FORGING ROD STRAPS

Forging a Strap to Size

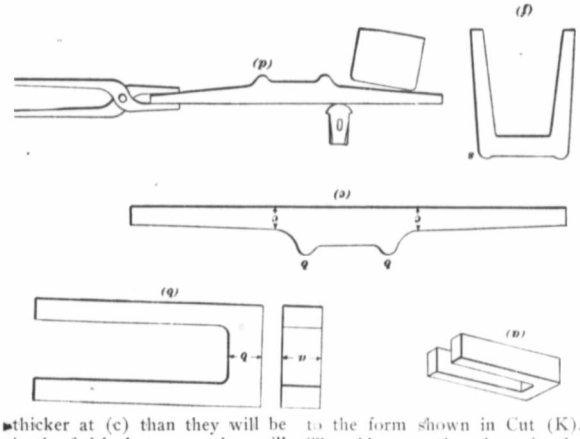
To make a rod strap of the form shown in Cut (A), select stock of the width shown at (a) in Cut (B) and thicker than (b) by a sufficient amount to form the corners (b) in Cut (C). Draw this stock to the form shown in Cut (C) leaving the sides slightly thicker at (c) than they will be in the finished strap, as they will draw in the bending, and being careful that the hammer leaves no ridges, which would tend to start cracks, sometimes called gaulds, in the corners, which become deeper as the work progresses. Next take the stock in the tongs and holding it as shown in Cut (D), proceed to bend it, using a large fuller to start the bend, as by starting in this way the iron is not cramped at the corners. Any ridges left by the hammer may be taken out by the fuller when starting the bend.

After the bends have been started as shown in Cut (D), place the stock in clamps, or hold it in the steam hammer in the manner shown in Cut (E). This may be done by lowering the upper die (d) on the upper one of two blocks (b) and (c) between which the stock is held, and holding it firmly by means of the steam pressure. Next have two helpers, one on each side, strike simultaneously on the ends until the piece has the form shown in Cut (F).

Take a heat on one corner by placing the side (s) down in the fire; and by using the flatter, bring the side to the shape shown in Cut (G) and repeat this on the other corner and side. It will be necessary during this operation to use the flatter on the strap, which is held as shown in Cut (H) in order to make the end of the proper shape.

Forging a Strap and Trimming to Size

Another way to make this strap is to use wider stock and forge it to the form shown in Cut (K). The sides are then bent in the same manner as in the operation just described, and the strap brought to shape as before. The end is formed however, by cutting off the excess of stock that has been allowed there, as shown by the dotted line in Cut (L).



WELDING CONDITIONS GOVERNING WELDING

Object of Welding

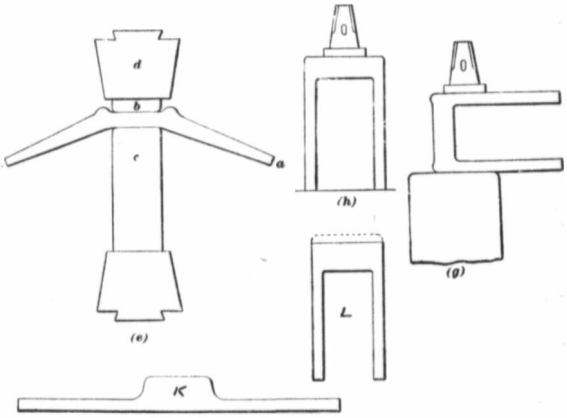
It is often necessary to join together two pieces of iron, or the ends of the same piece, so that the joint will form one solid mass. In such cases, the pieces are welded together. Each of the pieces treated thus far has been made of a single piece of iron, but very frequently it would be inconvenient or impracticable to make the forging out of one piece. If so, several pieces are welded together, and the forging is said to be built up.

Oxidation of Iron

If a piece of iron is heated in air, it will absorb oxygen from the air, thus forming a scale of oxide of iron on the surface. The hotter the iron, the more rapidly the scale will form. It does not adhere to the iron very firmly, and surfaces coated with it cannot be welded. It is therefore very important to guard against oxidation of the surface of the iron, if a weld is to be made, because the scale of oxide will lie between the two surfaces of the iron and prevent their coming in contact; and under those conditions it will not squeeze out if the pieces are pressed and hammered together. Two methods are employed to guard against the oxidation; namely, the use of a reducing fire in heating, and the use of suitable fluxes. By both of these methods the hot iron is prevented from coming in contact with the oxygen of the air.

Reducing Fire

A reducing ... is one in which all oxygen is consumed in the combustion, so that the gases coming in contact with the iron do not contain any oxygen that can unite with the iron. Under this condition no oxidation can take place, and the surface of the iron will remain clean. This condition is obtained in a closed fire by having a thick bed of fire for the air to pass through before coming in contact with the iron and by maintaining a moderate blast. If, however, the blast passes through a thin bed of fuel or if more air is blown through than the fire needs, the unused oxygen will oxidize the iron. Therefore, a thick fire should always be maintained, and the blast regulated so as to supply just enough air and not too much.



Fluxes

The other method for preventing the oxidation is to coat the surface of the iron with some substance that will exclude the air. It must, of course, contain no oxygen that will unite with the iron. It must be fluid at a heat below the welding heat of iron and still not become so fluid at the welding heat that it will run off and leave the iron exposed as before.

Substances used for preventing the formation of scale on the iron when being heated for welding are called fluxes. Strictly speaking, most of them form a fusible mixture with the iron oxide, which offers the desired protection to the iron, but they use up some of the iron to make this mixture, therefore wasting it. This mixture, however, is so liquid that it will squeeze out from between the surfaces being welded, thus leaving clean surfaces of iron to be welded together. There are many kinds of fluxes. Some of these consist of a mixture of several substances. The most common flux for wrought iron is clean, sharp sand; this fuses readily on the surface of the iron and sticks to it during the heat, thus excluding the air.

A very good flux for iron, but one that cannot be used on steel because it tends to reduce the carbon, can be made by mixing 2 ounces of calcined borax and 1 ounce of sal ammoniac. Calcined borax is a good flux for steel. It is made by heating borax in an iron pot until the water is driven off. The mass is then cooled and pulverized. Calcined borax is also called borax glass. Sand and

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