

The Forging Machine at the Montreal Locomotive Works.

In the blacksmith shop, it is doubtful if there is a much more useful machine for all sorts of duplicate forging work than the one which is commonly called the upsetting or forging machine. The prime requisite, of course, to make the installation of such a machine a paying proposition is that there is a sufficient quantity of work passing through of a duplicate nature, so that, with the same set of dies, the machine can produce the desired quantity at one setting. In fact, this feature may be varied within

form a small shoulder against which the pipe for the tender tank handle fits. This is a simple operation. On a further heat, after changing the dies, the end plunger upsets the reverse end, spreading the metal to the triangular shape indicated at B, the forward part of each half of the impression being contained in the stationary and moveable cross rams. The completion of the job is apart from the upsetting machine, the formed stock being bent by hand to a right angle as in C, completing the job except

cross ram grips the two parts, while the end ram forces the metal of the longer piece over on to the short section, welding it together into a homogeneous whole as indicated. The boss thus formed, on being drilled, and the strap likewise drilled for the retaining rivets, is completed.

The next piece to be considered, a boiler brace jaw, is a somewhat more difficult piece of work, being made up of three separate pieces, welded together and upset to the required final form. The base consists of two pieces of flat bar stock as at A in fig. 3, which are first of all welded together at one end to the shape indicated at B, under

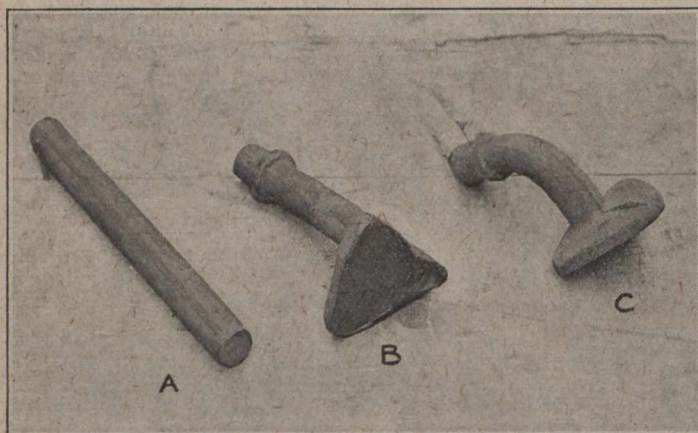


Fig. 1.—Tank Handle Produced on the Forging Machine.

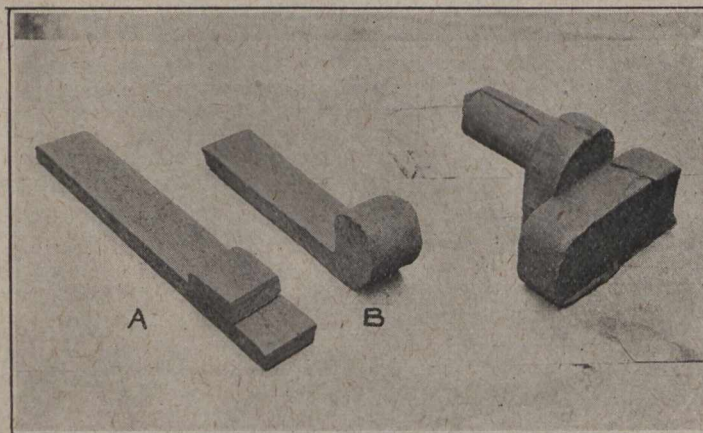


Fig. 2.—Hinge and Link Block Produced on the Forging Machine.

a large range, as many of the jobs undertaken are of such an intricate or complicated nature as to require a great deal of time were the parts so made to be produced from the solid by machining, or to be made from the same size of stock as used in the upsetting machine by hand forging. As with nearly all such rapid production machines, the local conditions alone decide the general advantages of making any such installation.

As an example of what can be done on the upsetting machine under skilful management, the writer was impressed with the

for a certain amount of grinding off of the fins, and the making of the shoulder end fit the pipe of the handle. Before the use of the upsetting machine for the making of such parts, they were usually castings, and when small like this one, were liable to be weak and tend to break. To make them by hand forging would be out of the question, but by the machine they are produced even more cheaply than would be possible by casting. It is of interest to note that a new type of tank handle has been developed as the result of using the forging machine, the whole handle being solid,

a Bradley hammer, leaving the near ends of the original flat stock open, and of the same shape, not broken down in any way. Into the spread ends of the forged rod at this stage a small piece of square stock is slipped, making the member ready for the forging machine, where it is forged to the shape at C. The shape of each jaw is contained in the stationary and movable jaws, and the ram has a projecting blade that enters the separated ends, and when entered to the set depth, forms the rounded ends of the jaws. For this complicated forging operation, the member must necessarily be

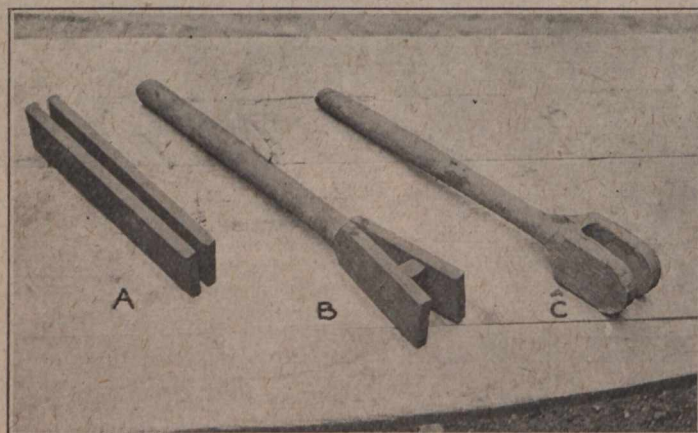


Fig. 3.—Boiler Stay End Produced on the Forging Machine.

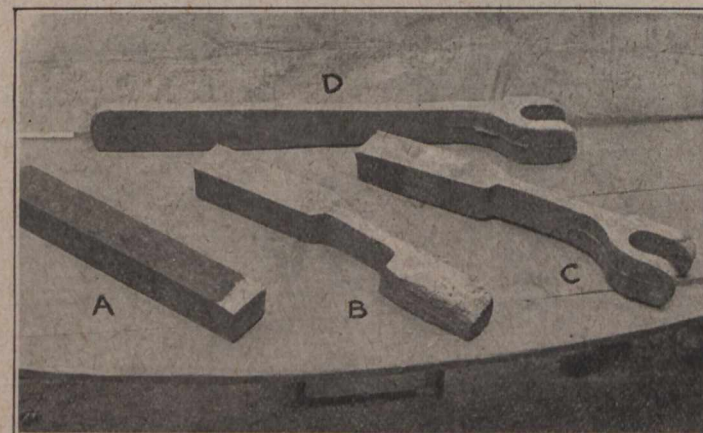


Fig. 4.—Eccentric Rod Produced on the Forging Machine.

class of work being produced on a 5 in. machine in the blacksmith shop of the Montreal Locomotive Works. Under the direction of the foreman, J. G. Boyer, who has made a specialty of upsetting or forging machine work, some rather remarkable pieces of machine forging are being produced in the course of the daily work. A few of these will be described here.

One of the simpler pieces produced, a tank handle post, is shown in fig. 1 in the successive stages of production. The stock for this is a short piece of 1 in. round iron as at A in the illustration. After heating, the first operation is to upset the far end to

formed from 1 1/4 in. bar stock. The ends are drawn to 1 in., and upset as in the foregoing to form two triangular feet.

Another rather simple example is shown to the left in fig. 2, but, while in no way complicated, it emphasizes how the forging machine may be used to advantage in reducing hand and steam hammer forging work. The piece shown is a coal door hinge. A piece of stock of the required end section is heated to a working heat with a short piece of the same stock laid on top of it near the end in the position indicated at B, with an intermediate layer of flux between the two parts. In the forging machine, the

heated to an almost white heat to give the required flow to the metal, as the displacement at some points is considerable. The completed boiler stay, which is used for staying the heads of the boiler, is made by forging two of these forged ends on the end of a round bar, for the different length of stays required in the boiler. This is a simpler and better method of forming the stay rods than that used in many places of forming them from two looped square bar pieces welded to the end of the stay rod, forming the jaw ends in this way.

A somewhat similar but more complicated job is shown in fig. 4. This piece, an eccen-