G. B. Manley.

Hammer for Forging Blooms.

No. 59,425. Patented Nov. 6, 1866.

Fig: 2.

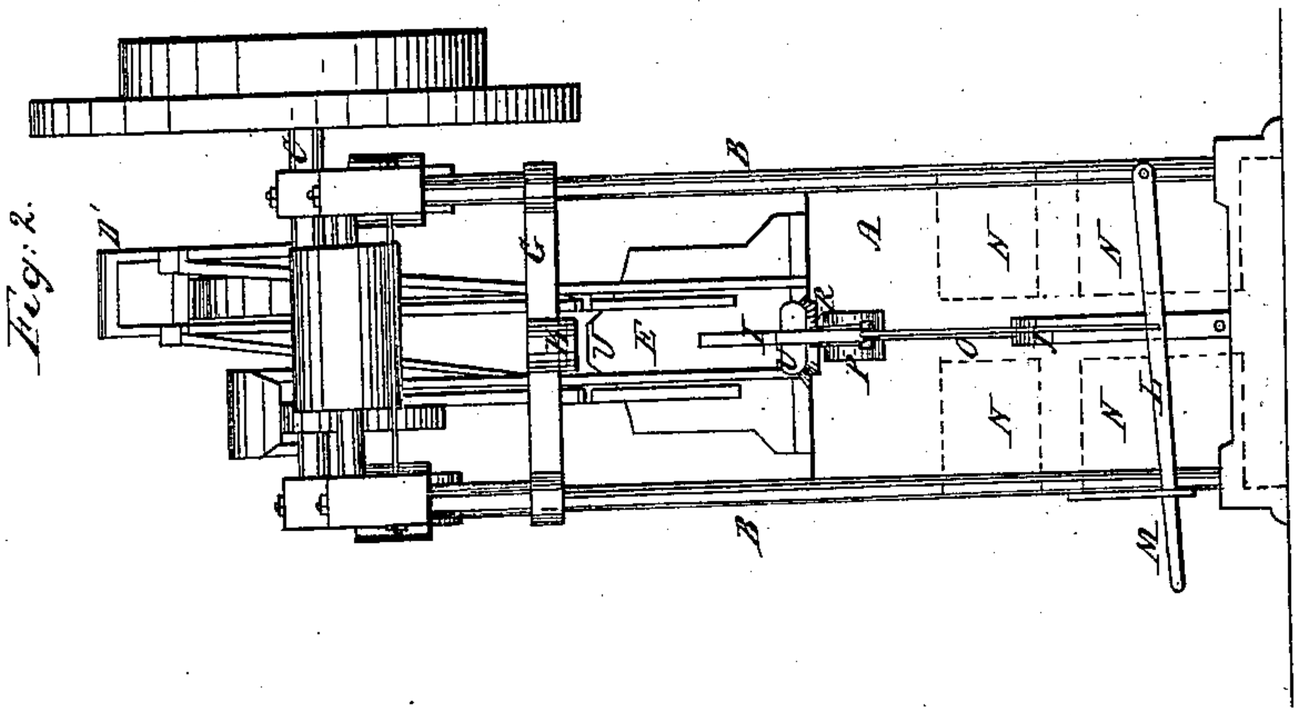
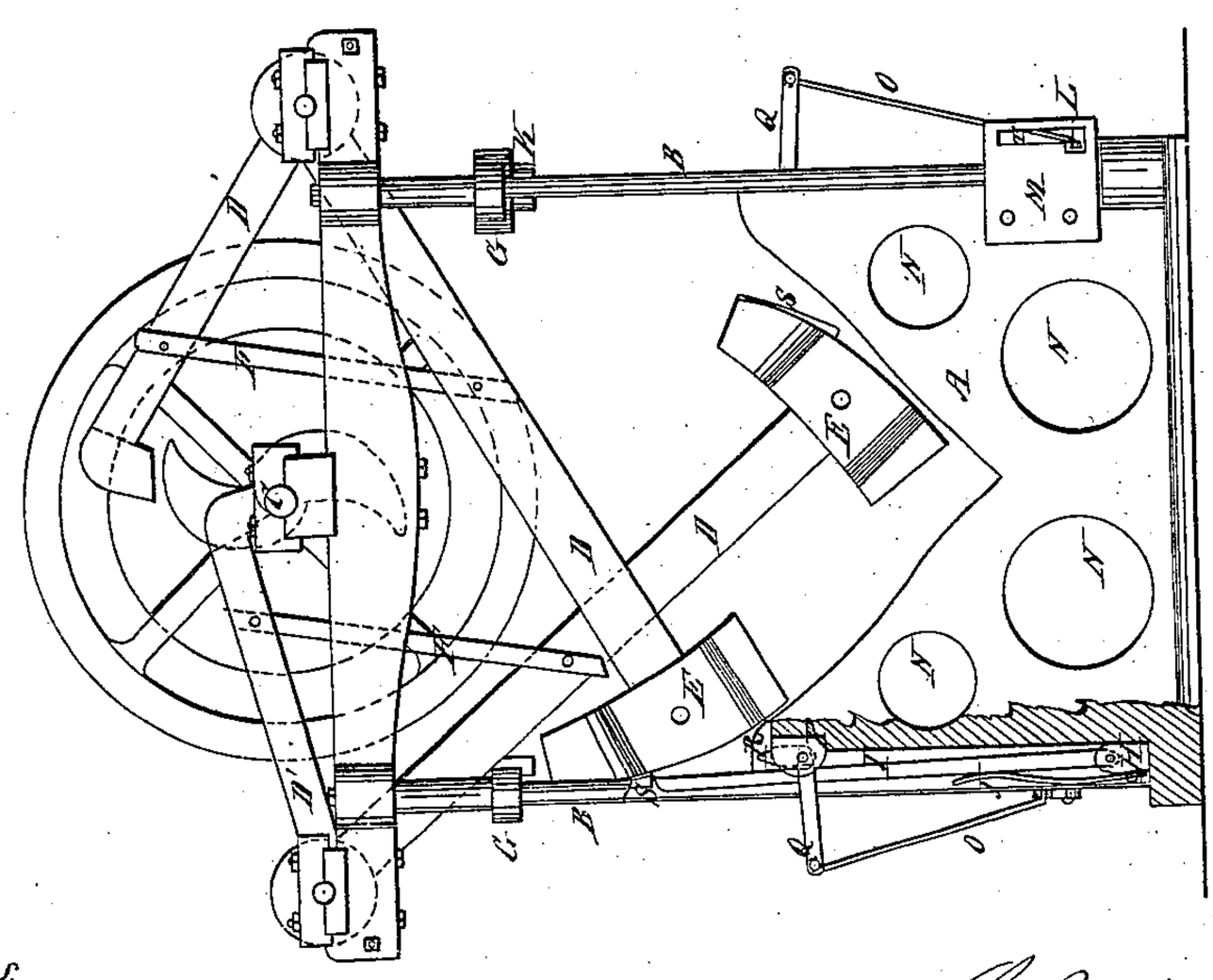


Fig: 1.



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UNITED STATES PATENT OFFICE.

G. B. MANLEY, OF COGAN STATION, PENNSYLVANIA.

IMPROVEMENT IN HAMMERS FOR FORGING BLOOMS.

Specification forming part of Letters Patent No. **59,425**, dated November 6, 1866.

To all whom it may concern:

Be it known that I, G. B. MANLEY, of Cogan Station, in the county of Lycoming and State of Pennsylvania, have invented a new and useful Improvement in Hammers for Forming Blooms of Iron; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents, in side view, an anvil with its hammers made according to my invention. Figure 2 is an end view.

Similar letters of reference indicate like parts.

The object of this invention is to produce a machine for hammering iron which will enable the manufacturer to make heads for rails of railways and such like articles directly from balls from the puddling-furnace. It consists in combining two or more hammers in one machine working on the same anvil, the hammers working in directions at right angles to each other, so as to produce a bloom for the head of a rail of the proper shape and dimensions at one operation.

A is an anvil from whose corners rise standards B, which support the frame in which the fulcra of the hammers and the cam-shaft have their bearings. C is the cam-shaft, placed midway of the frame. Besides the cams, said shaft carries the ordinary fly-wheel and a driving-pulley. The fulcra of the hammers are at opposite ends of the frame, and their helves consist each of two parts, D D′, the parts D′ being those which are acted on by the cams. The parts D of the helves of the two hammers pass each other at right angles, and the hammers E E themselves are placed at right angles to each other, the hammer which is on the right-hand side of the anvil having its fulcrum on the left-hand side of the frame, and the hammer on the left-hand side having its fulcrum on the right-hand side of the frame. The helves are, in this example, made with double arms, one arm of each helve being inclosed by the arms of the other, but not working in contact. The parts D D′ of the helves of each hammer are connected by braces, F, to strengthen and stiffen them. The cams are so arranged as to let the hammers fall in alternation, and when one of them has fallen to its lowest position the other will be lifted high enough to clear it, so that they will not interfere with each other.

The anvil A has two faces at right angles to each other, and which are parallel with the faces of the hammers respectively. The two faces of the anvil are carried up to a considerable height along the standards B, and their higher portions are slightly curved opposite the paths of the hammers, to allow the hammers to swing near to them without coming in contact.

The letters G designate cross-pieces which connect the standards B at each end of the anvil, and a little distance above it. They are so placed as to be in the path of the hammers, whose heads strike against the under sides of the cross-pieces respectively, which under sides are fitted with rubber or other elastic bumpers K so that the ascent of the hammers may be arrested without injury to the cross-beams. On the rear sides of the hammers are shoulders S, one on each side, which enable the operator to hold them suspended above the cams by means of vibrating arms I I, one at each outer end of the anvil, which arms are constantly pressed inward by springs J J. The arms I are withdrawn from beneath the shoulders S of the hammers, so as to let the parts D′ of the helves rest on the cams, by means of levers, L, whose free ends pass through the right-angled slot T of a locking-plate, M, which projects from one corner of the anvil. The other end of each lever is pivoted to the standards B at the opposite corner of the same end of the anvil that holds its locking-plate M.

The letters O designate rods which connect the levers L with the long ends of right-angled levers Q, which are pivoted at their angles between forked brackets P on each end of the anvil, in a line with the center or middle of the hammers. The short arms of these right-angled levers are marked R. The parts R of the levers act against the inner sides of the arms I, and said arms make their vibrations between the double sides of the horizontal part of the lever Q, which are slotted or made in the shape of a loop for that purpose.

When the cam-shaft is rotated, its cams come in contact with the upper parts, D′, of the

helves, and raise the hammers alternately, and allow them to fall toward the anvil. When the attendant desires to arrest either of the hammers without stopping the rotation of the shaft, he disengages that one of the levers L which belongs to the hammer that is to be stopped, and allows the vibrating lever I to be pushed by its spring J toward the anvil, when it will take the position shown on the left-hand side of the apparatus in Fig. 1, its top coming beneath the shoulder S of the hammer, and holding the hammer so high that the upper part, D′, of its helve will be clear of the cams as they revolve. When the hammers are raised by the cams they receive an impetus which carries them above the height which is due to the radius of the cam. In order to arrest the upward motion of the hammers after the cam has passed, I place elastic bumpers K above them in their path as they ascend, against which their heads V strike, from which bumpers the hammers rebound, and consequently descend with increased velocity toward the anvil. When the hammers are to be allowed to work without cessation, the levers L are depressed, whereby the right-angled levers Q are drawn down through the connecting-rods O, the toes or vertical parts of the levers Q coming up against the arms I and forcing them out from under the shoulders S of the hammers, thereby letting the upper parts, D′, of the helves rest on the cams.

One of the objects of this invention is to provide an apparatus by means of which a solid bloom of two hundred pounds weight or more can be made with facility for the head of rails for railways, combining therefor two or more balls from the puddling-furnace. This cannot be conveniently done by any process heretofore known or used. One great objection to rails as at present made is that they laminate under the tread of the locomotive and car wheels, and the laminæ separate and peel off from each other; and this arises in a great measure from the mode in which they are made, which consists in making the heads of rails from "piles" of several thin layers or bars of iron. Moreover, the heads so made are usually of about the same character as the flange or base of the rail. In order to prevent this lamination, and so produce heads of rails of a more perfect character, I make them from one bloom or ball instead of from piles, so that they will not laminate, and I also make the heads of hard iron, to give them strength to resist the violent concussion of the wheels of the locomotives and cars. I accomplish this by the use of my right-angled hammer, (above shown,) working on an anvil with a double face, the angle of which receives the balls from the furnace. I thereby produce a bloom at one operation which is of weight sufficient to make a head for a single rail, without requiring a series of small bars laid in a pile, according to the usual mode.

The bloom produced in this apparatus is afterward reheated and rolled into a proper length for the rail or rolling mill, and can, when at red heat, be hammered to solidify the iron. The head should be made of the character of iron known as "cold short." The flange may be "red short" or neutral, to give the bottom of the rail toughness, while the intermediate body of the rail may be such as will form a fusion or perfect weld with both the flange and head. The intermediate body may be built up of bars three and four inches wide, piled so as to break joints between each layer.

The solid head produced by means of my apparatus enables me to build up and construct the rail in this way—that is to say, with a solid head of hard iron, a bottom flange of tough iron, and an intermediate body of iron that will readily weld with the head and flange, and so avoid the imperfections of rails whose heads are made with several thin bars.

The bloom is kept under the operation of the right-angled hammers until it has acquired the proper shape, and so, by a single operation and on the same anvil, I am able to complete a bloom for an entire head of a rail.

The hammers can be driven directly by steam, if desired, instead of by cams and helves, as here shown. Adjustment of hammers gives the shape of bloom, flat or square, as desired.

For the purpose of economizing metal in the anvil I have cast it with cavities N on each side thereof, leaving the middle part solid. This construction leaves the anvil strong enough for all practical purposes, while a proper size and height are attained without correspondingly increasing its weight and cost. The bloom is wrought in the angle made by the two right-angled faces of the anvil, and consequently is hammered into a corresponding form—that is to say, with straight sides.

I claim as new and desire to secure by Letters Patent—

1. The combination of the hammers E with the helves D, and arms D′, arranged with the cam-shaft C, whereby the hammers fall alternately on a two-faced anvil, A, and operating substantially as described, for the purpose specified.

2. The shouldered hammers E, operating with the spring-arms I, lever L, slotted plate M, rod O, lever Q, and forked bracket P, constructed and arranged substantially as described, for the purpose specified.

G. B. MANLEY.

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