telegraph Receivers for Beginners," by M. B. Sleeper. Over 14 pages, fully illustrated. Paper covers, price seventy-five cents. Norman W. Henley Publishing Company.

Since radio phones have proven so popular, no home seems complete without a radio of some kind Of course, it is possible to purchase entire outfits complete and ready for setting up, but there are many who prefer to make their own apparatus. This little volume is planned and written with that idea in mind.

All of the work outlined in this book is carefully described and thoroughly illustrated by means of photos, diagrams, and working drawings. Experimenters and beginners will find the instructions easy to follow and will have the added satisfaction of constructing useful and practical apparatus.

As the author outlines in his preface; "The interests of the novice who is desirous of receiving the radio broad casting stations, has been kept in mind, and equipment which can be installed in the parlor of ones home, described."

DICK SELLER'S OPPORTUNITY COLUMN

Here you will find interesting comment on trade literature and business activities. If you desire copies of any of the literature mentioned, write direct to the firms indicated or to the Subscribers Service Bureau who will gladly see that you are supplied.

Subscriber's Service Bureau American Backsmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

A New Comer in our columns this month is the Medina Bending Co., of Medina, Ohio. This company has been making and supplying vehicle stock to the trade for many years. Their stock includes all kinds of wood vehicle material. If you are in the market for any vehicle wood ask for their special price list for readers of "Our Journal." They have a line that will interest practically every reader of "Our Journal" and if you aren't in touch with them in what they can do for you write them today for their special proposition to "Our Folks." Or if you prefer the Subscriber's Service will take care of the matter for you.

One of the oldest advertisers in our columns is the Champion Tool Co. of Meadville, Penn. They have been o ering a line of up-to-date tools to "Our Folks" for years, and are continually on the lookout for new ideas and soundly practical improvements on their line. If you want to know how really efficient a line of practical tools can really be, send for their tool catalog showing ninety-two tools for practical men. If you prefer, Subscriber's Service will take care of the matter for you, but don't hesitate to get this catalog of practical shop helps.

Probably the most valuable books the practical repairman can have in his shop are the catalogs of his trade. And when a catalog such as Cray Brothers of Cleveland, Ohio is offered free, every practical shop owner should have one on file. The new 1922 Cray Catalog has just recently been issued and if you haven't gotten your copy better send for it today. It is filled with money making opportunities and in naturally sent only to the trade. Ask for your copy now or tell the Subscriber's Service Dept., what you want. Cray Brothers are at 1113 W. 11th St., Cleveland, Ohio.

Samples of Welding Compound are being offered readers of "Our Journal" by the Anti-Borax Compound Co., of Fort Wayne, Ind. This company offers two kinds of welding flux—one known as the "E-Z" is especially intended for steel work. Their "Crescent" compound is for plow work, toe calks and similar work. You can secure their compounds from practically any of the big jobbers, and wholesalers, but if you haven't tried them send for a liberal free sample. The Anti-Borax Co., will gladly send it upon request or if you prefer ask Subscriber's Service.

"NEW BOOKS"

"THE MODERN GAS TRACTOR."

By Victor W. Page.

4th edition revised and enlarged. 600 pages; 300 illustrations; 3 folding plates; Price $3.00. The Norman W. Henley Publishing Co., New York City.

This is the 4th edition of this excellent book on the construction, utility, operation and repair of the modern gas Tractor. All types and sizes of gasoline, kerosine and oil tractors are described, and every branch of tractor engineering is covered.

For the blacksmith tractor repair man who desires reliable information on the construction and repair of gas tractors and the various mechanisms concerned, this book will be found most practical and a useful aid.

"POPULATION AND ITS DISTRIBUTION."

J. Walter Thompson Co., 244 Madison Avenue, New York City.

This is the 3rd edition of this very good volume for the use of advertisers and sales organizations. This latest volume contains much new matter, not incorporated in previous editions and the date in this edition is based upon the 1920 sections.

The information in this book is grouped according to states and cities and includes trade information on 30 separate classifications of dealers—wholesale and retail in the leading trades.

Towns down to 500 inhabitants are listed with their classifications, and outlined maps enable the sales executive to secretly visualize the location of population and towns.

Copies of the book are obtainable from the publishers at the price of $5.00 each.

DICK SELLER'S OPPORTUNITY COLUMN

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Subscriber's Service Bureau American Backsmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

Donnelly & Company, the well known jobbers and dealers in supplies and equipment, are now occupying greatly enlarged quarters. Formerly located at 317 Vine Street, Philadelphia, they now occupy new and commodious quarters at 531-533-535 North Fourth St., Philadelphia. Here in greatly enlarged quarters with all branches of the business under one roof, they are equipped with the most up-to-date facilities for giving prompt and systematic attention to their customers requirements.

Donnelly & Company recently acquired the iron and steel business conducted for many years by Day Brothers, and this addition to their own large and growing business has necessitated their removal to larger quarters. As most readers of "Our Journal" know, this excellent house deals in all manner of iron and steel products and supplies.

This great enlargement of the facilities of Donnelly & Company indicates most emphatically that Mr. Michael Donnelly, who is the very enterprising head of this concern, and who is so ably assisted by his three sons, is fully awake to the tendency of the times and the demands of the trade.

An Oil Gauge for a Ford should be a time and labor saver, and while there are accessories and additions almost without number that the owner can put on his car, a really good oil gauge is just about the most essential device he can add to what friends Henry has already put on. And while considering oil guages, just consider the one called the "Akuret." It is about the most practical device that has been plannd for Mr. Ford's well known product. The ease with which it can be fitted to the car will appeal to every practical seller of accessories, because it will enable the shop man to make an easy quick profit on a device that does its work accurately. Write the Wallace Motor Products Corp., 465 Washington Street, New York City for full particulars, regarding their "Arkuret" oil guage. Or ask Subscriber's Service Bureau to put you in touch with them.

The Welding Rods used in oxy-acetylene welding, also in electric arc welding are a most important consideration. The Page Steel and Wire Company specializes in the production of welding rods and their recently issued hand book tells all about their product known as "Page-Armco Welding Rods."

Those readers interested in sound welding, and that means every one of "Our Folks", will find much of vital interest and value in the new Page-Armco Hand Book. It will be sent to any reader free who mentions "Our Journal". Address the Page Steel and Wire Company, Bridgeport, Conn. Or, if you prefer, the Subscriber's Service Bureau will see that you get this Hand Book.

"NEW BOOKS"

"Ford Car, Truck & Tractor Repair", by Alfred A Good, formerly Director Ford Motor Company's Service School, 229 pages, pocket size, flexible, 32 illustrations, $2.00.

This book presents the material used in the Ford Service course at home plant in Detroit. Mr. Good describes the machines, the Ford Chassis, and its various parts, takes up the engine, running parts, ignition systems, the generator, and the starting motor and battery. In his descriptions of the various parts of the Ford Machines, he also describes the proper and most efficient way to repair the product of the Ford factories. This book contains information that will be invaluable aid to the practical repair man and mechanic. If you are handling Ford cars to any great extent, you will find that a study of this book will save you time and trouble.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912.

OF AMERICAN BLACKSMITH, AUTO & TRACTOR SHOP, published monthly, at Buffalo, N. Y., for October 1, 1922.

State of New York, County of Erie,—ss.

Before me, a Notary Public in and for the state and county of the aforesaid, personally appeared Walter O. Bernhardt, who having been duly sworn according to law, deposes and says that he is the Treasurer of THE AMERICAN BLACKSMITH, AUTO AND TRACTOR SHOP, and that the following is to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 543 Postal Laws and regulations printed on the reverse of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are;

Publisher, American Blacksmith Co., Buffalo, N. Y.

Managing Editor, W. O. Bernhardt, Buffalo, N. Y.

Editor, none

Business Manager, W. O. Bernhardt, Buffalo, N. Y.

2. That the owners are: E. D. Corson, Lockport, N. Y., G. A. Castle, Lockport, N. Y., W. O. Bernhardt, Buffalo, N. Y., A. W. Bayard, Buffalo, N. Y.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (none).

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company; but also in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

6. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise to paid subscribers during the six months preceding the date shown above is.....

(This information is required from daily publications only.)

W. O. BERNHARDT, Treas.

Sworn to and subscribed before me this 21st day of September 1922.

ELIZABETH PFANDER
(My commission expires March 31, 1923)

DICK SELLER'S OPPORTUNITY COLUMN

Here you will find interesting comment on trade literature and business activities. If you desire copies of any of the literature mentioned, write direct to the firms indicated or to the Subscribers Service Bureau who will gladly see that you are supplied.

Subscriber's Service Bureau American Blacksmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

THE BLUE BOOK FOR BODY BUILDERS

The Cleveland Hardware Company of Cleveland, Ohio announce in this issue the "Blue Book For Body Builders," and if you are interested in the building, repairing or overhauling of truck or wagon bodies you will want a copy of this book.

In this Blue Book is shown a complete line of body irons ready for use and forged from mild steel. These come to you ready to be slapped right onto the job.

Builders and repairers of wagon and truck bodies will find the "Body Builders Blue Book" an excellent reference work to be kept on hand at all times. If you write direct to the Cleveland Hardware Company, mention Department B, or if you prefer, ask the Subscribers Service Department to secure this book for you. It is free, of course.

A BOOK FOR THE CYLINDER REGRINDING SHOP.

It is now generally agreed that the cylinder in the automobile, truck and tractor should be reground periodically in order to enable the motor to deliver its maximum power. It has been shown that lack of power, besides excessive use of gas and oil and carbon-formation in the cylinders beside many other faults and annoyances are over come and corrected by regrinding the cylinders and the proper fitting of pistons and rings.

The Heald Machine Company, 100 New Bond Street, Worcester, Massachusetts, built a regrinding machine which enables the practical shop owner to do this work at a fine profit, right in his own shop.

Right now is an excellent time to install one of these regrinding machines as it will enable you to regrind the cylinders of automobiles, trucks, and tractors during the winter months when these machines are usually laid up. This enables you to turn what is usually a slack period into a most profitable season.

Write to the Heald Machine Company, for their book on cylinder regrinding. This is a practical little volume on how to start a cylinder regrinding business. It will tell you something of the profits to be made from this work, it will tell you how to do the work and also details the small amount of equipment that is necessary.

If you prefer, ask the Subscribers Service Department to secure a copy of this book for you.

A COMBINED HAND AND POWER BORING MACHINE

The York Boring Machine which is offered by the Winterknight Equipment Company of Philadelphia, Pa., may be operated either by hand or by means of an electric drill. Another advantage of this machine is that the motor may be bored while on the chassis.

In order to introduce the York Boring Machine to readers of "Our Journal", the Winterknight Equipment Company offer to let you test the machine for two weeks on the jobs you have in the shop. If you cannot obtain the same results that the manufacturers can you are at liberty to return the machine.

Cylinder reboring is an operation that pays excellent profits. The fall and winter months are the time to do this work. The equipment necessary for this work is very simple and easily operated. If you will write the Winterknight Equipment Company, at 7299 Limekiln Pike. Philadelphia, Pa., you will find them very ready and willing to give you every possible assistance and information on this profitable work.

If you prefer the Subscribers Service Department will put you in touch with the Winterknight Company.

SKILL IS NECESSARY.

The Pennsylvania Coal and Coke Corporation say that skill and good coal ore necessary for the making of a perfect weld. But coal with an extremely large sulphur content will discount the skill of the most expert smith.

Smithing coal is such a small item in the cost of blacksmithing work that it would pay every shop owner to specify the best coal that he can possibly secure for his purpose.

The Pennsylvania Coal and Coke Corporation publish a little booklet which tells all about their "Webster Selected Smithing Coal." They will gladly send this booklet to any one interested in securing the best possible results from their forge work.

Write direct to the Pennsylvania Coal and Coke Corporation, 17 Battery Place, New York City, or ask the Subscribers Service Department for this booklet.

SINCE 1878

Another new advertiser appearing in our columns this month is the C. D. Edwards Manufacturing Co., of Albert Lea, Minnesota. They are advertising the Edwards Shear which they say has been on the market since 1878 and has stood the test of long usage. This shear is made in two sizes and is advertised as being ideal for the blacksmith and repair shop. You can secure one from your heavy hardware dealer.

If you want to know more about Edwards Shear write direct to the C. D. Edwards Manufacturing Co., at Albert Lea, Minnesota. Or tell the Subscribers Service Department to put you in touch with the Edwards Company.

DICK SELLER'S OPPORTUNITY COLUMN

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Subscriber's Service Bureau American Blacksmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

Knots, Splices and Rope Work by A. Hyiatt Varill. Price $1.00. This is the third edition of this practical book on rope work. It is especially adapted for travelers, campers and for the practical application of ropes and knots in hoisting and pulling operation. The book is fully illustrated and begins with a chapter on Cordage, in which ropes of various kinds are described. The splicing or ropes is detailed and both the useful and ornamental knots are described and illustrated.

Automobile Repair Instruction Manuel for Repair Shops. (Volume 2) for Electrical Service Men by J. C. Wright. 417 Pages illustrated, cloth $3.00. This is the second volume in the Wright automotive series and takes up the subject of electrical repair service in detail. Part 1, of this book details a great many common automobile repair jobs in the electrical system of the automobile, truck and tractor. It is in fact titled "Instruction Manuel of Repair Jobs."

Part 2 of this volume explains electricity as applied to the needs of the electrical service station. It describes magnetos and magnetism, the electrical units, storage batteries, generators, starting motors and ignition.

As in volume one the same system of describing every repair job is followed; namely, a description of the work to be performed then a detailing of the operations necessary to perform the job and then the mechanical adjustments are detailed.

The description of farious operations are well illustrated and the automobile repair man will find this volume of extreme practical worth to him, in the repairing of electrical systems on automobiles, trucks and tractors.

Motor Vehicles and their Engines.— By Herser and Jones. Second edition revised and enlarged with 390 illustrations, 370 pages, price $2.00. D. Van Naustrand Co., New York.

This is the second edition of this book by Edward Herser and Ralph F. Jones. It is intended for the use of owners, operators, garage men and for schools. It is announced as a practical hand book on the care, repair and management of motor trucks and automobiles.

The volume begins with an explanation and description of the gas and its principals of operation. The various chapters then take up the elementary, connection with the operation, upkeep and the adjustment of motor vehicles.

All parts of the motor operated vehicle are considered. The engine, its timing, cooling and fuel system; electricity, battery ignition system, magnetos, starting and lighting; power transmission, clutches, drives and running gears as well as tires and rims are covered in this volume.

There is also a chapter on how to drive, and one on engine troubles on the road. The last chapter is devoted to care and adjustment tables with special reference to well known cars.

Construction of New Type Transatlantic Receiving Sets by M. B. Sleeper, Fully Illustrated, Price 75 Cents

Here is another book by Mr. Sleeper, which will interest radio enthusiasts as well as wireless telegraphers. There is a distinct fascination in listening to the broadcasting stations, and when the novice knows that it is very easy to listen to ships and the high-power stations in other countries, he will of course want to increase his receiving range. This book describes several types of receiving sets for listening in on the high power stations of England, France, Germany and Italy and the matter is really a much simpler one than most people imagine. Detectors, amplifiers, oscillators, etc., for long distance reception are also described. Suggestions for the operation of relays by the signals and the reproduction of them on a phonograph are given.

The radio and wireless amateur will find this book of considerable interest and value to him in developing his apparatus for a wider range of activity.

SAMPLES OF WELDING AND BRAZING PLATES

Laffittee Welding Plates have been known to readers of "Our Journal" for a great many years. But in order to introduce these plates to new readers, and in order to acquaint all of our folks with their easy-to-use brazing plates. the Phillips-Laffitte Co., offer to send free samples of these plates to any one asking for them and mentioning "Our Journal."

The ease with which both the welding and brazing plates are used is surprising even to experienced craftsmen. No special equipment is necessary and the use of Laffitte plates will save you time, fuel and labor. And as the plates are in a most convenient form there is no waste as with powders. Write to the Phillips-Laffitte Company, Philadelphia Building, Pittsburgh. Pennslyvania for samples mentioning the fact that you are a reader of "Our Journal."

Or if you prefer the Subscribers Service Department will have samples sent to you.

COMBINATION METAL AND WOOD LATHES

The Little Giant Company of Mankato, Minn., announces a line of combination metal and wood lathes which will be of unquestioned interest to our readers.

The Little Giant Company is already well known as the manufacturers of the Little Giant Power Hammers. They have been advertising their line of hammers in these columns for a great many years and many of our readers are thoroughly familiar with their excellent hammers.

This line of metal and wood lathes which they now announce is being built to meet the demand for a machine suitable for heavy and continous service. They advise that these lathes are unlike any other equipment made at the present time and that all metal and wood working operations can be performed on them.

The metal working attachments for these lathes consist of grinders, buffers, millers, gear cutters and similar machines. While the wood-working attachments include sanders, grinders, buffers, polishers, band saws, jointers, plainers, saw tables. and similar equipment.

Readers interested in this line of combination metal and wood working lathes will be much interested in receiving the Little Giant Company's folder which describes this line. It will be sent upon request either direct from the Little Giant Company at Mankato or upon a request sent to the Subscribers' Service Department.

DICK SELLER'S OPPORTUNITY COLUMN

Here you will find interesting comment on trade literature and business activities. If you desire copies of any of the literature mentioned, write direct to the firms indicated or to the Subscribers Service Bureau who will gladly see that you are supplied.

Subscriber's Service Bureau American Blacksmith, Auto & Tractor Shop, New Sidway Bldg., Buffalo, N. Y.

A NEW PROFIT SUGGESTION

Another new Profit Suggestion is contained in the announcement of the G & O Manufacturing Co., in this issue.

This company builds radiators for all makes of cars. They are establishing Radiator Repair Stations and through their seventeen stock depots can take care of your requirements immediately so that you need not carry a large stock on hand all the time.

The coming cold .weather will make business for you in radiator repairs and replacements. Every cold snap will mean some replacement and repair work. Let folks know you can do this work. The G. & O. Company furnish signs that will direct car owners to your shop. Their Core List will give you prices and particulars of radiator cores and replacements.

Write to the "Core Manager"—G. &. O. Mfg. Co., New Haven, Conn., or ask the Subscriber's Service Bureau to put you in touch with this company.

A NEW CATALOG

If you haven't secured a copy of the Campbell Iron Company's new catalog better send for it now. We have just received copy of their new catalog No. 25 which shows a complete listing of supplies and tools.

The Campbell Iron Company are located in St. Louis, Missouri and sell at wholesale only all kinds of supplies, tools and accessories for blacksmith, and repair shops. They are also wholesale distributors of automobile supplies, body builders equipment, implement supplies and parts, and tools and machinery.

If you want a copy of their latest catalog mention "Our Journal" when writing to the Campbell Iron Co., at St. Louis Missouri or ask the Subscribers Service Department to secure a copy for you.

LATEST BOOK CATALOG

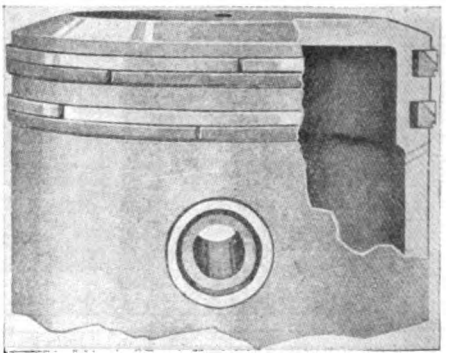
The Norman W. Henley Publishing Co. have just issued their 1922-23 catalog of practical books. The list contains descriptions of the latest books on many practical subjects ranging from automobiles to welding and wireless.

Readers of the American Blacksmith Auto & Tractor Shop desiring to plan a practical reading course for the coming winter evenings will find this catalog of practical books can be purchased through our book department at regular catalog rates.

KENDELL PISTON RINGS

Kendell Piston Rings are said to embody a number of scientific and mechanical features that are arousing considerable interest among the trade. They are of two-piece construction, an inner or expansion ring and an outer or packing ring. This ring is said to be especially beneficial in slightly out-of-round cylinders. A non-clogging oil wiper is also provided in the inner section of the ring.

The outer or packing ring is of softer non-resilient iron, being turned with an



inner surface on a 55-degree angle, the expansion ring having an externally inclined face of the same angularity, thereby relieving groove pressure and increasing pressure on the circumference, lengthening the life of the expansion ring. This has also proven to be a non-carboning feature.

All drawbacks such as deepening of ring grooves, drilling of pistons, oil regulations, springs, pins or other objectional features are said to have been eliminated. This ring is also backed up by the manufacturer with a money-back guarantee. If you wish to know more about this ring write Dept. A. B.—Kendall Engineering Corporation, Fort Wayne, Indiana or write Subscriber's Service Department.

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y. FEBRUARY 1922

VOLUME 21
NUMBER 2

$1.00 A YEAR
10c A COPY

AMERICAN BLACKSMITH
AUTO & TRACTOR SHOP

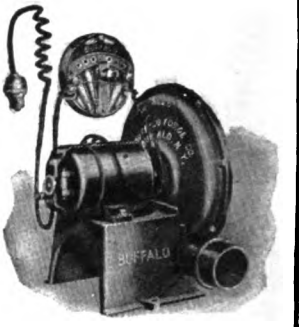
BUFFALO, N. Y. MARCH 1922

VOLUME 21
NUMBER 3

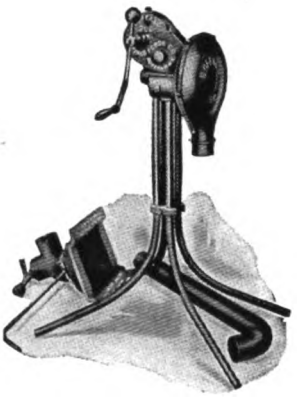
$1.00 A YEAR
10c A COPY

No. 3-G Tire and Axle Upsetter

"Buffalo"



No. 2-E Electric Blower



No. 300 Blower

Blacksmith Tools

Every farmer will have a lot of repairing to be done before the frost is out of the ground. Are you going after this work? Now is the time to convince the farmer that you are equipped to give him full return for money spent for repairs. Look up the plows, tractors and other equipment now.

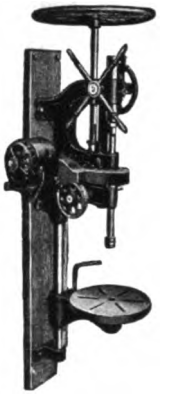
Buffalo Tools are the Most Economical in the Long Run.

We make forges; electric blowers; drills—floor and post type; shears—for cutting angles, bars and sheet—and of every size from the little bench type hand-power shear to the heaviest power shear made—and all sizes of Punches. These are the tools you should know about.

Write Dept 6 for Catalog.

Buffalo Forge Company

Buffalo, New York

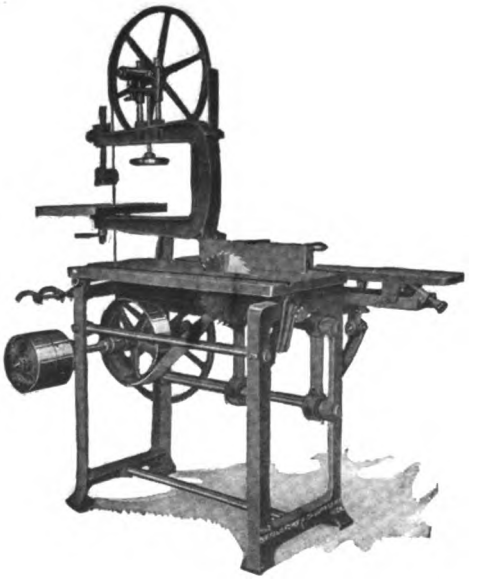


No. 124-E Drill

No. 4-B Armor Plate Punch and Shear

10 inch Bench Drill

15" Power Drill



No. 2 Woodworker

No. 240-H Forge

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y. APRIL 1922

VOLUME 21
NUMBER 4

$1.00 A YEAR
10c A COPY

TODAY

Farmers own 60% of the Automobiles in the United States.
Farmers own 20% more Trucks than the Manufacturers.
Farmers own 15% more Trucks than the Retailers.

Horses and Mules in the United States number over 25½ millions—or 1½ million more than in 1910.

Tractors in use on Farms number a quarter of a million.

Horse Drawn Vehicles are third in point of value of Equipment on Farms.

Farmers last year spent:
$478,000,000 for new automobiles.
$471,000,000 for new farm machines.

QUESTION

Who repairs the Farmer's Autos, Trucks and Tractors?
Who sells him Auto, Truck and Tractor Accessories?
Who shoes his Horses, and Mules?
Who repairs his Farm Implements?
Who fixes his Wagons?

These are the Opportunities knocking at the Door of the Smithing Craft.

These are the Opportunities Readers of this paper are grasping TODAY.

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., MAY, 1922

VOLUME 21
NUMBER 5

$1.00 A YEAR
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AN OPPORTUNITY
THE TOURIST SEASON

The season of automobile tourists is again at hand with its opportunities for added repair work and increased sales of parts, supplies and accessories.

The opportunity at this season is one of tremendous possibilities and we are glad to see most readers taking advantage of it. If you have failed to realize its possibilities just consider what one Kansas reader did last year. His shop is located on an R. F. D. route and serves many tourists. Last year he sold 200 tires, 300 tubes, 500 pistons, 2000 piston rings. and radiators, timers, spark plugs and other items in goodly quantity. The "gas" dispensed at this shop amounted to twenty thousand gallons while oils and greases were sold in proportion.

So cater to the tourist—it means real money. Road signs along the highway—some distinguishing mark at the shop front or door and an invitation to stop for air, water, oil or just information will help to stop them. You cannot hope to stop all of them—but you can stop some of them and usually with profit. And when they stop don't hesitate to ask them to buy—in the proper way of course.

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., JUNE, 1922

VOLUME 21
NUMBER 6

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AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., JULY, 1922

VOLUME 21
NUMBER 7

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AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

VOLUME 21
NUMBER 8

BUFFALO, N. Y., AUGUST, 1922

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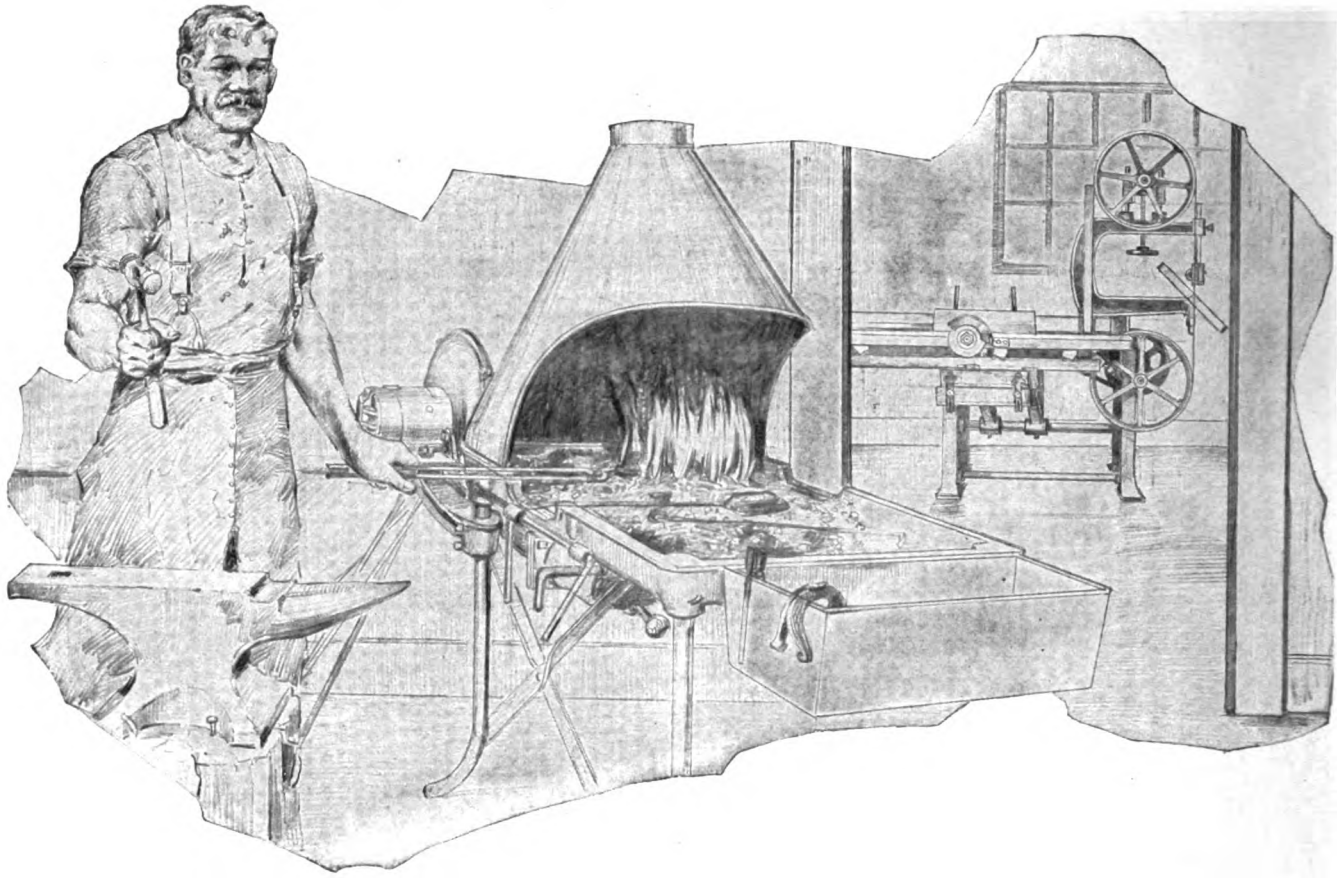

"Boys! I'm like big business --- if one line gets dull I'm right ready for others

'Yep, Autos cut down business but I got a Buffalo Woodworker.

Send along your jobs for it's a whole shop in itself.

'Band, rip and cross cut saws, jointer, planer, drill, emery wheel, sander—nigh most everything—it takes the place of 12 machines.

You can't send 'em too fast for me as I can work three men on it to once without mix up.

'And it's husky too — no toy mind ye — ribbed frames and tables keep it stiff and solid—'nough metal there too to make it last for years like the rest of those Buffalo tools we pass down from father to son.

'Yes, they've one with lathe, shaper and edge molder too. You can read all about it in that book telling how to use them over there.

'Sure they'll send you one; just ask for—let's see, there 'tis—Shop Kinks Section 360-I"

Buffalo Forge Company

Buffalo, N. Y., U. S. A.

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO N. Y., SEPTEMBER, 1922

VOLUME 21
NUMBER 9

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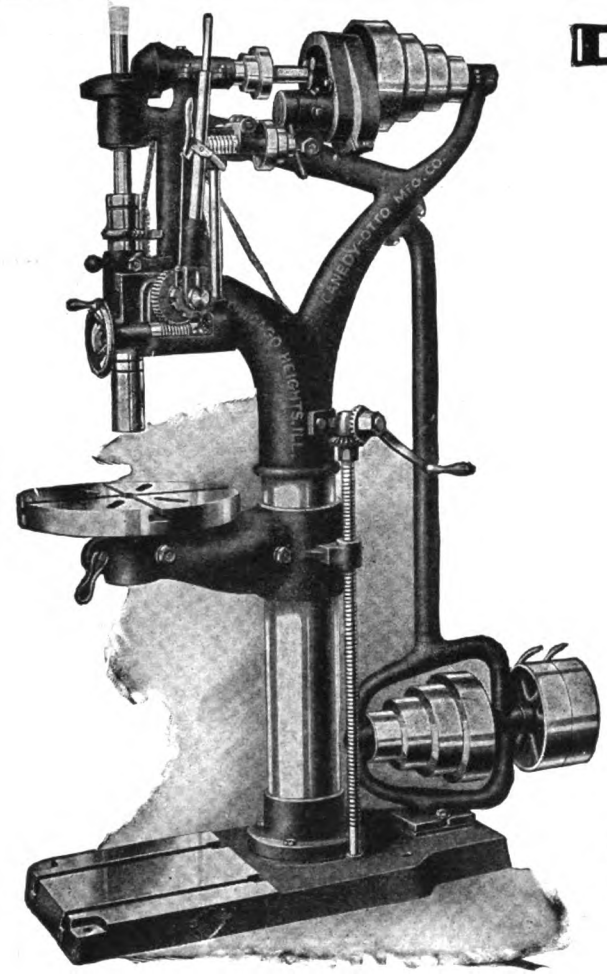


CANEDY-OTTO

"The Well Equipped Shop Gets the Business"

YOU do better, faster work with C-O equipment. This means time and labor saved on every job. You make more money and your customers are better satisfied.

You gain trade, because business men appreciate the well equipped shop. They know they will get better work, in less time, and with fewer "alibis."

When you use C-O equipment, you are getting the best there is. Each unit is the result of practical shop experience, tested, proved and tried.

Throughout our fifty years of manufacturing experience, we have led in the design and manufacture of shop equipment. Today, C-O equipment is more widely preferred than ever.

Send for a free copy of our catalog showing our complete line of machines and tools. Do it today.

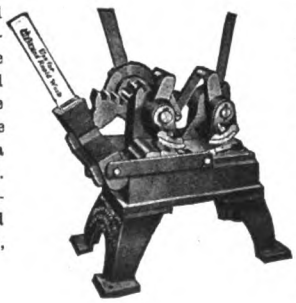
Address Dept. C

CANEDY-OTTO MFG. CO.

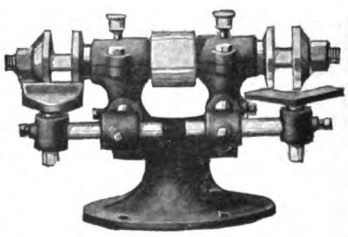
Manufacturers of Automotive Equipment, Drills, Punches, Shears, Shrinkers, Countershafts, Grinders, Buffers, Forges, Blowers, Tuyere Irons and Blast Gates.

Main Office and Factory—Chicago Heights, Ill.
New York Office—Grand Central Palace

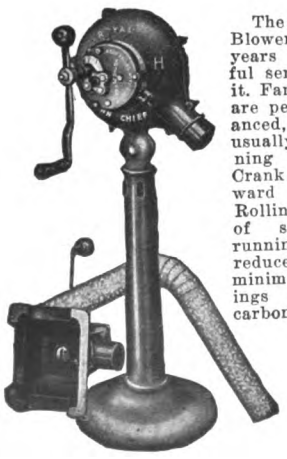
Every modern operating feature and convenience is included in the C-O 21" Drill. The spindle travel is 12", and the distance between spindle and base 43". It will drill to the center of a 21⅛" circle in the clear. The brace gives extra rigidity for capacity drilling. Eight speeds meet all requirements. Both the table and base have T-slots for quick, convenient clamping.



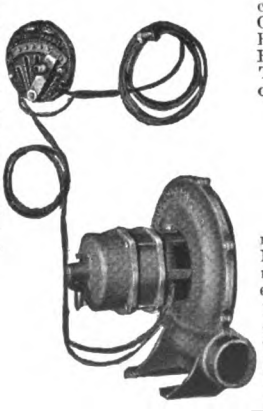
The C-O Tire and Axle Shrinker No. 1½ works with half the labor of any other shrinker of equal capacity. Even a light man can operate it to full load, due to the special gearing. Jaws 4½" wide will take from smallest to 4"x1" round edge tires, and 1¼" square axles. Jaws are hardened, machine-cut tool steel. Shrinking lever pulls toward machine, not away.



Vibration and jar are eliminated in the C-O No. 2 Grinder, due to the exceptionally rigid construction and extra large bearings. Wheels are smooth running and perfectly balanced. For heavy work, this machine is unsurpassed Rests are regularly furnished. Safety wheel guards, open side or enclosed, furnished as extra equipment is desired.

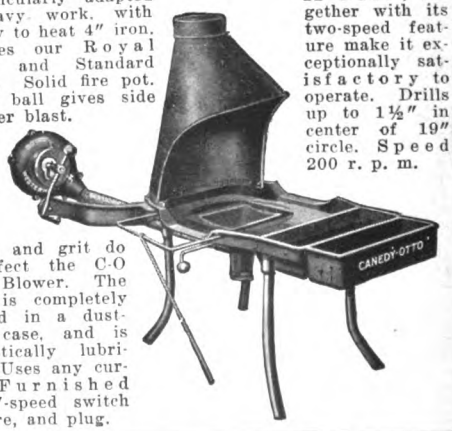


The C-O Royal Blower has 25 years of successful service behind it. Fan and gears are perfectly balanced, giving unusually light running quality. Crank turns forward or back. Rolling contact of spur gears running in oil reduces wear to minimum. Bearings are 40-pt. carbon steel.



Dust and grit do not affect the C-O No. 8 Blower. The motor is completely enclosed in a dust-proof case, and is automatically lubricated. Uses any current. Furnished with 7-speed switch 15' wire, and plug.

The C-O Royal Forge is particularly adapted for heavy work, with capacity to heat 4" iron. Combines our Royal Blower and Standard Hearth. Solid fire pot. Tuyere ball gives side or center blast.



The self-friction clutch and star lever feed of the C-O No. 21 Drill, together with its two-speed feature make it exceptionally satisfactory to operate. Drills up to 1½" in center of 19" circle. Speed 200 r. p. m.

AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., OCTOBER, 1922

VOLUME 21
NUMBER 10

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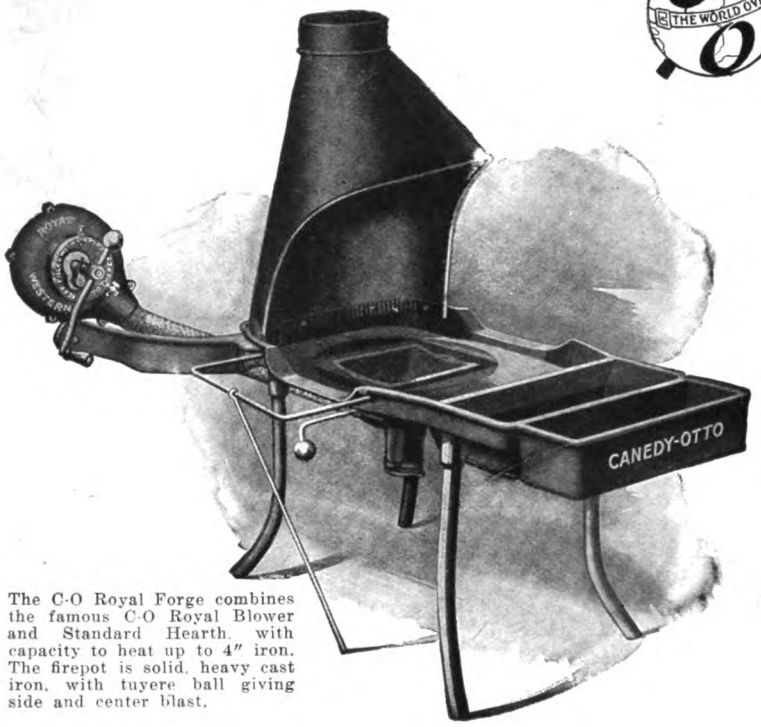
CANEDY-OTTO

THE WORLD OVER



The C-O Royal Forge combines the famous C-O Royal Blower and Standard Hearth, with capacity to heat up to 4" iron. The firepot is solid, heavy cast iron, with tuyere ball giving side and center blast.

"The Well Equipped Shop Gets the Business"

FOR fifty years, C-O tools and machinery have demonstrated their ability to make money, by improving quality of work and cutting time and labor costs.

Work done with C-O equipment is not only better but cheaper, because more rapidly performed, and with less spoilage and waste.

The exceptional earning power of C-O equipment is due as well to its reasonable price, giving an unusual rate of return with a minimum investment.

A half century of leadership in the design and manufacture of shop tools and machinery guarantee the high quality and dependability of every article we make.

Write today for our big catalog, showing a complete line of profit making shop necessities.

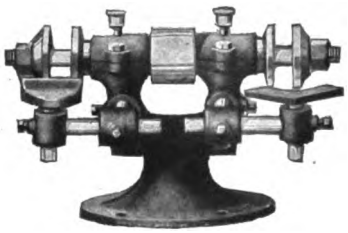
Add Dept. C

CANEDY-OTTO MFG. CO.

Manufacturers of Automotive Equipment, Drills, Punches, Shears, Shrinkers, Countershafts, Grinders, Buffers, Forges, Blowers, Tuyere Irons and Blast Gates.

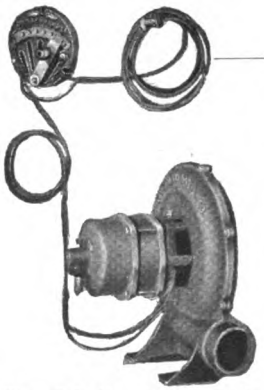
Main Office and Factory—Chicago Heights, Ill.
New York Branch—407 Broome St.

Even a light man can operate the C-O Tire and Axle Shrinker No. 1½" to full load, due to the special gearing. It takes up to 4"x1" round edge tires, and 1¼" square axles.

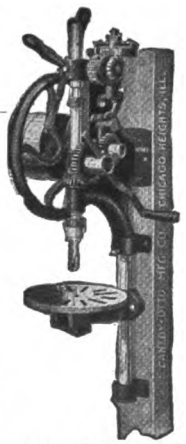


The exceptionally rigid construction and extra large bearings of the C-O No. 2 Grinder eliminate jar and vibration. Safety wheel guards, open side or enclosed, furnished if desired.

Behind the C-O Royal Blower stand 25 years of successful service. Fan and gears are perfectly balanced giving exceptionally light running quality. Rolling contact of spur gears revolving in oil practically eliminates wear.

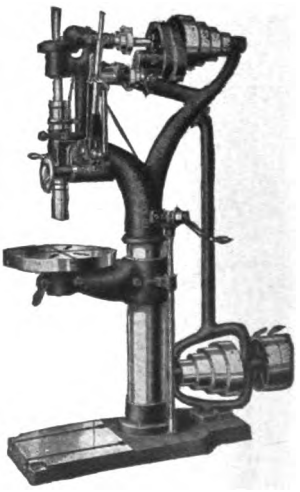


The C-O No. 8 Blower is proof against dirt and grit, the motor being enclosed in a dust-proof case, with automatic lubrication. Costs but 3 cents a day to run. Uses any current. Furnished with 7-speed switch, 15 feet of wire, and plug.



The self-friction clutch and star-lever feeds of the C-O 21" Drill, together with its two-speed feature, make it exceptionally satisfactory to operate. Speeds are changed instantly. Drills up to 1½" in center of 19" circle.

Every operating convenience is embodied in the C-O 21" Drill. Spindle travel is 12", and distance from spindle to base 43". Drills to center of 21⅛" circle. Brace gives extra rigidity for capacity drilling. Table and base have T-slots for clamping.



AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., NOVEMBER, 1922

NUMBER 11
VOLUME 21

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AMERICAN BLACKSMITH AUTO & TRACTOR SHOP

BUFFALO, N. Y., DECEMBER, 1922

NUMBER 12
VOLUME 21

$1.00 A YEAR
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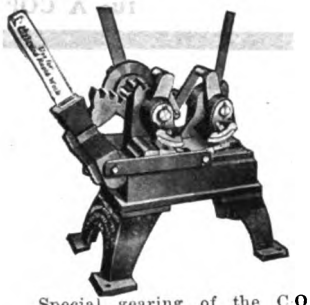
ASK ABOUT THE CANEDY-OTTO CREDIT PLAN

C-O Shop Equipment Now Buys Itself



Special gearing of the C-O No. 1½ Tire and Axle Shrinker makes easy work of handling up to 4"x1" tires and 1¼" square axles.

Heavy construction and oversize bearings eliminate vibration in the C-O No. 2 Grinder. Equipped with wheel guards, if desired.

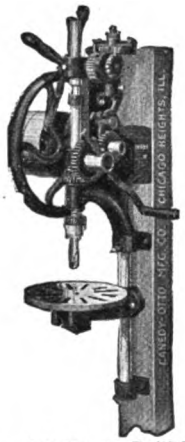
UNDER the new C-O Credit Plan, there is no reason longer to postpone the purchase of needed time-saving and money-making tools and machinery.

By depositing only one fourth of the cost of the equipment you need, immediate delivery is obtained. The balance is taken care of monthly out of increased earnings, and a handsome profit can be realized besides.

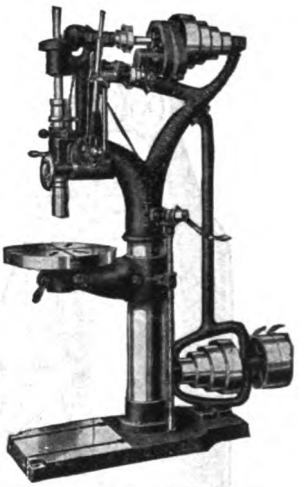
Thousands of shops are proving every day the value of C-O equipment in saving time and money. Fifty years of high grade manufacturing guarantee the quality and dependability of every item in the C-O line.

Decide now to earn all the profit that your shop is capable of producing, by investigating the C-O Credit Plan. Ask your jobber!

Address Dept. C



The C-O No. 21 Drill has two speeds, with self-friction clutch and star-lever feeds. Drills up to 1½" in center of 19" circle.



Brace of C-O 21" Drill gives extra rigidity for capacity work. Spindle travel 12". Spindle to base 43". Drill to center 21⅛" circle.

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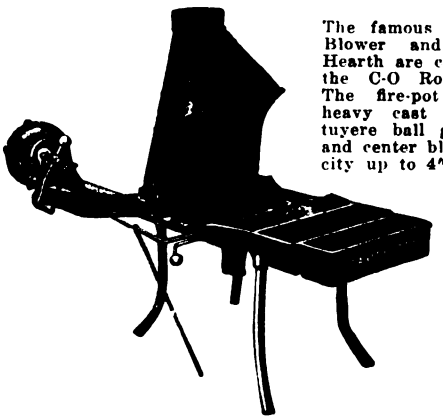
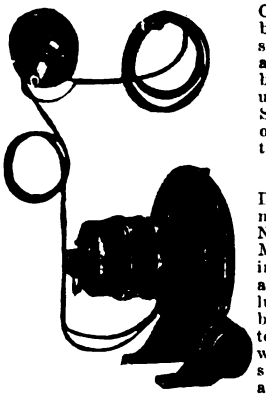


The famous C-O Royal Blower and Standard Hearth are combined in the C-O Royal Forge. The fire-pot is solid, heavy cast iron, with tuyere ball giving side and center blast. Capacity up to 4" iron.

"The Well-Equipped Shop Gets the Business"

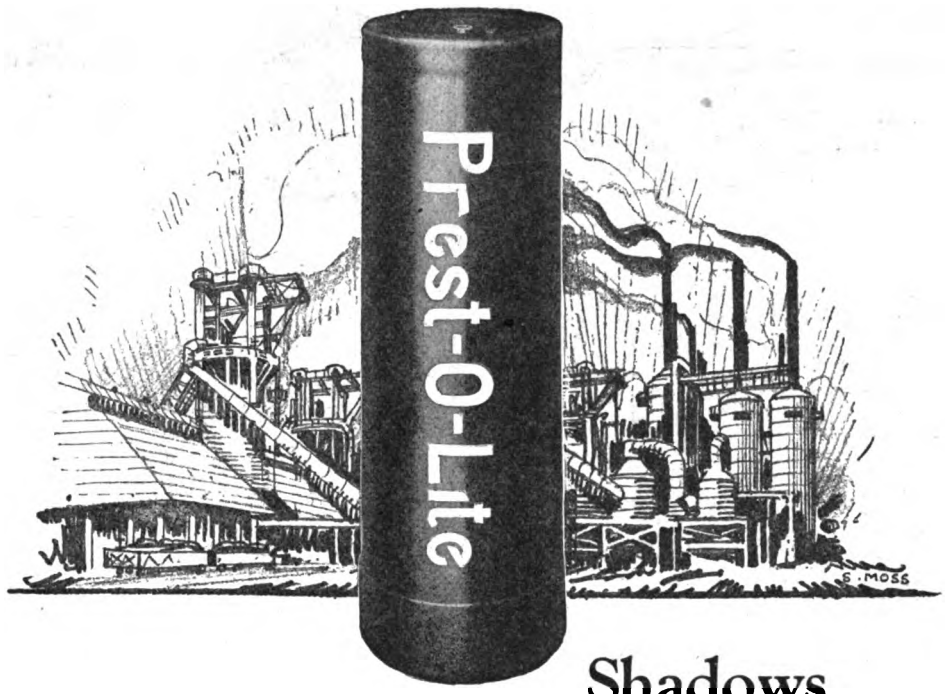


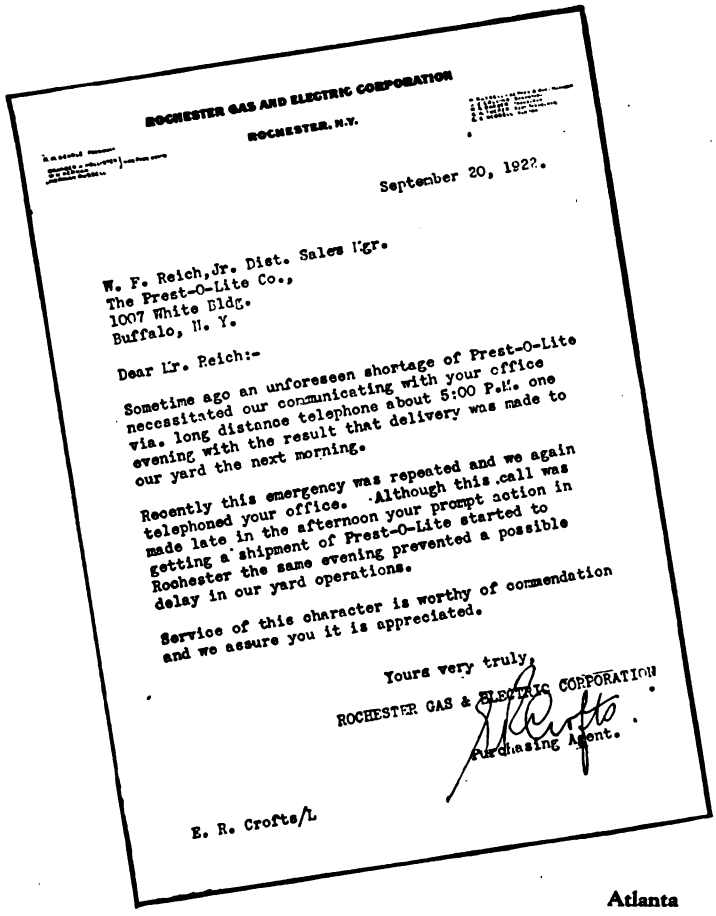
C-O Royal Blowers are backed by 25 years of successful service. Fan and gears are perfectly balanced, making them unusually light running. Spur gears revolving in oil bath are fully protected against wear.

Dust and grit cannot injure the C-O No. 8 Blower. Motor is enclosed in dust-proof case and automatically lubricated. Costs but 3 cents a day to run. Furnished with 7-speed switch, 15' of wire, and plug.

CANEDY-OTTO

THE WORLD OVER





ROCHESTER GAS AND ELECTRIC CORPORATION
ROCHESTER, N.Y.

September 20, 1922.

W. F. Reich, Jr. Dist. Sales Mgr.
The Prest-O-Lite Co.,
1007 White Bldg.
Buffalo, N. Y.

Dear Mr. Reich:-

Sometime ago an unforeseen shortage of Prest-O-Lite necessitated our communicating with your office via. long distance telephone about 5:00 P.M. one evening with the result that delivery was made to our yard the next morning.

Recently this emergency was repeated and we again telephoned your office. Although this call was made late in the afternoon your prompt action in getting a shipment of Prest-O-Lite started to Rochester the same evening prevented a possible delay in our yard operations.

Service of this character is worthy of commendation and we assure you it is appreciated.

Yours very truly,
ROCHESTER GAS & ELECTRIC CORPORATION
Purchasing Agent.

E. R. Crofts/L

Shadows of Coming Events

The cutting and welding torch is regularly called away from its routine tasks to bridge over an emergency breakdown.

Years of experience have taught Prest-O-Lite that satisfactory service must anticipate unexpected gas needs on such occasions. Hence Prest-O-Lite service, built to satisfy the user's needs, rarely fails to have foreseen the emergency.

Each Prest-O-Lite user looks to his nearest District Sales Office, not merely for arrangements to adequately cover acetylene needs, but for helpful co-operation and advice on any matter involved in the use of acetylene.

Prest-O-Lite
DISSOLVED ACETYLENE

DISTRICT SALES OFFICES

Atlanta	Buffalo	Dallas	Milwaukee	Pittsburgh
Baltimore	Chicago	Detroit	New York	St. Louis
Boston	Cleveland	Kansas City	Philadelphia	San Francisco

THE PREST-O-LITE COMPANY, INC.

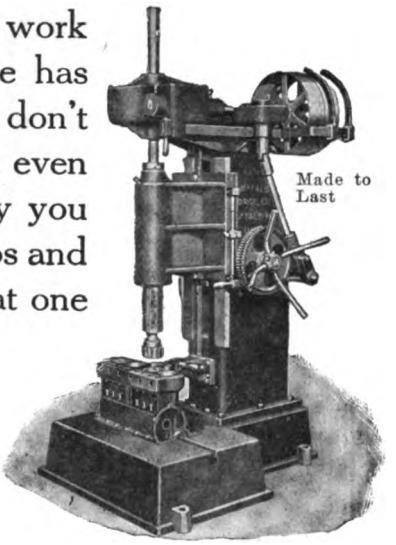
General Offices: Carbide and Carbon Building, 30 East 42nd Street, New York
Balfour Building, San Francisco; In Canada: Prest-O-Lite Company of Canada, Limited, Toronto

Why Would——Fix your Car if You Were in a Hurry?

243-H Forge

For Blacksmith Garages and Contractors who do a variety of work. Steel Cut gears and ball bearings in powerful 14 in. blower, hearth 28 x 40 in.

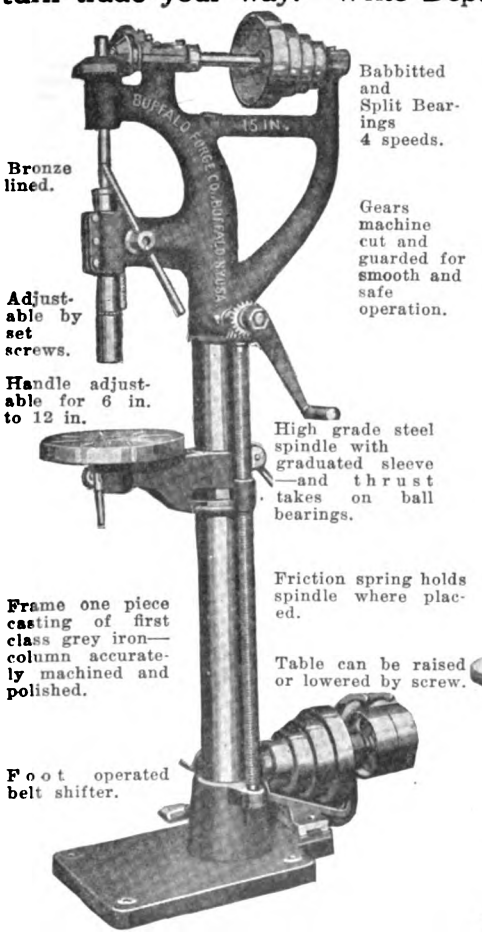
Because he is equipped to do the work well and quickly. The automobile has become such a part of our lives we don't want to do without it even for a day. That's why you have so many rush jobs and work piles up so—all at one time.



Buffalo Reboring Machines

handle practically any size cylinder for motor, car, truck and tractor in minimum time.

Consult the best jobber in your neighborhood about these tools—which will enable you to get the work out well and quickly done to turn trade your way. Write Dept. No. 1



Babbitted and Split Bearings 4 speeds.

Bronze lined.

Gears machine cut and guarded for smooth and safe operation.

Adjustable by set screws.

Handle adjustable for 6 in. to 12 in.

High grade steel spindle with graduated sleeve—and thrust takes on ball bearings.

Friction spring holds spindle where placed.

Frame one piece casting of first class grey iron—column accurately machined and polished.

Table can be raised or lowered by screw.

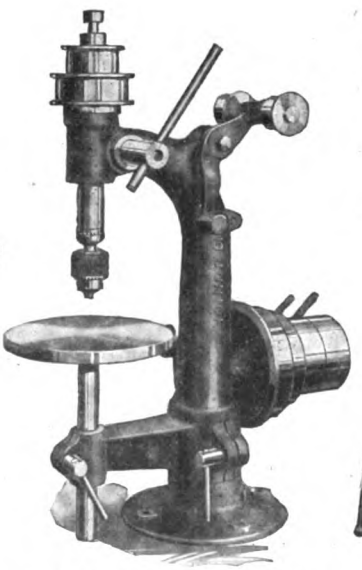
Foot operated belt shifter.

Buffalo 15 in. Upright Power Drill

Spindle takes No. 2 Morse Taper.

Buffalo Forge Company

BUFFALO, N. Y.

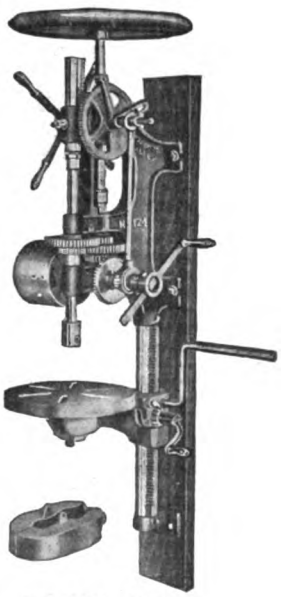


Buffalo 10 in. Junior Drill

for accurate small work at moderate price.

3B Punch and Shear

Punches ⅜x⅜ Cuts ¾ rounds or 3x½ in. flats.



Buffalo Ball Bearing Drill No. 124

Machine cut and guarded gears. Drills to center 24 in. circle.

HEALD

Are You Getting All the Possible Work in Your Vicinity?

Machine and auto repair shops can no longer rely on a miscellaneous set of small tools to maintain a successful business. Today their equipment must be such that no matter what the job is, it can be handled properly and at the least expense if they are to get all the potential work in that locality. This is clearly demonstrated by a recent article in "Motor Age" which says:

"In a small town of Nebraska of less than 2000 people there is a dealer who has one of the most completely equipped shops ever noted in automotive repair work. This shop is prepared to do anything except cutting gears.

There are two lathes in it, several drill presses, a CYLINDER REGRINDING MACHINE, welding outfits, forge, arbor presses and other equipment too numerous to mention.

"Naturally the question comes up, 'Why all this equipment in so small a community?' It is for this reason: In this part of Nebraska there are many tractors. The county is supposed to have a car for every four persons.

There are farms trucks, too. This dealer knew that all this equipment must be maintained properly. He knew that there were HUNDREDS OF CYLINDERS THAT WOULD NEED REGRINDING EVENTUALLY, so he installed the grinder.

"Work is sent to him from a radius of hundreds of miles. The shop does a lot of miscellaneous work for farmers such as pointing and sharpening plough shares, making brackets for wagons, welding broken parts, etc., with the result that the farmers are sold on the place and naturally bring their cars and trucks there for repairs. THE SHOP IS BUSY SUMMER AND WINTER. It is true that new car sales in this territory are not what they might be, but the shop is making money. The dealer knew the potential service work of the community and then tooled up for it. He got it."

Needless to say, a concern with such foresight and business management would use equally as good judgment in the choice of its machines and therefore they selected a HEALD.

There are many repair shops all over the country that are not getting the potential business in their vicinity because they are not equipped for it. Especially is this true in regard to cylinder regrinding which is fast becoming recognized as a necessity if the motor is to give maximum results. The shops that pride themselves on being able to turn out a complete perfect job must equip with a HEALD unless they can secure HEALD finish from some nearby grinding shop.

Why This Shop Installed a Cylinder Grinder

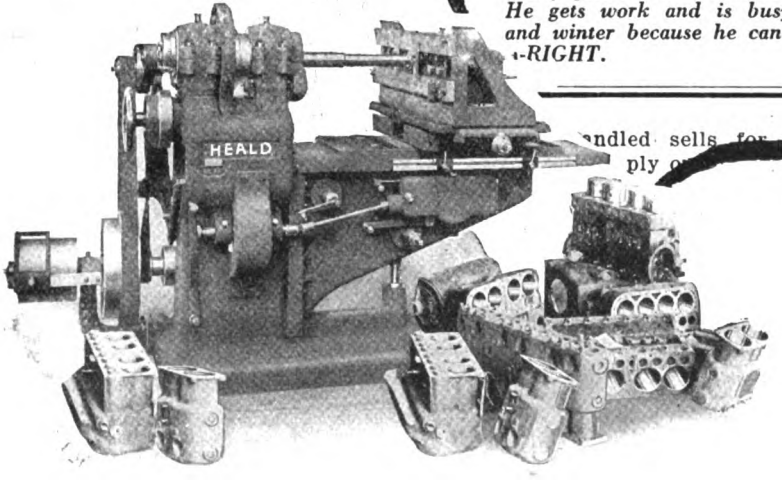
WHEN one thinks of a cylinder regrinding machine he hardly can imagine one of these expensive machines in any but a large town machine shop or in a good-sized service station.

Yet there is a dealer in a small town —less than 2,000—of Nebraska who, among other machines like engine lathes, drill presses, grinders, etc., has a cylinder regrinder. On this machine he can handle any engine block, from a Ford to the large blocks of the gigantic tractors operating in that territory.

Why a cylinder regrinder in such a small town? Just this:

This dealer knew the potential repair work in that territory. He knew by equipping his shop as completely as the large machine shops of the country he could handle any class of work, except gear cutting. He does work for the farmers on their agricultural implements and as a result naturally gets all their automobile work. He gets work and is busy summer and winter because he can handle it right.

Motor Age Oct '21



The above facts will be inevitable this spring when cars are overhauled and now is the logical time to write, wire or 'phone.

The Heald Machine Co.

100 New Bond St.

Worcester, Massachusetts

INDEX TO ADVERTISERS

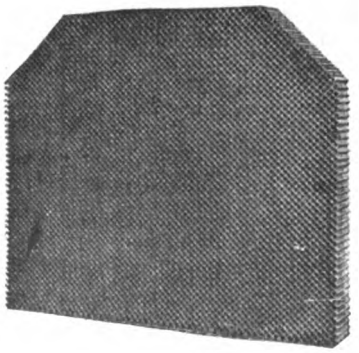
There's Money for you in

G&O Radiators

What is G & O Core Service?

When you wire us for a G & O core we make shipment the same day, from the nearest one of our stock core depots as follows:—

Baltimore	*New York*
Birmington	*Philadelphia*
Boston	*Pittsburgh*
Cleveland	*Raleigh, N. C.*
Dayton	*Rochester*
Detroit	*Springfield, Mass.*
Indianapolis	*Toronto*
Montreal	*Wilmington*
Newark	



Wide-awake repairmen are finding it a simple matter to build up a highly profitable business in repairing and replacing automobile radiators. It is not necessary to make a large investment in stock—G & O Core Service takes care of that. When a job comes in you simply wire us for the core required. Every cold snap this winter will mean business for you. Hang out your G & O Core Service sign (we furnish 'em free) and get busy. Send today for our Core List giving all sizes and prices at a glance. Others are making real money on G & O cores, and G & O radiators for Fords, "Built especially for Ford Service". Why not you?

Address "Core Manager"

The G & O Manufacturing Co.

Builders of High Grade Radiators

New Haven, Conn.

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Want and For Sale advertisements, situations and help wanted, five cents a word. Send Cash with order. No charge less than fifty cents. The small cost of these advertisements prevents our investigating and guaranteeing them. WE WILL NOT knowingly accept any but reliable ones.

WANT a good used electric blower for one fire. Quote price and make to **HERMAN LAMBRECHT, Sullivan, Ill.**

Wanted:—To hear from owners of blacksmith shop for sale. State cash price, full particulars. **D. F. Bush, Minneapolis, Minn.**

PRINTING:—1,000 Envelopes, Noteheads, Billheads or Business Cards $2.75 postpaid. Samples free. Let us know your needs. **ANDERSON PRESS, Beacon, N. Y.**

FOR SALE—Half interest in best shop in Minnesota. Reason for selling half interest—cannot depend on hired help. Address: **G. H. P., c/o American Blacksmith, Auto & Tractor Shop.**

WANTED—a Pony Planer size 16x18 inches. State price, make and full particulars, or will exchange a 12 horse power gasoline engine. Address **H. A. L., care of American Blacksmith, Auto & Tractor Shop.**

BLACKSMITHS LISTEN!—There are not enough blacksmiths and none learning the trade. Every handy young man can learn the trade and make more money doing hard jobs Easy. Forging and solid welding with Toy's modern methods of Blacksmithing. Hardening and Tempering to a standard with colored Tempering Charts all for one dollar. Sample free. **W. M. TOY, Sidney, Ohio.**

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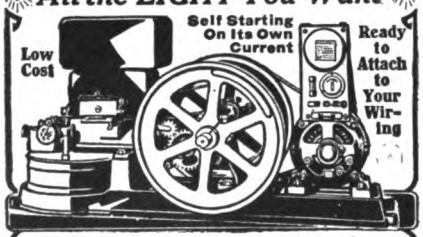
All the POWER You Need
All the LIGHT You Want



IN our new *"Power-Lite"* outfit we provide a specially built, Throttling Governor Electric Light Engine, connected to a 700-watt generator and 16-cell battery, making a practical Power and Light Outfit for farm and suburban homes. Besides running generator to charge battery, engine will operate cream separator, washing machine, churn, feed mill, air compressor, pump, wood-saw or lineshaft.

Save $50 to $100

You can operate engine on Kerosene, Distillate, Gasoline, or Gas—run your machinery direct from engine—use battery for lights. Costs much less to install—more power. Plenty of light for house and barn—easy to operate.

For Particulars and Prices, address,
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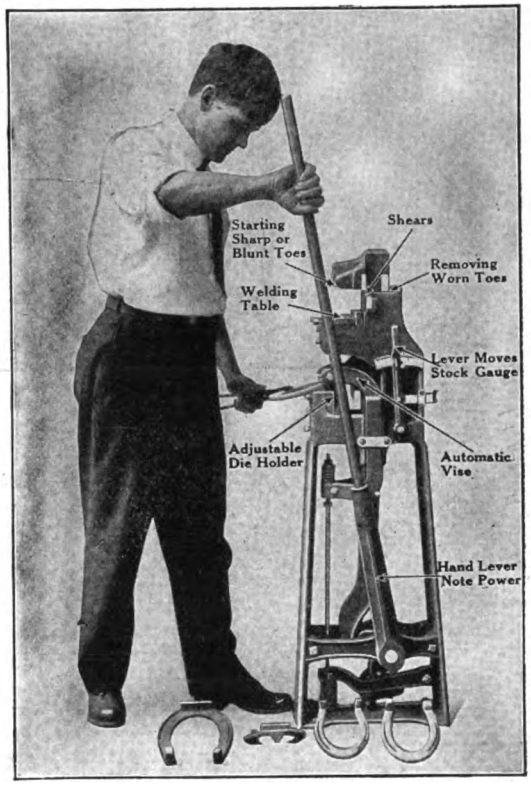
The L. S. P. Calking Machine

The Greatest Time and Labor Saving Machine on Earth



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The Latest Model, it has not been changed any within the past two years. We agree with the users and so would you that it cannot be improved.

Do not mistake this for a machine which makes toe calks or a foot vise. This machine is for turning heel calks, both Blunt and Sharp, sticking and welding toe calks, clipping and trimming ends of shoes. IT CALKS SHOES, doing the work just the same as you do by hand with the hammer, only it is done much better and easier, and in a fraction of the time.

In turning heels, you can turn up just as much stock as you wish, upset or stoveup to make as heavy as you like and square up the calks without use of hammer. There is no losing of toes when you weld on the L. S. P.

It is a strong, handsome, well-made machine, and will last, as you might say, a life time, fully warranted for one year. It is in use in the best shops in the United States, users claiming more for it than we do. Write at once for full information and prices.

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NATIONAL MACHINE CO.
Brighton, Ont., Canada

Value Not Measured in Words

The James D. Darney Company of Philadelphia uses a Parks Wagon Shop Special in their shop for repair work. They say they wouldn't be without it, because of the amount of time it saves and the work it does."

"Its value cannot be measured in words" says the Darney Company.

That's the way many blacksmiths and wheelwrights feel about Parks Machines. They are light, easy to handle and cost next to nothing to run. They out-perform heavier machines, and cost much less.

Write today for a catalog and see how well Parks Woodworkers are built and how adaptable they are to your work.

The Parks Ball Bearing Machine Co.

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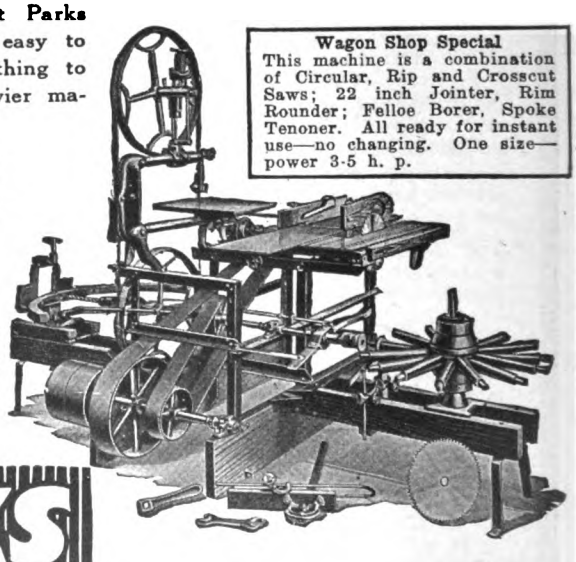
Canadian Factory: 200 Notre Dame East Montreal, Canada.

Wagon Shop Special
This machine is a combination of Circular, Rip and Crosscut Saws; 22 inch Jointer, Rim Rounder; Felloe Borer, Spoke Tenoner. All ready for instant use—no changing. One size—power 3-5 h. p.



PARKS
Wood Working Machines

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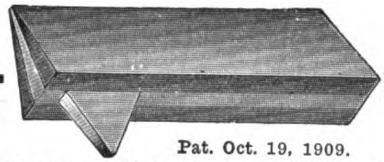

Pat. Oct. 19, 1909.

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THE HARD STEEL PLATE in the center and the two outside plates are welded together and shaped to a sharp calk that stays SHARP while it WEARS DOWN. Sizes, 0 to 7.

We will gladly mail a sample of this calk to any reader of The American Blacksmith on request. BE SURE TO TELL YOUR JOBBER you want LUDVIGSEN BROS. WELDED STEEL CENTER TOE CALKS.

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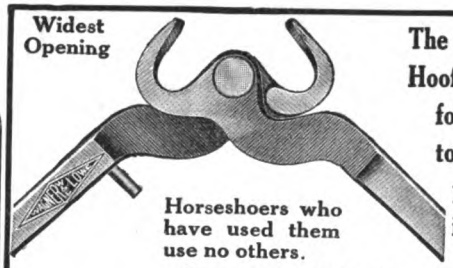

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Horseshoers who have used them use no others.

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Longest Leverage

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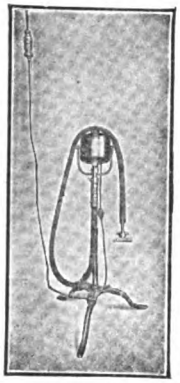

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NO WORK. NO FUSS.

Operates from any electric lamp socket

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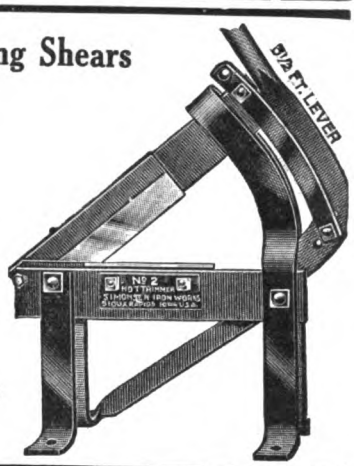
Made in two sizes. The only shear made expressly for cutting hot material. Handiest tool for cutting out plow points, trimming cultivator shovels, etc.

Sold by jobbers. Write for circular.



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Shaped Right

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For Strength, Safety And Quality Of Material

The most perfect in form and finish. Made of the Highest Grade Material to our own analysis. Will hold a shoe longer than any other nail made. Has a re-enforced point—makimg it easiest to drive and the safest to use.

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