

(No Model.)

J. C. COVERT & J. BILLINGHAM.

MACHINE FOR WELDING CHAIN LINKS.

No. 377,193.

Patented Jan. 31, 1888.

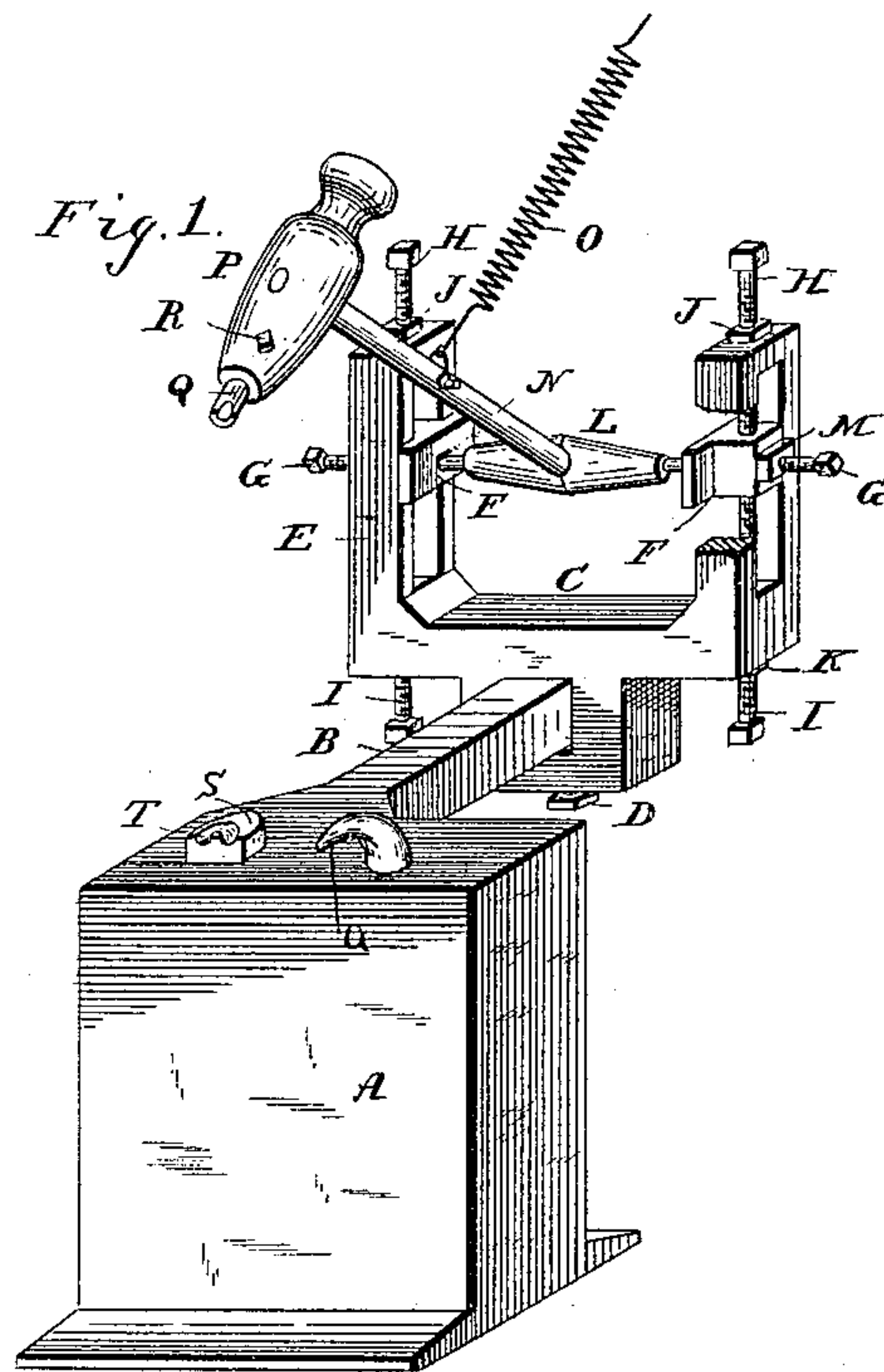


Fig. 2.

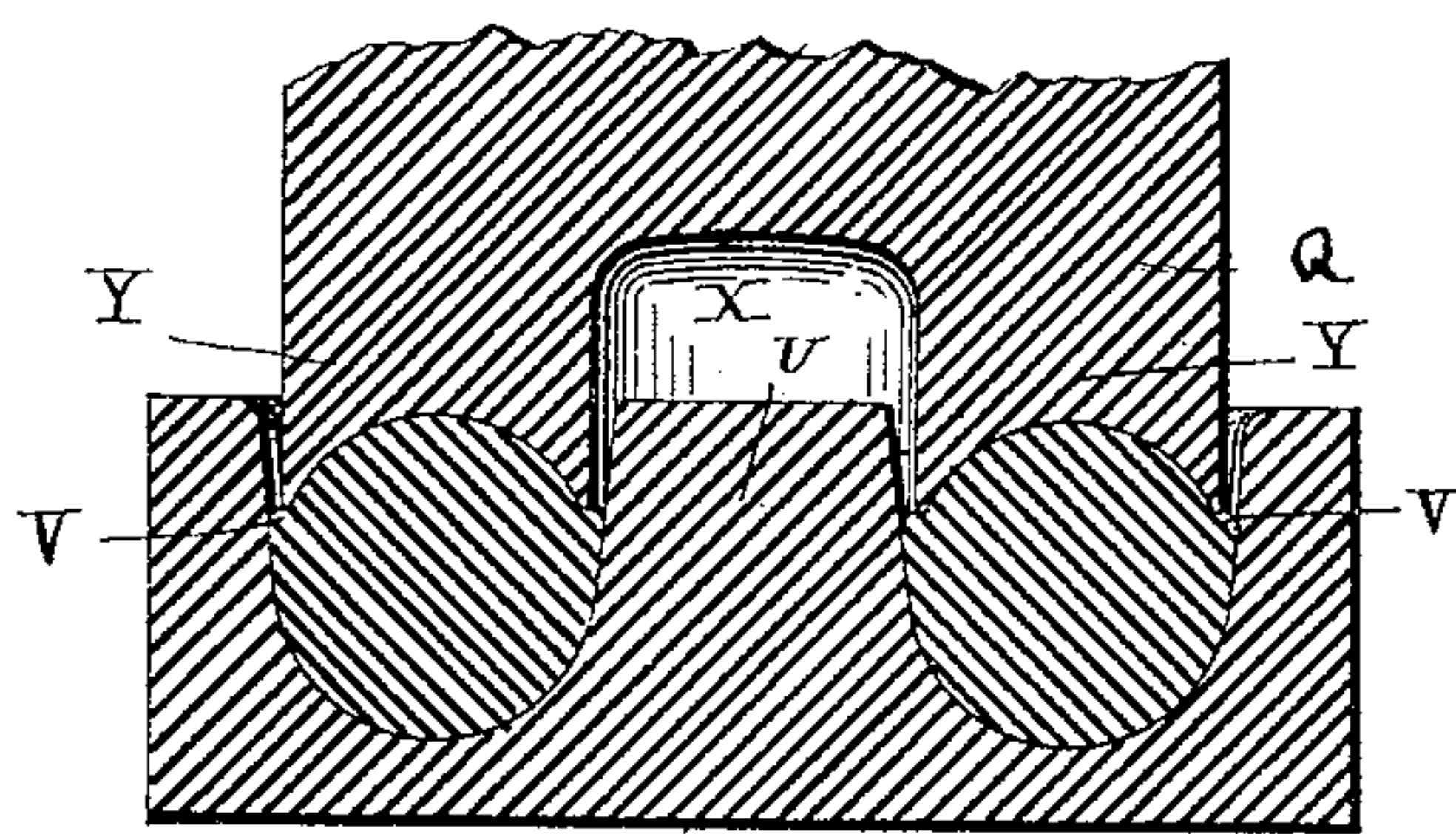
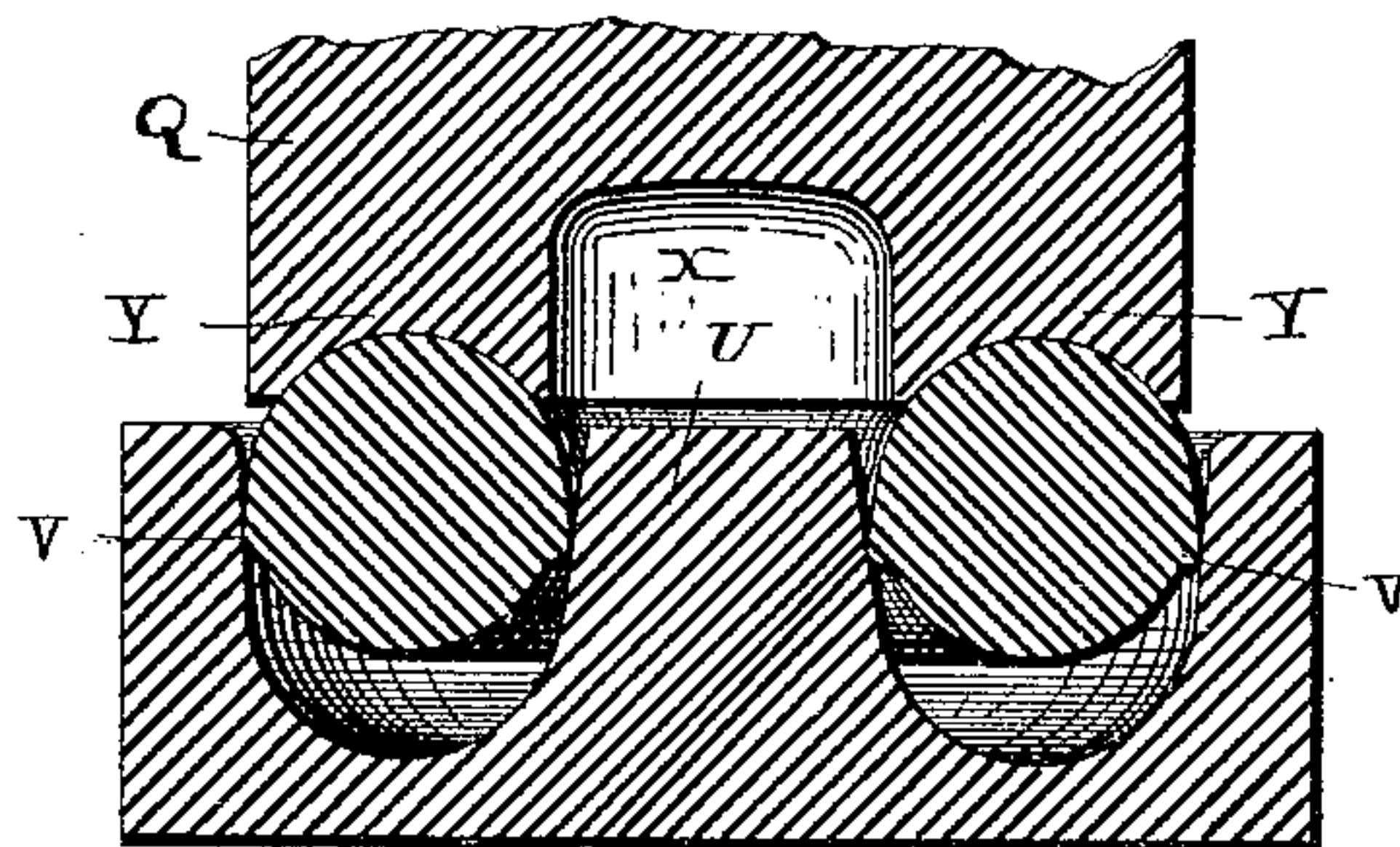


Fig. 3.



WITNESSES

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# UNITED STATES PATENT OFFICE.

JAMES C. COVERT AND JETHRO BILLINGHAM, OF WEST TROY, NEW YORK;  
SAID BILLINGHAM ASSIGNOR TO SAID COVERT.

## MACHINE FOR WELDING CHAIN-LINKS.

SPECIFICATION forming part of Letters Patent No. 377,193, dated January 31, 1888.

Application filed March 5, 1887. Serial No. 229,825. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES C. COVERT and JETHRO BILLINGHAM, citizens of the United States, residing at West Troy, in the county of Albany and State of New York, have invented certain new and useful Improvements in Machines for Welding Chain-Links, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to machines for welding chain-links in the manufacture of the same.

The invention consists, first, of an anvil or suitable bed carrying a female die possessing the peculiarities hereinafter appearing, and of a frame adjustably mounted with respect to the bed, and provided with a rock-shaft having bearings vertically and laterally adjustable therein and carrying an arm and hammer, into the latter of which a male die is fitted, this die also possessing peculiarities hereinafter appearing.

Our invention consists, secondly, of a female die having a recess therein occupying approximately one-half of a circle in length and semi-circular in cross-section in the lower portion thereof, while from the termination of the semi-circular portion its walls are inclined outwardly to present a flaring entrance and to permit of the easy withdrawal of the link, and also of a male die having a recess semi-circular in length and less than a semicircle in cross-section, and fashioned on the exterior so as to enter without interference into the recess of the lower die, whereby less than half of the circumference of the link is acted upon by the upper die and only half of the circumference is acted upon by the lower die, whereby, also, the surplus metal is prevented from extending any appreciable distance from the surface of the link during the action of welding.

In the accompanying drawings, forming a part of this specification, and on which similar letters of reference indicate the same or corresponding features, Figure 1 is a perspective view of our improved link-welding machine; Fig. 2, a vertical sectional view of the male and female dies detached; Fig. 3, a similar view representing the position of the link therein

at the commencement of the second and final operation.

The letter A designates an anvil or bed of any approved form generally, and constructed to be secured to a suitable foundation and made, preferably, of metal. From this anvil extends an arm, B, and to the arm is fitted slidably a frame, C, preferably made of cast-iron, having a set-screw, D, by which its position on the arm is fixed. Any other means may be employed to secure the frame to the arm. This frame has two vertically-slotted standards, E, in which are slidably fitted suitable metallic bearing-blocks, F, enlarged at their inner ends, so as to fit against the inner vertical faces of the standards which hold the blocks against the action of the bearing-screws G, which are screwed into the blocks. To the upper and lower ends of the respective standards E are also fitted adjusting-screws H and I, provided with jam-nuts J and K, by which they are held in a set position. These screws engage the upper and lower sides of the respective blocks F and serve to determine their altitude, so as to bring the faces of the male and female dies in alignment with each other irrespective of any loss of that alignment by reason of wearing due to use.

The letter L designates a cross-head or rock-shaft, the ends of which are recessed to receive the bearing-screws G, on which the cross-head oscillates and by which it is set laterally, so as to bring the male die directly over the female die and secure it there. Jam-nuts M are also provided for the bearing-screws G.

The letter N refers to an arm extending from the cross-head L and normally supported by a spiral or other spring, O, and carrying at its outer end a suitable head or hammer, P, to which is secured the male die Q, as by a set-screw, R, which engages with the shank of the die. Of course any other manner of securing the die in the hammer may be employed, and, by preference, the upper end of the head is fashioned to receive the hand, by which it is thrown violently down in the operation of welding.

We will now refer to the dies.

The letter S designates the female die, which is mounted upon the anvil A, and secured in



any desired manner, and consists, preferably, of a block of steel. It is provided with a recess, T, which extends through approximately half a circle, while in cross-section its lower portion is also semicircular. At a line about 5 coincident with the axis of the recess, as seen at U in Fig. 2, the walls of the recess are flared or inclined slightly in opposite directions, while near their upper ends they are curved more abruptly. The object of this construction is to perfectly form at least one-half of the circumference of the link while welding the ends thereof together, and to admit of the ready entrance and withdrawal of the male 10 die and the link itself. Again, the space designated by the letter V affords a sort of pocket, into which the surplus metal bulges when the male die comes down upon the overlapping ends of the link. It should be noted that this 20 pocket being narrow prevents this surplus metal from extending very far from the outer surface of the link and makes it possible for the female die to receive within its recess this bulged portion of the link on reversing the 25 same in position, as seen in Fig. 3. The result of this is, that instead of forming fins upon the exterior of the links, as heretofore, and which fins during the second operation were removed and caused a loss in the strength and 30 a reduction in the bulk of the link at the point where the wear principally occurs and where the strain is otherwise than tractile, we preserve this surplus metal, and by the second operation force it into the body of the joint, 35 and thus secure more metal and greater strength in the link at the point where most needed.

Referring now to the male die, this consists of a short stout bar, Q, fashioned, as already 40 suggested, to be readily connected with the head or hammer P. At its lower end it is provided with a recess about half a circle in length, substantially agreeing as it does in length with the recess in the female die, but of less than 45 half a circle in cross-section. This is clearly shown in Figs. 2 and 3. This construction also prevents the male die from extending down into the female die far enough to occupy the pockets V, into which the bulged metal 50 extends. Again, the male die is recessed at X, leaving a semi-annular portion, Y, in which the recess is formed. This semi-annular portion is the portion which enters the recess in the female die.

Referring now to the second operation and to Fig. 3 of the drawings, it will be observed that the link is fitted down into the female die only so far as the bulged metal will permit; yet the bulged metal is well down in the recess. Therefore, when the upper portion of the 60 link receives a blow from the male die, the bulged metal, owing to the tapering contour of the die beneath the place occupied by the bulged portion, will be forced into the body of the link. Thus the ends of the link are welded, 65 and all the metal contained in these ends be-

fore being welded is contained in the link after they are welded, and yet the contour of the link is practically perfect.

It should be observed that before putting 70 the links in the female die their ends are "stuck" by placing the link in a convenient position over the welding-point  $\alpha$  of the anvil, and tapping the overlapping ends sufficiently to stick them together, as distinguished from 75 properly welding them. The ends of the link are also made to overlap each other by placing the link on its edge and striking the outer surfaces with a hammer until they are brought properly across each other. This operation 80 is preliminary to that of "sticking" the ends.

We have already alluded to the fact that as heretofore done fins have been formed during the first operation of welding, and removed by being sheared during a subsequent operation. 85 It is also a fact that it has been attempted in welding chains to bring the recess of the male die down to the recess of the female die in such a manner as not to leave a fin; but in such instance the practical difficulty is in preventing 90 the metal of the link from spreading laterally and preventing the dies from coming well together. The result of this lateral spread is to form a link whose exterior is more or less rough. 95

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a link-welding machine, the combination, with a base or anvil, of a frame adjustably 100 mounted with respect thereto, a cross-head mounted in said frame and provided with screws for vertically and laterally adjusting it, and an arm and die head or hammer carried by said cross-head. 105

2. In a link-welding machine, the combination, with an anvil or base having a die thereon, of a frame adjustably mounted with respect thereto, a cross-head mounted in said frame, and screws for laterally and vertically adjusting it, an arm carried thereby and provided with a die-head and a die secured to the same, and a spring to lift the die-head. 110

3. In a link-welding machine, the combination, with an anvil or base having an arm extending therefrom, of a frame adjustably fitted to said arm, blocks slidingly fitted to said frame, screws for adjusting the blocks up and down, and bearing-screws fitted to said blocks, a cross-head supported and adjusted laterally 115 thereby, an arm extending from said cross-head, and having a hammer or die head.

4. In a link-welding machine, the combination, with a frame and blocks slidingly mounted therein, of screws fitted to said frame above 120 and below said blocks, to adjust them up and down and maintain them in a set position, and screws passing through said blocks, a cross-head carrying a hammer or die head and mounted upon the latter screws. 125

5. In a link-welding machine, the combination of a female and a male die, the female die 130



consisting of a metallic block having a recess  
in the upper face thereof whose length is ap-  
proximately semicircular, whose lower portion  
in cross-section is semicircular, whose sides  
5 from the termination of the said latter portion  
extend upwardly and outwardly, and a stud  
or projection extending from the said recess  
to said face, and the male die consisting of a  
metallic bar rounded in an annular direction  
10 on the rear side of the lower end and recessed  
in a vertical direction in the front side of said  
end, leaving a semi-annular portion adapted to  
enter the female die and stand between the  
rear side of and partly round the stud and the  
15 wall of the recess round it, and a concavity in  
the lower face of the said resulting portion  
whose cross-section is less than a semicircle,

the width of said concavity being less than the  
width of the recess in the female die at the  
point where the link arrests the male die, 20  
whereby a space or pocket is left all around  
the link, into which surplus metal may escape  
and lie above the plane of the axial line of the  
link in position to be worked back into the  
link by reversing the link in the die, as set 25  
forth.

In testimony whereof we affix our signatures  
in presence of two witnesses.

JAMES C. COVERT.  
JETHRO BILLINGHAM.

Witnesses:

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ARTHUR B. STEWART.