

HAND TOOLS. PLATE 17

HAND TOOLS

PLATE 17 illustrates the uses of various hand tools.

FIG. 1 is showing top and bottom fullers. Fullering is generally the first operation before commencing to forge. By hammering the fullers into the depth required, as shown in FIG. 2, the smith is given a good start before drawing down, as shown in FIG. 3.

FIG. 4 shows top and bottom radius fullers, which are used for reducing a large diameter bar to a small diameter bar, as shown in FIG. 5. FIG. 6 shows the bar when drawn down.

In FIG. 7 is shown a circular chisel, which is used for cutting discs out of square plates.

FIG. 8 shows a gouge, which is used for rounding ends of bars as shown.

FIG. 9 illustrates a punch for punching holes in the material when hot. FIG. 9 also shows a sledge hammer, which is made out of $2\frac{1}{2}$ -inch square cast steel. The average weight of a sledge hammer is 12 lb.

FIG. 10 illustrates a cold set for cutting rivet heads off. This particular set is ground at one side only, as shown. FIG. 10 also shows a tool known as a quarter hammer, made from a 2-inch square cast-steel bar. Its average weight is 6 lb.

HAND TOOLS. PLATE 17

FIG 1

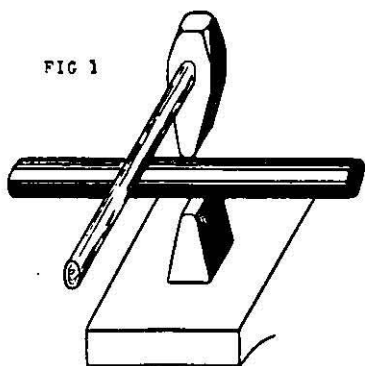


FIG 4

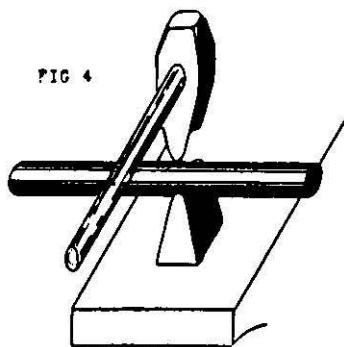


FIG 2



FIG 5



FIG 3



FIG 6



FIG 7

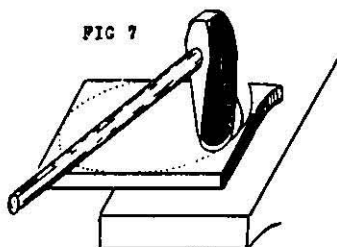


FIG 8

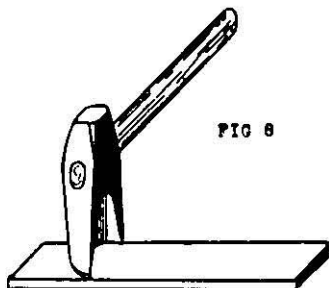


FIG 9

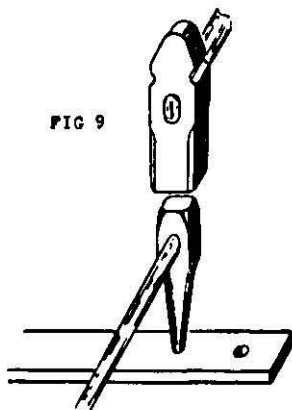
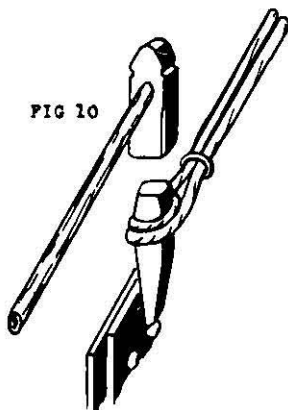


FIG 10



HAND TOOLS. PLATE 18

CALIPERS, ETC.

PLATE 18 illustrates a useful collection of tools very necessary for the smith in his trade.

FIG. 1 shows double calipers, which are used for checking sizes when forging.

FIG. 2 shows the handle made from a flat bar.

Note.—This has a square hole to allow each arm, as shown in FIGS. 3 and 4, to work separately when riveted. The rivet used (FIG. 5) has a square collar.

FIGS. 6 and 7 are the washers which complete its structure.

FIG. 8 represents blacksmiths' compasses or dividers.

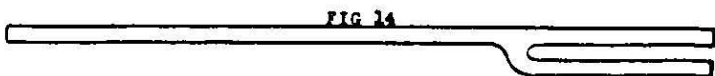
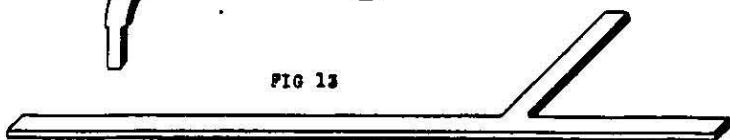
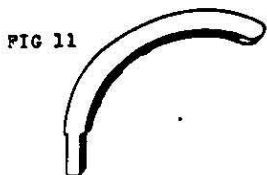
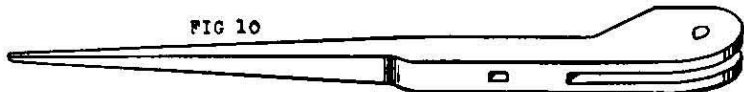
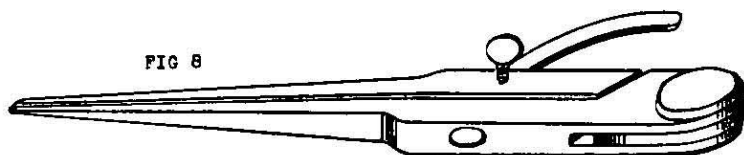
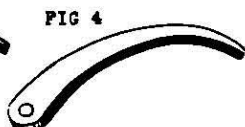
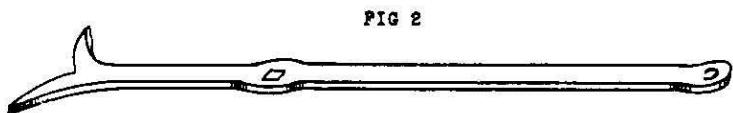
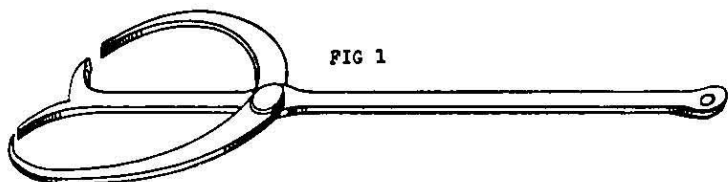
FIGS. 9 to 12 illustrate the parts of compasses before they are riveted together.

FIG. 13 illustrates a blacksmith's T-square, which is used to square corners.

FIG. 14 shows the method of making it.

FIG. 15 represents a bevel used for setting bars to their required angles.

CALIPERS ETC. PLATE 18



ANVIL TOOLS. PLATE 19

ANVIL SWAGES

PLATE 19 illustrates anvil swages. These are made in various sizes and are used for rounding material to any size that may be required.

FIG. 1 shows a short bottom swage containing three different sizes. The narrow swage is necessary for swaging between two larger sections, as in FIG. 3.

FIG. 2 represents a long single bottom swage used as in FIG. 4.

To make a swage, commence by forging $1\frac{1}{4}$ -inch square from a 3-inch square bar. Next cut it off the 3-inch square bar, allowing enough material to make the body. Place in a bolster and hammer down to the required size. Next sink the groove by hammering in two or three different sizes of diameter bars, beginning with the smallest and gradually increasing the diameter to the required size.

ANVIL SWAGES.

PLATE 19

FIG 1

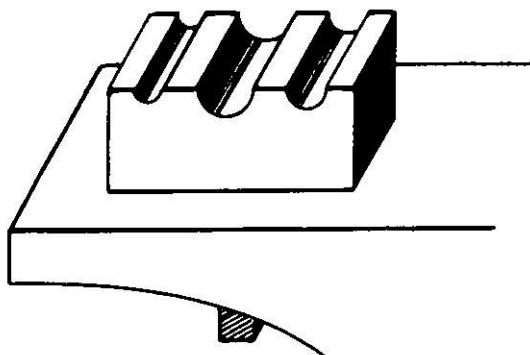


FIG 2

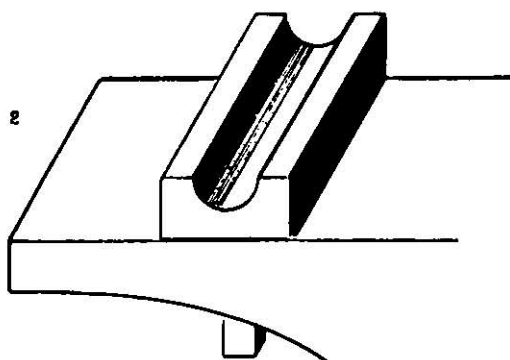


FIG 3

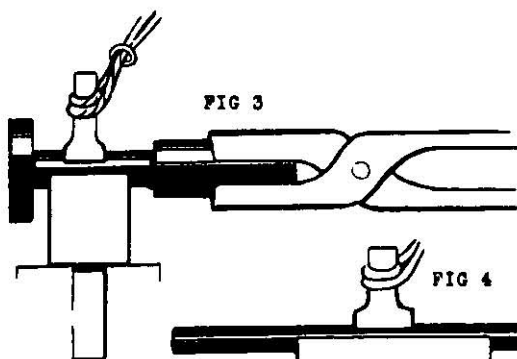
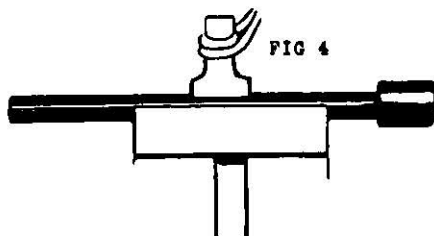


FIG 4



ANVIL TOOLS. PLATE 20

SMALL ANVIL

FIG. 1 illustrates a small anvil fixed into a large anvil, which is useful in the case of small work such as links, double eyes, etc.

FIG. 2 shows the first operation, by side-setting, 3 ins. from the end. Draw down the 3 ins. of the bar to 2 ins. diameter. Leave 4 ins. of the 2 ins. diameter, and draw down the remainder to the size of the hole in the anvil, which is about $1\frac{1}{4}$ -inch square, as shown in FIG. 3. Next cut it off the bar 3 ins. long and place it in a bolster as in FIG. 4. Flatten down as in FIG. 5. Next withdraw from the bolster and hold it with the tongs, as shown, and taper the flat end down to the required size. Next draw down the opposite end and finish off.

Note.—If a smith has not a bolster high enough to hand, the difficulty can be overcome by placing several on top of each other.

SMALL ANVIL.

PLATE 20

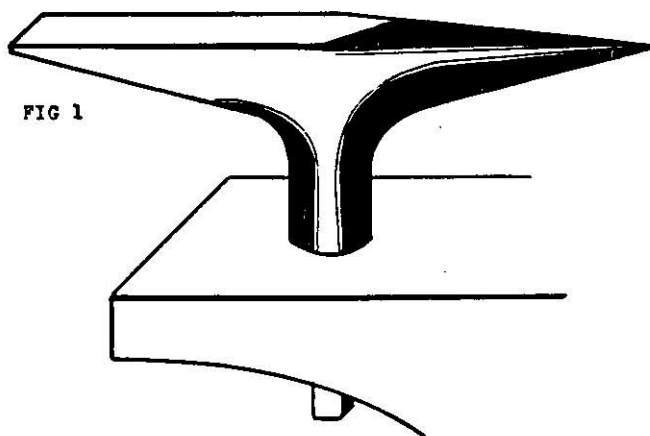


FIG 1

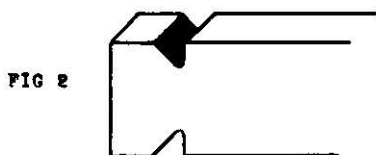


FIG 2

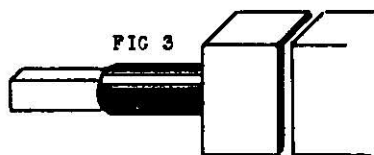


FIG 3

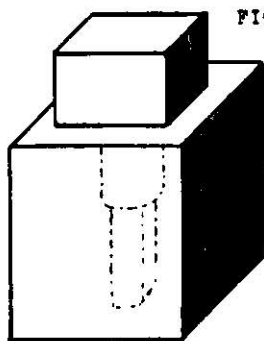


FIG 4

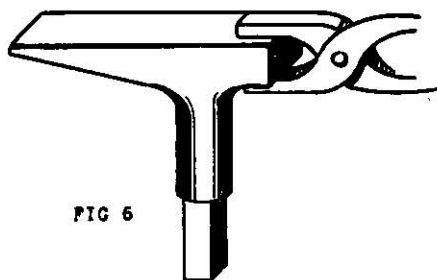


FIG 6

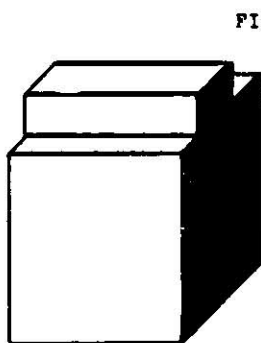


FIG 5

ANVIL TOOLS. PLATE 21

BOLSTER SWAGE

FIG. 1 shows a bolster swage which is a very useful tool, and ought to be stocked in various sizes. A large number of tools can be accumulated by using scrap pieces and shaping them while hot to any size required.

A bolster swage is similar to an anvil swage, except that it has a hole in the centre instead of a stalk.

The remainder of the illustrations on this plate show the uses to which a bolster swage can be put.

FIGS. 2 to 4 show the making of an eye bolt, before placing in a bolster swage, as in FIG. 5.

FIG. 6 illustrates a bolster swage in use during the making of a top swage.

FIG. 7 shows it in use during the making of a double eye.

FIG. 8 shows it in use during the making of a T-piece.

BOLSTER SWAGE. PLATE 21

FIG 1

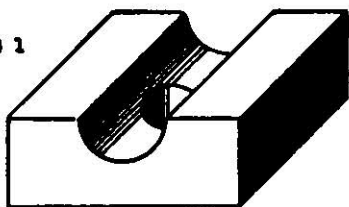


FIG 2



FIG 3

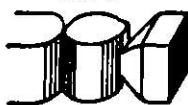


FIG 4



FIG 5

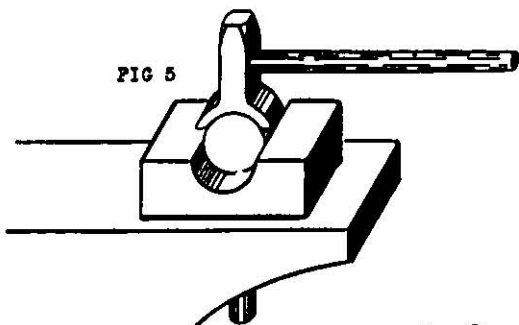


FIG 6

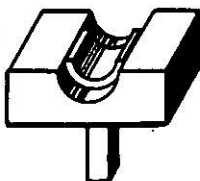


FIG 7

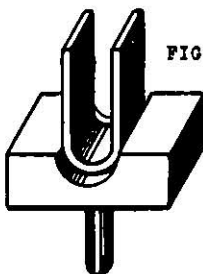
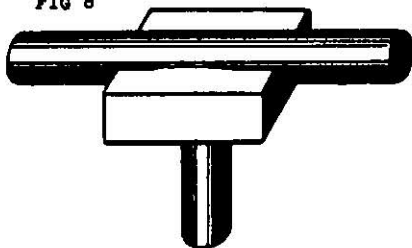


FIG 8



ANVIL TOOLS. PLATE 22

ANGLE BAR TOOLS

PLATE 22 is a collection of tools used for angle bar work.

It sometimes happens that smiths have to do this class of work, although it really belongs to another branch of the trade called Angle Iron Smiths.

In FIG. 1 is shown a split block used for straighting or cutting T-bars and angle bars, as seen in FIGS. 2 and 3.

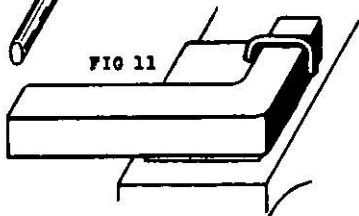
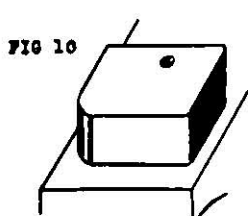
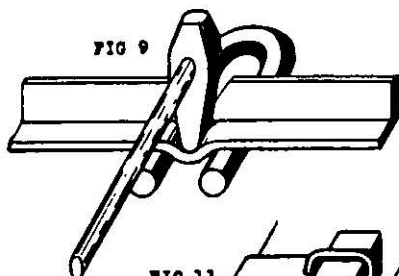
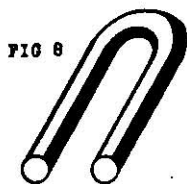
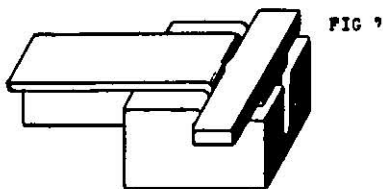
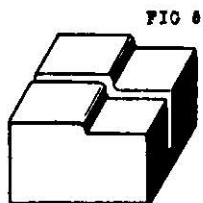
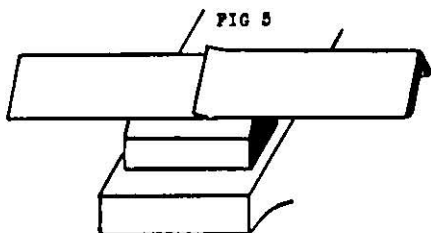
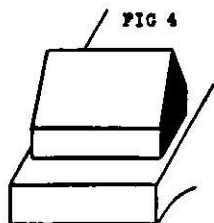
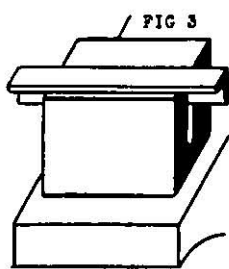
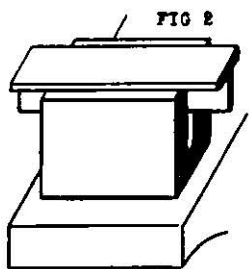
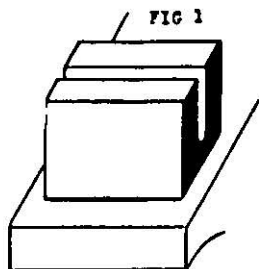
FIG. 4 shows an angle V-block suitable for welding angle bars, as shown in FIG. 5.

FIG. 6 shows a joggling block, which is used for joggling T-bars and angle bars by laying a piece of flat bar on top of the T-bar when hot under the steam hammer, and hammering down, as seen in FIG. 7.

FIG. 8 is a bending link used, as seen in FIG. 9, to bend an angle bar at right angles.

FIG. 10 shows a block to be used, as seen in FIG. 11, to bend small angle bars by gripping the bar at one end and pulling it around, at the same time hammering it on top to avoid puckering.

ANGLE BAR TOOLS. PLATE 22



POWER TOOLS. PLATE 23

CUTTERS

PLATE 23 illustrates cold cutters for cutting cold material at the steam hammer.

FIGS. 1 and 2 show a pair of steel cutters or shears for cutting flat bars under the steam hammer. The making of a pair of cutters is very simple. Use a steel bar $\frac{3}{4}$ in. by $\frac{1}{2}$ in. and cut a piece off 4 ins. long to make the bottom cutter. The top cutter has a handle forged, which is held by the smith as shown in FIG. 3.

FIG. 4 shows the position of the cutters ready to cut.

FIG. 5 shows the result.

To harden these cutters heat to a dark red, then plunge into oil. Next polish them, then lay on a hot surface till they turn dark brown.

FIG. 6 represents a cold cutter used at the steam hammer for cutting square and round bars.

FIG. 7 shows the cutter in operation.

FIGS. 8 and 9 show the method of breaking the bar when nicked around with the cutter. Place two pieces of material not exceeding 1 in. in thickness on the hammer block. Place the bar on top of them, and hold a small diameter bar on top as shown. Hit one sharp blow with steam hammer.

CUTTERS.

PLATE 23

FIG 1



FIG 2

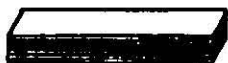


FIG 3

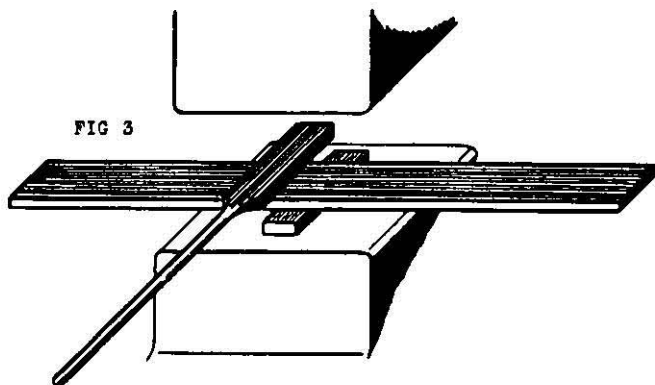


FIG 4



FIG 5



FIG 6



FIG 7

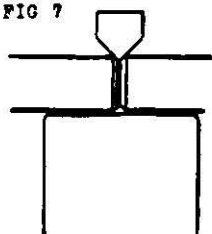


FIG 8

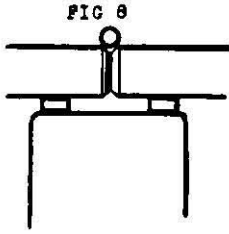
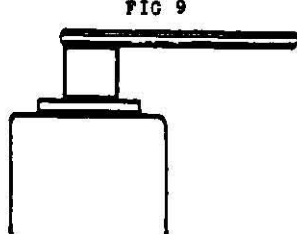


FIG 9



POWER TOOLS. PLATE 24

SIDE SET TOOLS

PLATE 24 illustrates various side set tools and their uses.

They are mostly used for heavy forging and made in different sizes. Side sets are used similar to fullers, i.e. generally used for the first operation in forging.

In FIG. 1 is shown a pair of side sets with sharp angles, which are used to form a square shoulder when hammered in.

FIG. 2 shows a pair of side sets with the edges rounded, so as to form a radius when hammered in.

FIG. 3 represents a pair of radius side sets, which are used for side setting round or square bars.

FIG. 4 illustrates each pair of side sets hammered into the bar.

FIG. 5 shows the result.

FIG. 6 shows where only one side set has been used.

FIG. 7 shows the method of making a side set, by drawing down a handle from 3-inch square cast steel and cutting one corner off. The angle, when finished, should be perfectly square, as shown in FIG. 8.

SIDE SET TOOLS. PLATE 24

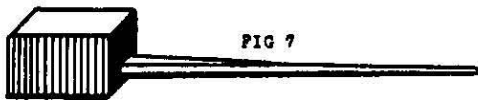
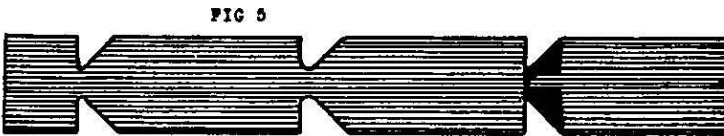
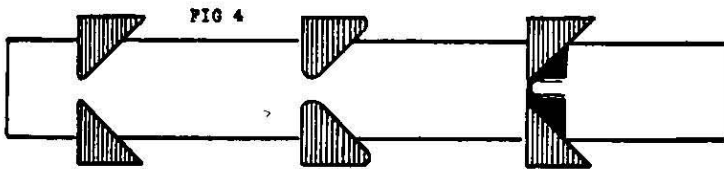
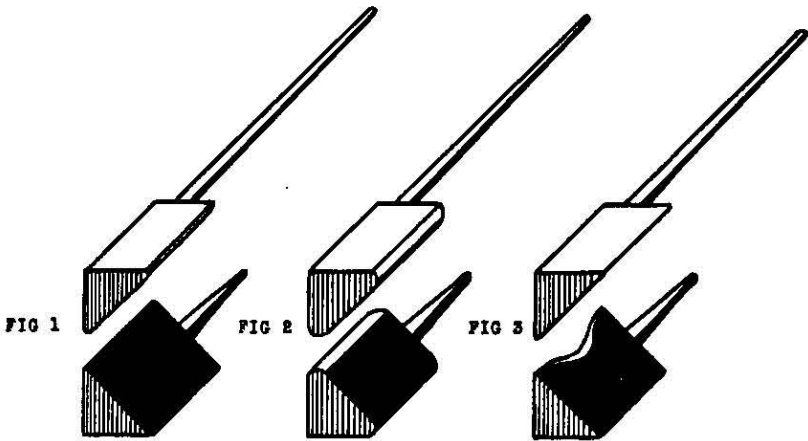


FIG 8

POWER TOOLS. PLATE 25

RADIUS TOOLS

PLATE 25 ; FIG. 1 illustrates radius cutters, which are used for cutting and rounding the end of a bar and also to form bosses.

FIG. 2 shows a pair of radius fullers, which are used to fuller and radius the bar at the same time.

FIG. 3 illustrates each pair of tools hammered into the bar, and FIG. 4 shows the result.

The method of making these tools is to hammer a square bar corner-ways into an impression which has been machined to shape, as shown in FIGS. 5 and 6.

FIGS. 7 and 8 show right-hand and left-hand cutters used for cutting hot material.

Note.—When drawing down the handles of these tools they should be made as light as possible to avoid jarring the hand.

RADIUS TOOLS.

PLATE 25

FIG 1

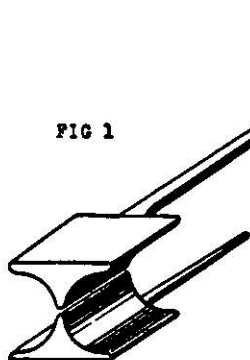


FIG 2

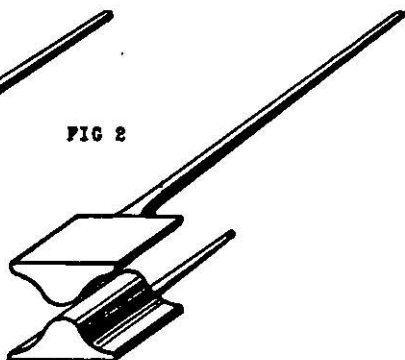


FIG 3

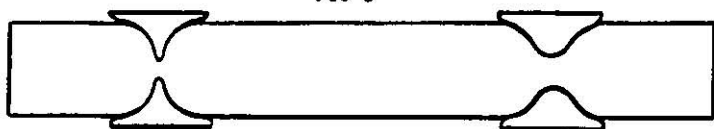


FIG 4

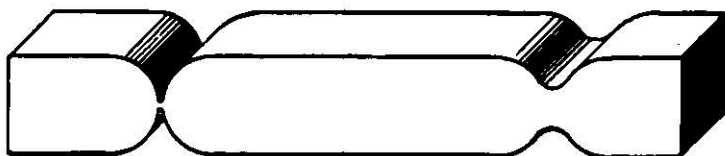


FIG 5



FIG 6

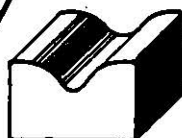
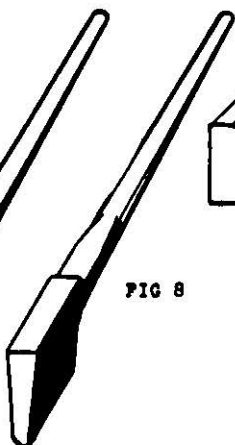


FIG 7



FIG 8



POWER TOOLS. PLATE 26

SPRING SWAGES

PLATE 26 illustrates how to make spring swages. Supposing you have to make a pair of 1-inch spring swages, as shown in FIG. 1. First make two 4-inch square blocks 2 ins. thick, and in each block sink a $\frac{3}{4}$ -inch diameter bar half-way down, as shown in FIG. 2. Next place a 1-inch diameter bar, as seen in FIG. 3, and sink it half-way in. When this is done, drill a $\frac{3}{4}$ -inch hole in each an inch deep. Next take a $\frac{1}{2}$ -inch diameter bar, 5 ft. long, jump it at each end, then place the ends into the holes, and fix them firmly by closing in the holes with a centre punch, as in FIG. 4. Next complete the spring swages by bending the $\frac{1}{2}$ -inch bar, as shown in FIG. 1. FIG. 5 shows the swages in use.

FIGS. 6 to 10 show the making of a pair of double eye spring swages. These swages are seen in FIG. 6. The forging for which they are used is shown in FIG. 7. After making a pair of swages similar to the previous ones, stamp a flat bar, $\frac{1}{2}$ -in. thick, in one side of one swage, as shown in FIGS. 8 and 9. Repeat the same operation to the other swage. Then stamp a flat bar $1\frac{1}{2}$ -in. thick between the two swages (FIG. 10).

SPRING SWAGES. PLATE 26

