(No Model.)

W. COOKE & D. CARLOUGH.

UPSETTING MACHINE.

No. 455,541. Patented July 7, 1891.

Fig. 1.

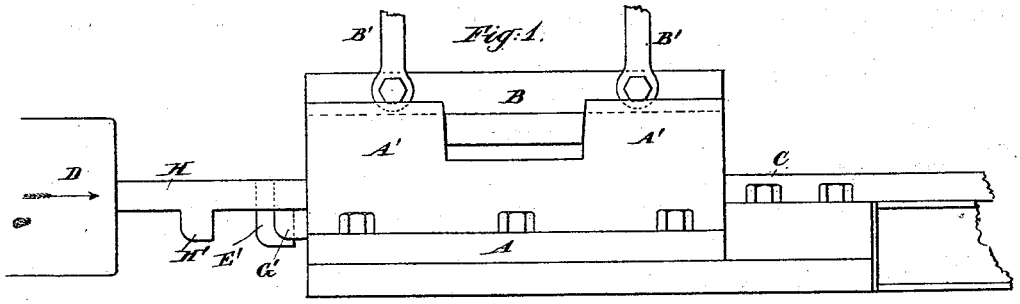


Fig. 2.

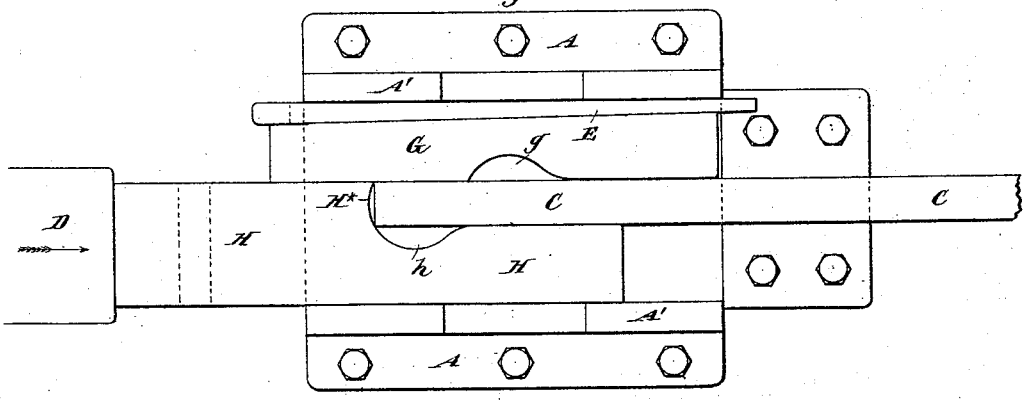


Fig. 3.

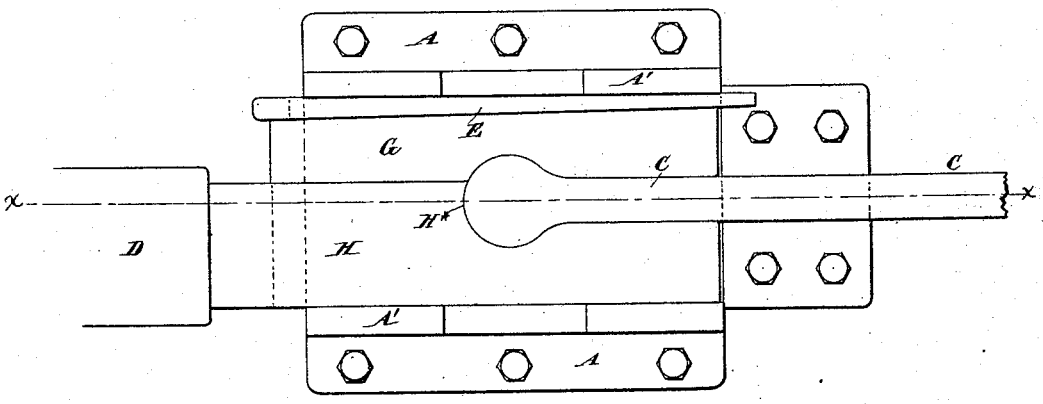
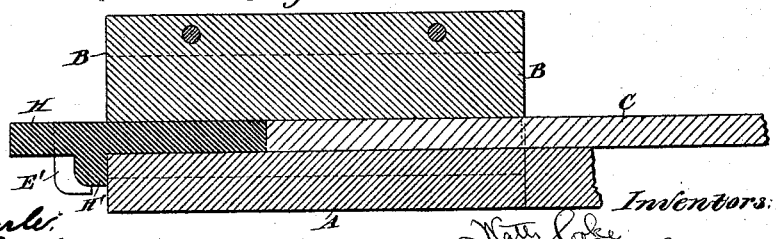


Fig. 4.



Witnesses:
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by their attorneys
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UNITED STATES PATENT OFFICE.

WATTS COOKE AND DANIEL CARLOUGH, OF PATERSON, NEW JERSEY.

UPSETTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 455,541, dated July 7, 1891.

Application filed November 24, 1890. Serial No. 372,409. (No model.)

To all whom it may concern:

Be it known that we, WATTS COOKE and DANIEL CARLOUGH, citizens of the United States, both residing at Paterson, in the county of Passaic, in the State of New Jersey, have invented a certain new and useful Improvement in Upsetting-Machines, of which the following is a specification.

Tie-bars used extensively in bridges, roofs, and other constructions require to be of uniform section throughout except at their ends, which require to be widened or thickened or both, to allow for the holes. Economy of manufacture requires that they shall be produced from previously-rolled bars of proper section. This is attained by heating portions at each end and contracting those portions forcibly endwise, technically "upsetting" the metal. Several machines have been before patented by us and by others to accomplish such upsetting of the ends.

The present invention provides a die having in its side a hollow equal to the swell of the eye on one side or edge and provides another die having a corresponding hollow and also a strongly-supported surface which applies against the end of the hot bar and through which the upsetting force is impressed. The hollows in the two dies coincide after the movable die has been moved by the ram to the proper extent to complete the upsetting. At earlier stages the two hollows stand out of coincidence. In the working of the machine the hollow in the stationary die receives a quantity of the hot and soft iron at an early stage of the upsetting, and by means thereof serves as an abutting surface to aid in resisting the great force impressed by the ram in the act of upsetting. We provide simple means for relaxing the lateral pressure of the dies to facilitate the removal of the eye after the upsetting is completed.

The accompanying drawings form a part of this specification and represent what we consider the best means of carrying out the invention.

Figure 1 is a side elevation. Fig. 2 is a plan view with the cover removed. It shows the position of the parts at the commencement of the upsetting operation. Fig. 3 is a similar view showing the position after the completion of the upsetting operation. Fig. 4 is a vertical longitudinal section through certain portions. It is taken on the line $x\,x$ in Fig. 3.

Similar letters of reference indicate corresponding parts in all the figures where they appear.

A A′ is a stout housing or bed-casting bolted or otherwise firmly held on a suitable foundation.

A′ are stout uprights which aid in holding the parts to resist the strong force impressed by the ram.

B is the cover moved strongly up and down by any sufficient force, as toggle-levers B′, properly operated. There may, if preferred, be a sliding piece mounted under this cover B, as set forth in our patent dated January 10, 1888, No. 376,295; but such is not necessary to success and is not represented.

C is a bar of iron or steel having its end portion highly heated.

D is a ram strongly reciprocated by any sufficient force. There is a clamp (not represented) holding the bar against end movement when subjected to the force of the ram. These parts are well known and have been long approved.

G and H are dies, one G being held stationary and the other H being moved longitudinally in the housing by the action of the ram to effect the upsetting. The die G has a hollow *g* sufficient to allow the swell of one side of the eye. The die H is correspondingly formed, with the important addition of a portion extending laterally across the whole width of the bar to act against the end of the bar and effect the upsetting. Each die G and H is provided with a hanging lip G′ H′, which by meeting the edge of the housing A A′ determines its position at the close of the operation. The dies together fill up nearly the whole width of the interior of the housing and are slightly tapered. The remainder of the width of the interior of the housing is filled by a wedge E, having a hanging lip E′, which determines its position when it has been driven home and all is ready for work. To liberate the eye after it is formed the wedge E is driven backward by a sufficient

blow against the protruding narrow end or by other means sufficiently to loosen the newly-formed eye, and, the cover having been previously lifted, the eye-bar with its properly-upset end is easily lifted out and removed.

To adjust the machine to receive a heated end of the next bar and produce the next eye, the die H is moved backward by hand or otherwise until its end lies against the ram D, and the wedge E is driven home to adjust the die G, so that it allows only sufficient room for the die H to move endwise easily. Now the properly-heated bar is introduced and thrust in until its end abuts against the lateral extension H* of the die H. Then the cover B is brought strongly down into position, and the clamps (not shown) being applied to hold the body of the bar C against being thrust away endwise the ram D is caused to move strongly forward. This carries with it the die H H* and upsets the metal of the bar C, forcing a portion out into the hollow *g* in the die G and another portion into the hollow *h* in the die H. When the ram has completed its forward movement and has brought the die H H* into the position shown in strong lines in Fig. 3, it retreats, and, the cover being lifted and the wedge E again slackened, the bar with its nicely-formed eye can be easily lifted out. The round of operations may be repeated indefinitely. The dies are so formed that the eye is symmetrical and nearly or quite perfect as to its outline. It will generally require to be reduced somewhat in thickness, which may be done by rolling or hammering after its removal from the die. The hole in the eye is produced by punching after its removal from the die.

Our dies sustain the mid-length portion of the metal which is to be upset at the commencement of the upsetting operation, when it is most likely to buckle. At that stage the dies are in the position shown in Fig. 2 and the mid-length of the metal is supported at each edge. It cannot buckle to the right by reason of its contact with that portion of the die G beyond the hollow *g*, and it cannot buckle to the left by reason of its contact with that portion of the die H which when the upsetting is completed applies against the neck of the eye. As the upsetting proceeds these spaces open, but the widening of the metal keeps up with the increasing space, and in practice the eyes are very complete.

We have the invention in active use.

We claim as our invention—

1. In an upsetting-machine, the die H, having the hollow *h* and the lateral extension H*, in combination with the die G, having the hollow *g*, and means for moving one die strongly endwise, combined and adapted to serve relatively to each other and to a heated bar introduced in the space between, substantially as herein specified.

2. In an upsetting-machine, the dies H and G, each having a hollow adapted to receive and shape a portion of the side of an eye and each having a lip to determine its position at the end of the upsetting, in combination with each other and with a member or part H*, adapted to act forcibly against the end of the heated bar, and means, as the ram D, for moving the parts forcibly to effect the upsetting, as herein specified.

3. In an upsetting-machine, the side wedge E, arranged to act laterally to hold and release the dies, in combination with the die H, having a hollow *h*, and the die G, having a hollow *g*, the ram D, serving to communicate the upsetting force, and the member H*, serving to transmit such force to the hot metal, all substantially as herein specified.

In testimony that we claim the invention above set forth we affix our signatures in presence of two witnesses.

WATTS COOKE.
DANIEL CARLOUGH.

Witnesses:
JAMES M. FORTUNE,
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