

INTRODUCTION

METAL WORKED ON THE ANVIL has a grace which belies its strength, and is particularly suited to gates, railings, grilles, sign and lamp brackets, as well as such hearth furniture as fire-dogs, screens, poker and tongs.

The first part of the book describes the making of the most common decorative features such as scrolls, water leaves, wavy bars and twists. The difficult acanthus leaves and embossed work are not included in the present volume. Part 2 describes step by step the making and assembly of a gate, which includes the same techniques as are used in all traditional decorative ironwork such as grilles, brackets and hearth furniture. The final chapter discusses the problems of painting and rust proofing. A knowledge of basic smithing techniques has been assumed throughout, and only those tools peculiar to decorative ironwork are mentioned. Basic smithing techniques, heats and tools are described in *The Blacksmith's Craft*.* Craftsmen are also urged to study the books on book-keeping; costing, estimating and business methods listed on page 97.

The techniques are shown by sequences of photographs with concise explanations which are intended to supplement instruction on the anvil. It is hoped that this clear and practical method will help the smith to achieve the highest standard of work.

TOOLS

As well as the tools and equipment which every blacksmith keeps in his shop, some special tools are used for decorative ironwork. For scroll-work you will need wrenches, pliers and scroll tools. Three scroll wrenches are shown in Fig. 1; several sizes are necessary to suit the shape and width of different scrolls.

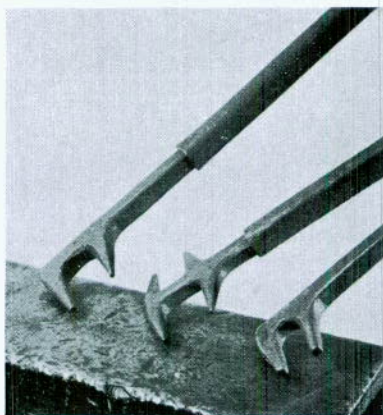


Fig. 1

**The Blacksmith's Craft* published by the Rural Development Commission.



Fig. 2



Fig. 3

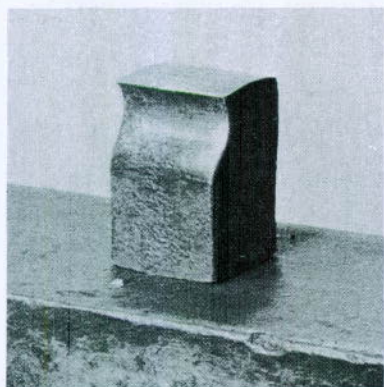


Fig. 4

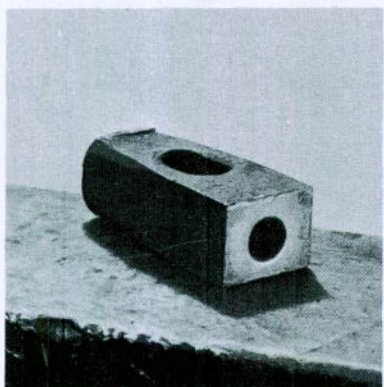


Fig. 5

Round-nosed pliers (Fig. 2) are used for gripping the tip of the scroll to the scroll tool, for adjusting the curve of a scroll nearly completed, and for fitting collars.

Bow pliers (Fig. 3) are also used for fitting collars: they are designed not to spoil the collars when they are gripped.

When several scrolls are required to the same design, it is usually worth while making a scroll tool, or adapting one already made: making a scroll tool is described on page 35.

The halfpenny snub-end scroll tool (Fig. 4). The groove is made with a one-inch fuller. The top should be curved as shown and the edge sharp. This tool is shown in use on page 25.

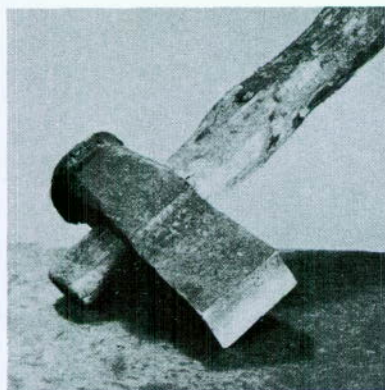


Fig. 6

The monkey tool, side set and butcher are used in making a shoulder. The monkey tool (Fig. 5) is used for squaring the shoulders of round tenons. If the end of the tenon is in danger of fouling the base of the hole in the monkey tool, it can be seen through the cross-hole and shortened.

The side set (Fig. 6) is for squaring the shoulder precisely; the end is bevelled to an angle of about 75° . A butcher (Fig. 7) is useful for making shoulders quickly.

For leaf work you will need a leaf hammer and a leaf tool (Fig. 8) and a crimping tool. A leaf tool is simply a forked stake with the inner edges slightly rounded so as not to gall the leaf. The head of the crimp tool (Fig. 9) is hollowed and rounded for crimping the leaves.

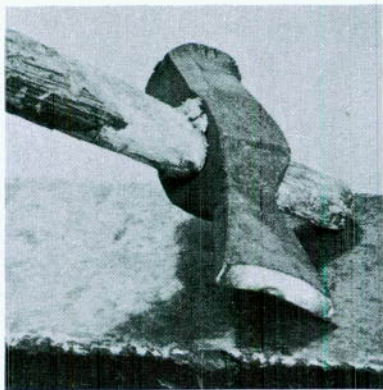


Fig. 7

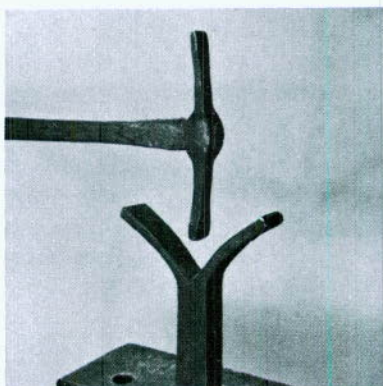


Fig. 8

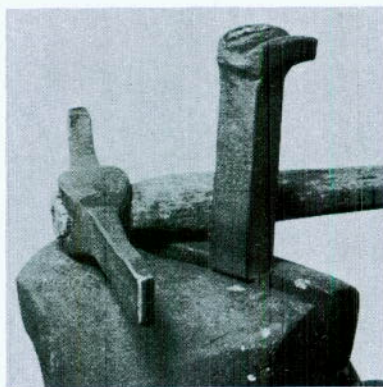


Fig. 9

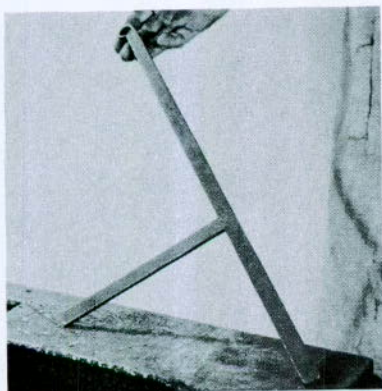


Fig. 10



Fig. 11

Lastly, for measuring off and marking, you will need a smith's square (Fig. 10), dividers, and chalk (Fig. 11) – both engineers' chalk for marking metal, and schoolroom chalk for transferring drawings on to metal plate.

To Transfer a Drawing on to a Metal Plate

Whenever metal has to be shaped hot to a drawing, the drawing must be transferred to an iron plate. A sheet of brown paper, chalked on one side is used like carbon paper to transfer the drawing on to the plate.

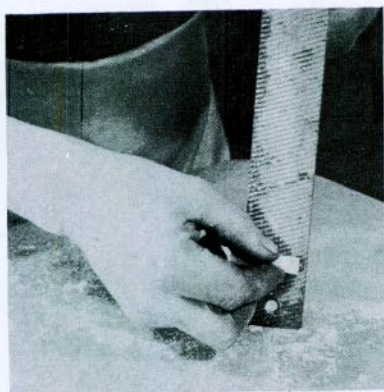


Fig. 12

A

First choose a piece of plate with a surface neither too new nor too rusty. Spread out the brown paper, and file a piece of natural or school chalk on to it with a bastard file.



Fig. 13

B

Rub the chalk in with your finger tips.

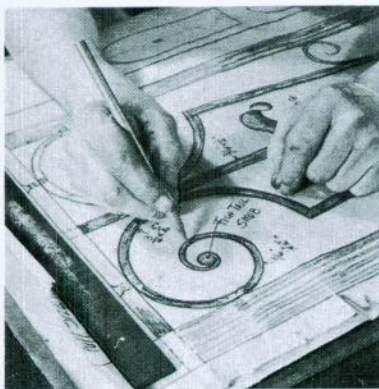


Fig. 14

C

Blow off the surplus chalk, turn the paper over, lay the drawing on top, and go over the lines with a pencil.

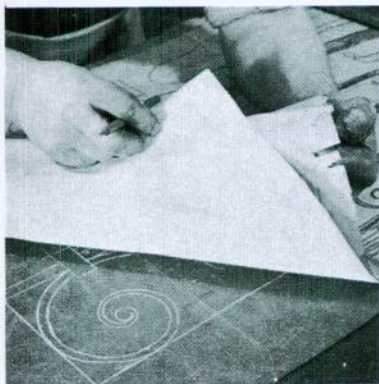


Fig. 15

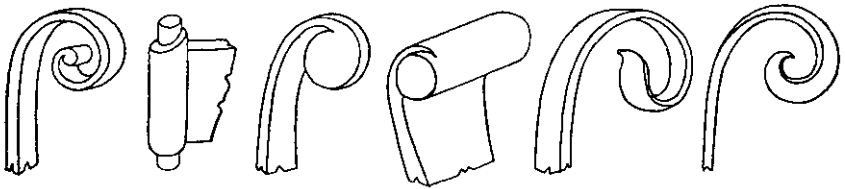
D

This is the result. Strengthen any weak lines with engineers' chalk.

PART I

CHAPTER I

MAKING AND FIXING SCROLLS



Scrolls are used more often than any other motif in wrought ironwork. Their variety and grace enhances many of the finest designs; a mastery of scroll-work is, therefore, the first essential.

The beauty of a scroll depends upon its proportions. As a smith gains experience, he will train his eye to judge how heavy a section of metal to choose, the fineness of the taper and how tightly to roll the scroll, and he will train his hand to strike the hammer blows where they tell. There are no rules by which to determine the proportion of a scroll and even when working to drawings, a smith must use his own critical sense to ensure that each scroll has a graceful flow.

Practice in freehand drawing is a valuable training. A beginner should take a course in drawing if he can. If there is no school near enough to attend, then he should practise drawing a simple scroll true to line when he has a few moments to spare. At first he may find it surprisingly difficult, but if he perseveres he will find the training most useful when he comes to make a scroll in metal.

This chapter describes nine different types of scroll, beginning with a ribbon-end scroll, which is the simplest, and progressing to the bevelled scroll. The scrolls have been explained before the scroll tool, because the making of the tool is best left until the smith has some experience of its use. The chapter ends with scrolls worked into a 'C' and an 'S', and the fixing of scrolls with collars. The side panels and centre panels for a gate described in Part II are typical examples of decorative scroll-work.

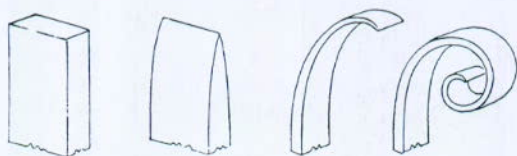
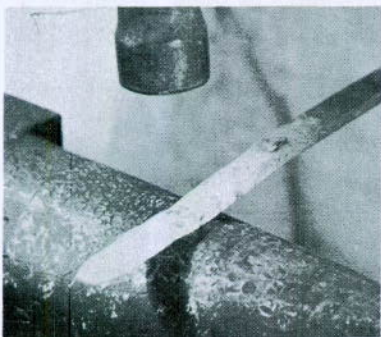


Fig. 16

**A**

The ribbon end is drawn down in two stages.

First, on the face of the anvil, reduce the width of the bar. Do not allow the thickness to increase, but do not reduce it either.

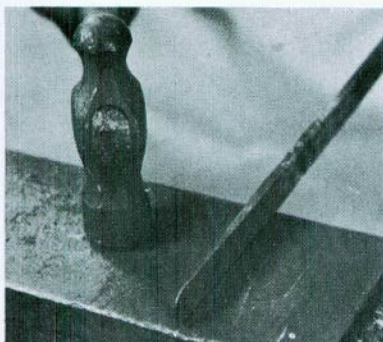
**B**

Next, move on to the bick, turn the metal on to the flat and draw the taper down.

The reduced width now spreads to the original size or a little over.

**C**

With the bar on edge, round up the tip neatly.



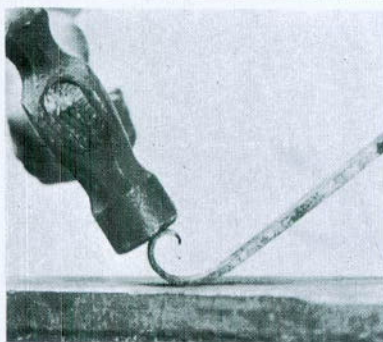
D

Level up on the edge to the width of the parent metal. If the first stage was well judged, little will have to be done now.



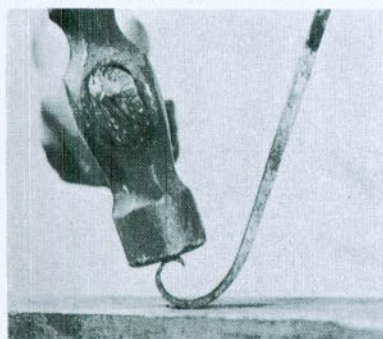
E

Roll the tip of the scroll over the edge of the anvil. Start at the extreme end and take care not to chop the metal against the corner of the anvil.



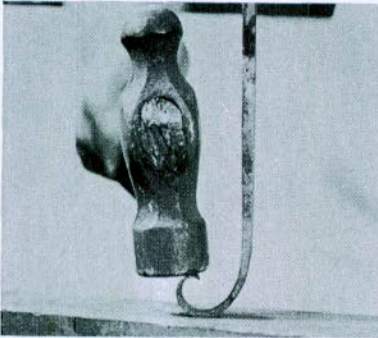
F

Now continue to roll up the scroll, at a RED heat, on the anvil face. As the scroll is formed, both the bar and the direction in which the blows are struck should steadily approach the vertical.



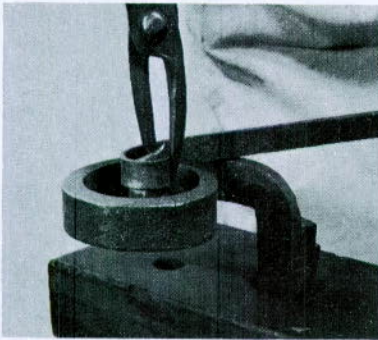
G

You will probably have to repeat these movements two or three times.



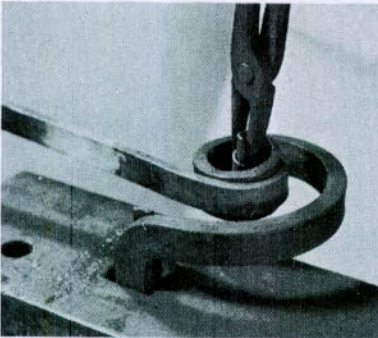
H

Scrolls can be completed by this means. But they are more often finished on a scroll tool as shown next.



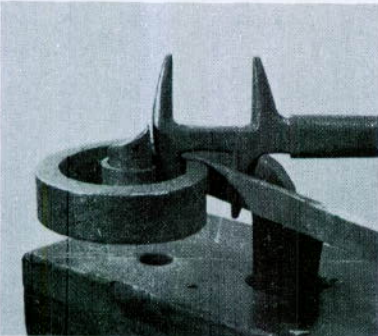
J

The making of a scroll tool is described on page 35. It is better to begin on one made by an experienced man and see how it works before making your own. Take a RED heat on the bar. Place the tip of the scroll which you have forged on the tip of the scroll tool. Hold them together with round-nosed pliers. Pull the end round far enough to ensure that the end of the scroll has firmly gripped the tool.



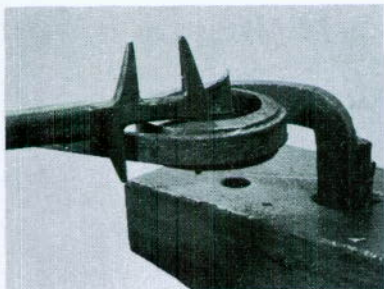
K

Relax your grip, and lower the scroll from the raised tip of the tool to the level of the main part.



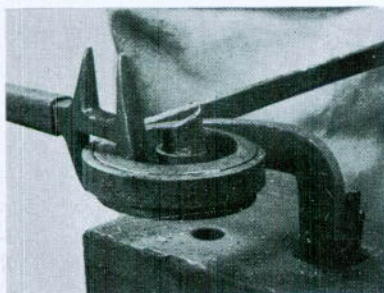
L

By now the cold end of the scroll will grip the scroll tool by itself. Continue forming the scroll, forcing the metal close to the scroll tool with a scroll wrench. Very small scrolls can be bent cold by this means.



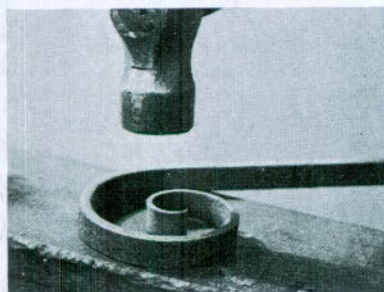
M

Move round the anvil as the scroll is formed so as to work in a comfortable position.



N

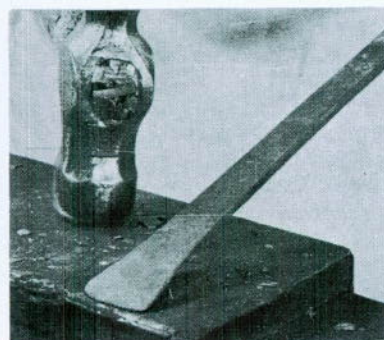
Continue in this way until the scroll is finished. It is sometimes a good idea to mark the scroll tool with chalk to show when the scroll is the right size.



O

A well made scroll tool will produce a scroll which is almost flat, but the scroll will require a little trueing up at the finish.

FISHTAIL-END SCROLL



P

Fishtail-end Scroll

The fishtail-end scroll is similar to the ribbon-end scroll except that instead of being kept parallel, the metal is spread out as it is forged.

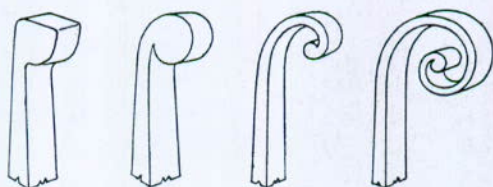
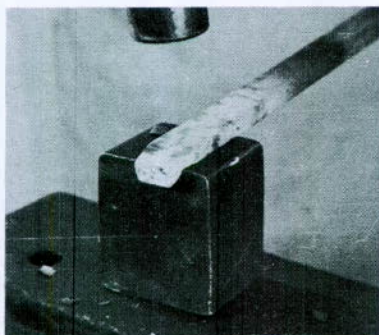
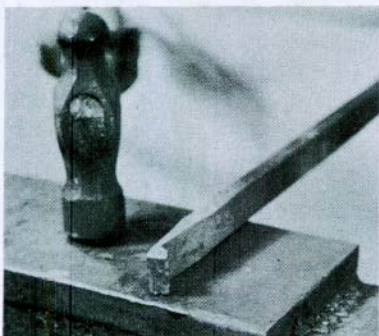


Fig. 17

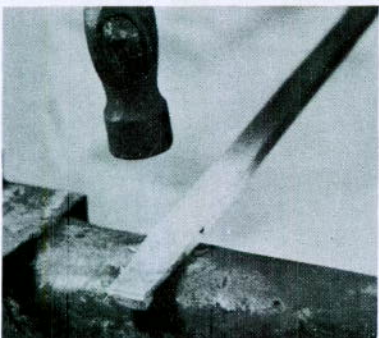
**A**

The snub-end is formed over the square edge at the far side of the anvil, or, if the anvil is worn, over a square-edged stake as shown here.

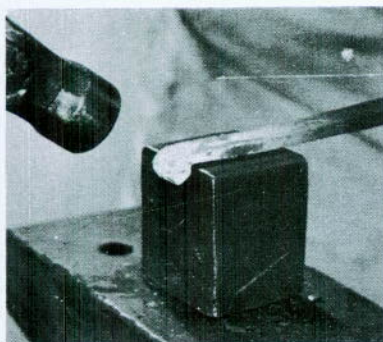
The amount of metal projecting over the edge should be equal to the thickness of the bar.

**B**

Forge in the swelling and level up on edge.

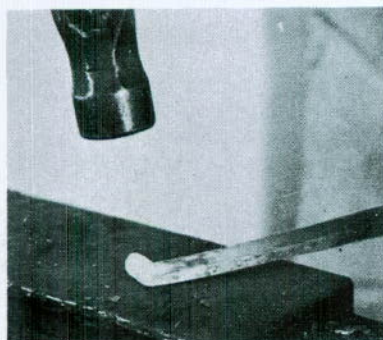
**C**

In order that a solid snub-end scroll shall look graceful, the metal should be forged to less than half its original thickness for a considerable way behind the snub, scarcely widening at all.



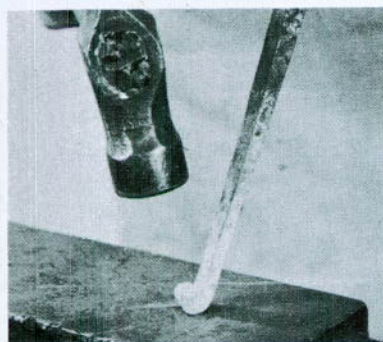
D

Forge in the outside corner of the snub over the anvil or stake edge.



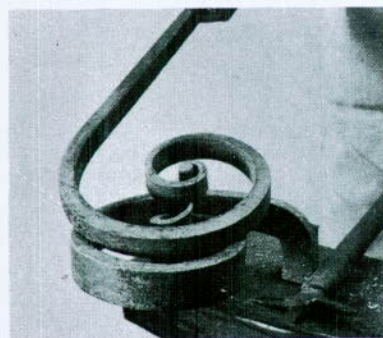
E

Turn the back of the piece on to the anvil face and forge in the remaining corner.



F

Dress up the snub, which should be perfectly round. It should join the taper with a flowing curve so that the scroll may bend gracefully from the snub.



G

When making any kind of snub-ended scroll on a scroll tool, it is vitally important to give the scroll a good start with hammer and pliers (as in Lessons 1 and 4).

The curve of the scroll must fit the scroll tool and grip it. On no account must the snub be allowed to do any of the holding or it will be distorted; this is very difficult to rectify.

Here is the finished scroll.

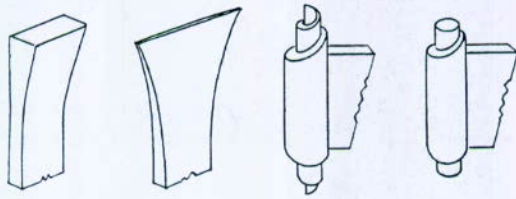
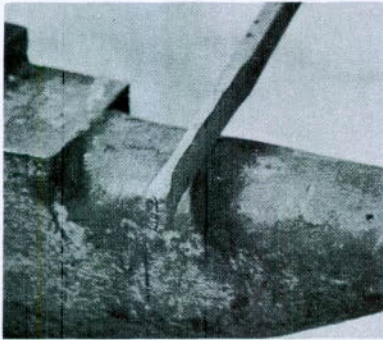
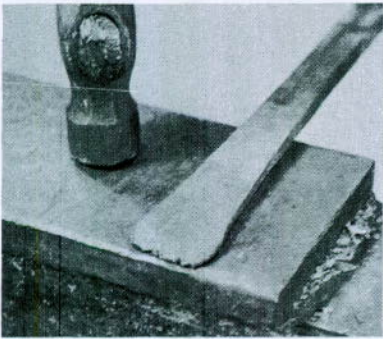


Fig. 18

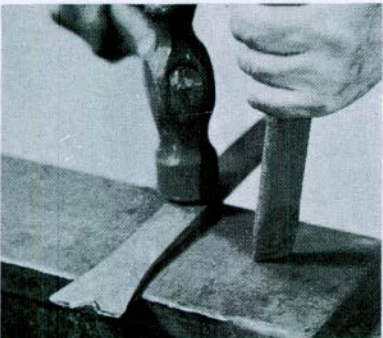
**A**

Reduce the metal on the back of the anvil, leaving an untouched lump at the end and a long taper. It is shown here on edge, cold.

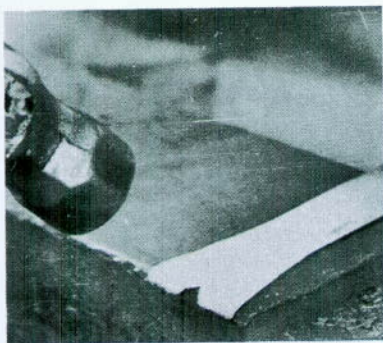
In the same heat, move it on to the anvil face, turn it on edge, and level it up.

**B**

Take a WELDING heat on the end in case the metal has cracked, and forge the lump into a broad, short fishtail.

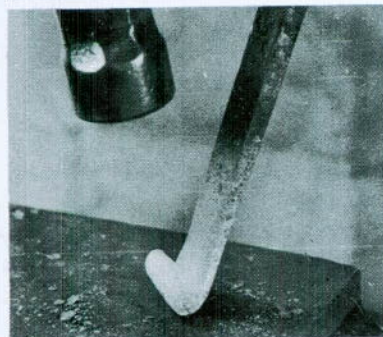
**C**

Notch the end as shown. This, by removing surplus metal from the centre, makes it easier to roll a tight snub, and prevents the middle of the snub from bulging when the end faces are burred.



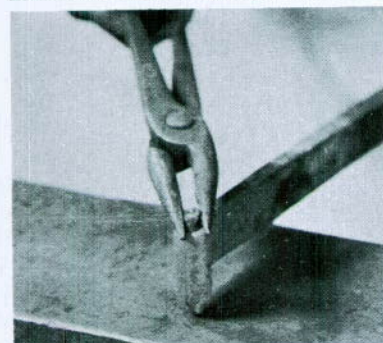
D

Starting at the extreme tip, begin to roll up the snub end.



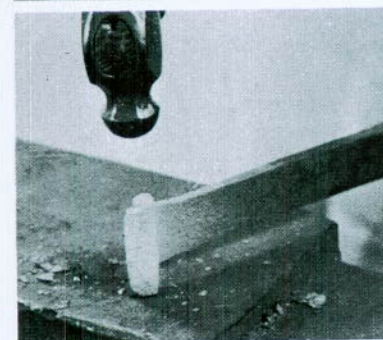
E

Tighten the roll in the same way as the solid snub was formed.



F

The projecting ends can be tightened up neatly with the round-nosed pliers. A scroll is sometimes left in this form, and is called a Fishtail Knib. It is delicate in appearance but apt to catch on clothing, so it is more often finished in a Fishtail Snub as below.

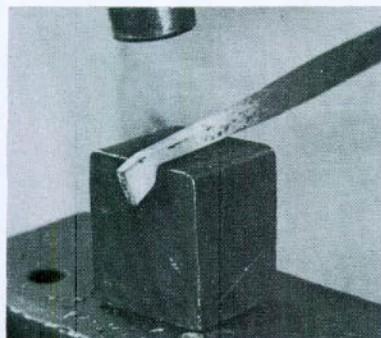


G

Flatten the end faces, burring them carefully so that the ends of the roll appear solid. If one end flattens more readily under the hammer than the other, cool it a little with water.

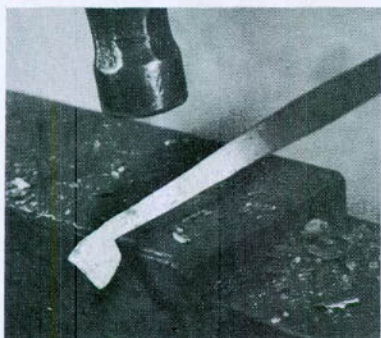


Fig. 19

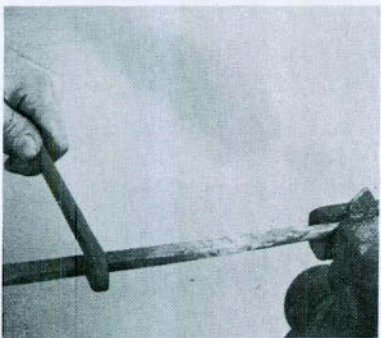
**A**

As in making a solid snub-end (see page 20), it may be wise to use a square-edged stake.

With the metal projecting as far over the edge of the anvil or stake as the bar is wide, forge an offset neck.

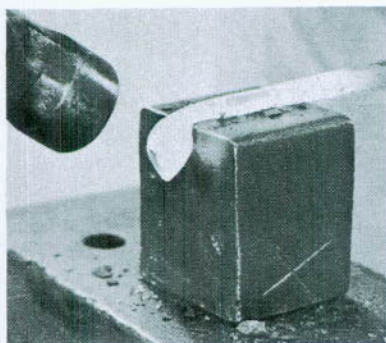
**B**

So far, the snub is being formed in the same plane as the bar, but in the finished scroll it must be at right angles to this. The snub will, therefore, need to be twisted through a right angle. Before making this twist, round up the neck, as the corners would show up the twist and it is more difficult to forge them in afterwards.

**C**

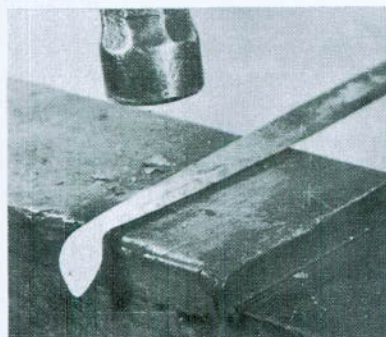
Take a BLOOD RED heat, and concentrate it on the rounded part, using water if necessary.

Now grip the snub in the vice and twist the bar at right angles using a suitable wrench or a pair of tongs.



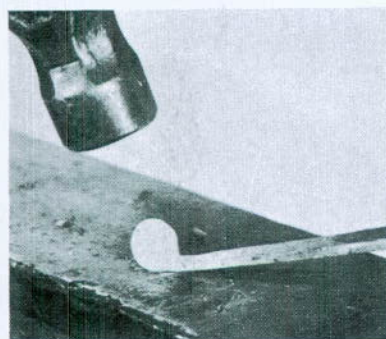
D

Take a heat on the snub and forge in the far corner.



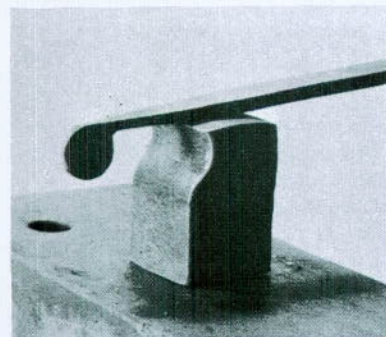
E

The neck which was rounded for twisting should now be squared up again. If this were left till later, the head would get in the way.



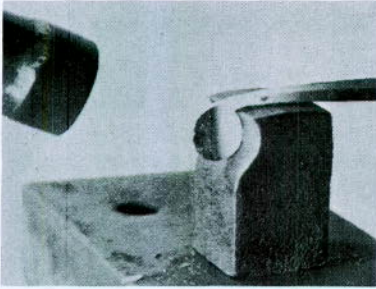
F

Turn the piece on its back and round up the snub on the anvil face.



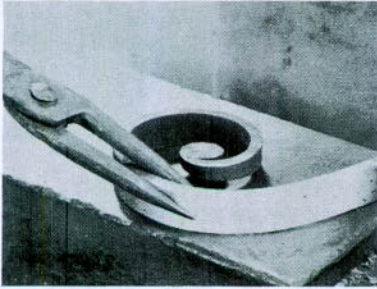
G

Here is the special tool (shown on page 10, Fig. 4) with the piece, showing the radius in the neck as forged so far.



H

To finish the snub and make it blend gracefully into the neck, take a near welding heat, cool the far edge quickly to avoid damaging it and get rid of the radius with light blows.



J

As the normal scroll tool cannot readily be adapted to these scrolls, it is usually easier to bend them with the round-nosed pliers.

If a large number is needed, a special scroll tool with an open centre should be made.

Lesson 5

BOLT-END SCROLL

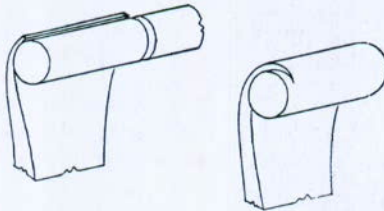
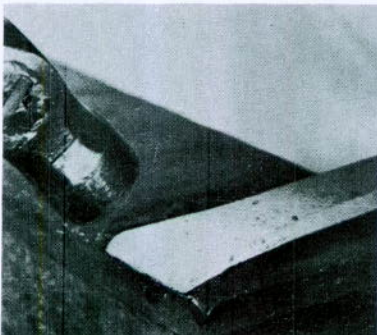
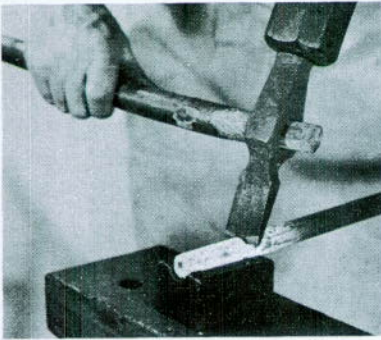


Fig. 20



A

Forge a fishtail, leaving the end not less than $\frac{1}{8}$ -inch thick. If the bolt-end is to be wide in proportion to the bar, it will be necessary to upset the end to some extent first.



B

The bolt is made from a round bar, and should be at least $\frac{1}{4}$ in. longer than the width of the fishtail.

Make a notch all round the bar with a hot set, leaving just enough metal at the centre to support the bolt while it is being welded.

Hold the set to one side, as shown here, so as to leave a square end on the bolt.



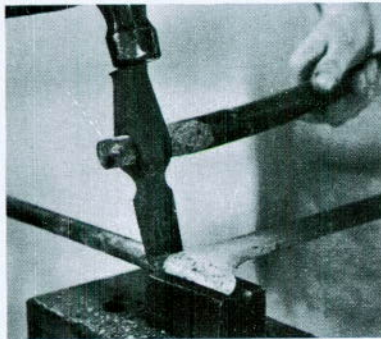
C

Help will be needed for this weld. Take a WELDING heat on both pieces. Have your mate take a wire brush in one hand and the round bar in the other.

He should lift the round bar from the fire and place it in a bottom swage, wire brushing it on the way.

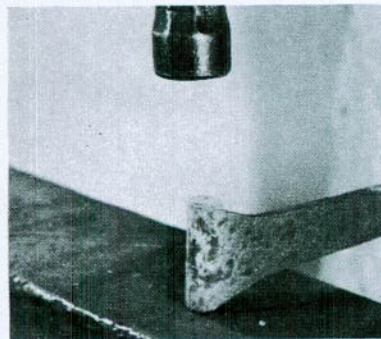
Lift out the fishtail and present the end, bottom upwards, to your mate. He should give it one stroke with the wire brush.

Turn it over and immediately weld it to the bolt.



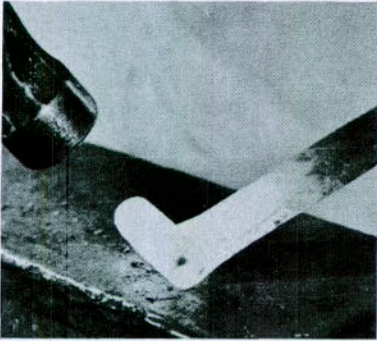
D

Hand your hammer to your mate and sever the bolt from the bar with a hot set.



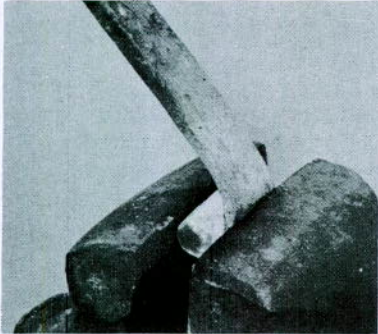
E

Square up the ends of the bolt.



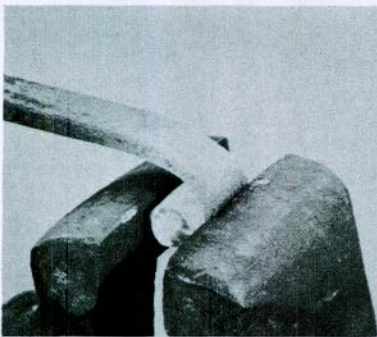
F

Very slowly, so as not to burn the thin fishtail, take a FULL WELDING heat and strengthen the weld, rolling the bolt up a little.



G

Grip the bolt in a vice and pull the bar over to begin the scroll.



H

Take a fresh grip and repeat the process until the bar almost encircles the bolt, then form the rest of the scroll with hammer, horns and wrench (see page 33 E).

Bolt-ended scrolls are not very common and are normally fairly sturdy, so scroll tools are seldom used for them.