2 Sheets--Sheet 1.

B. HERSHEY.

Machine for Bending Chain-Links.

No. 166,375. Patented Aug. 3, 1875.

Fig. 1.

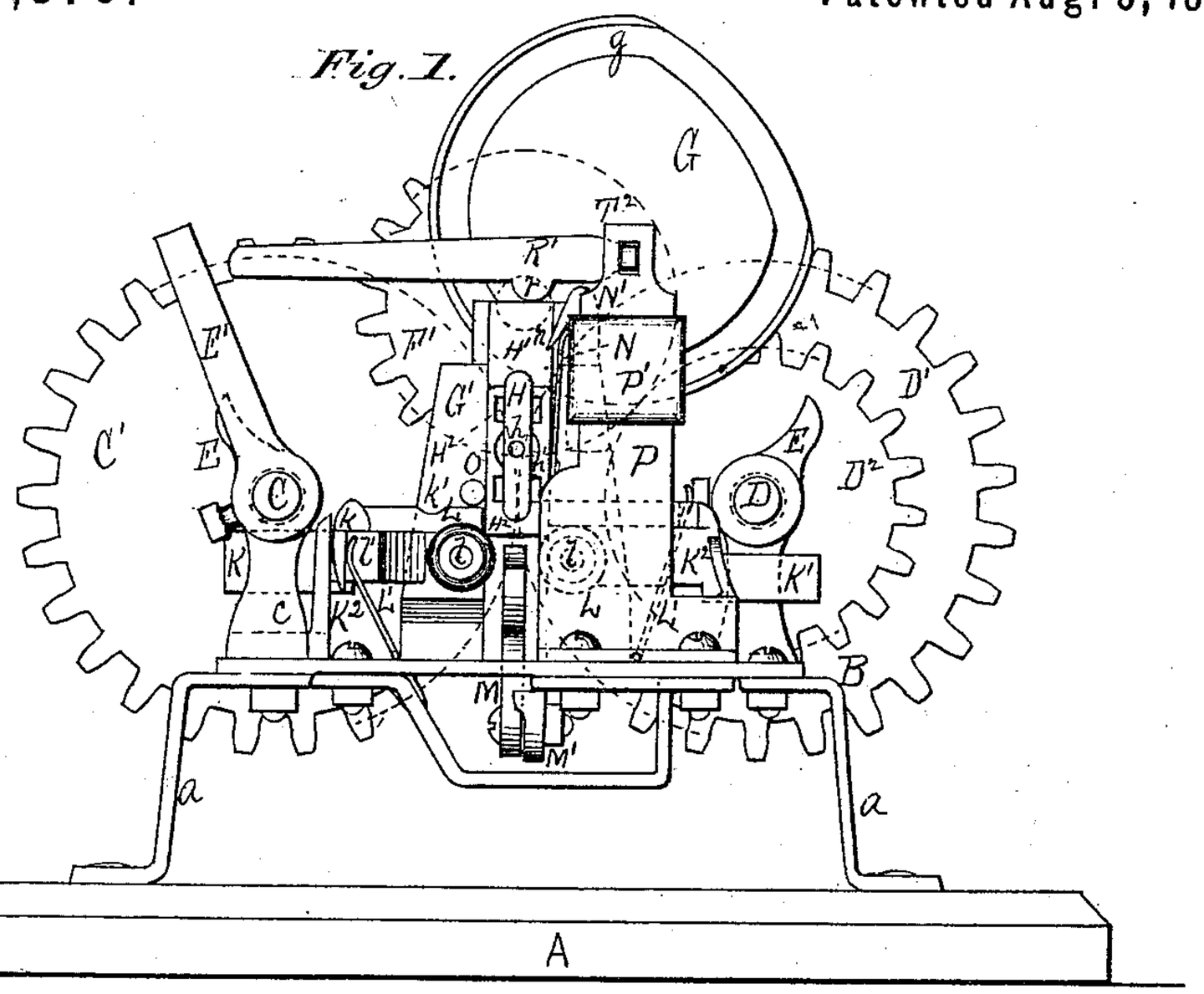
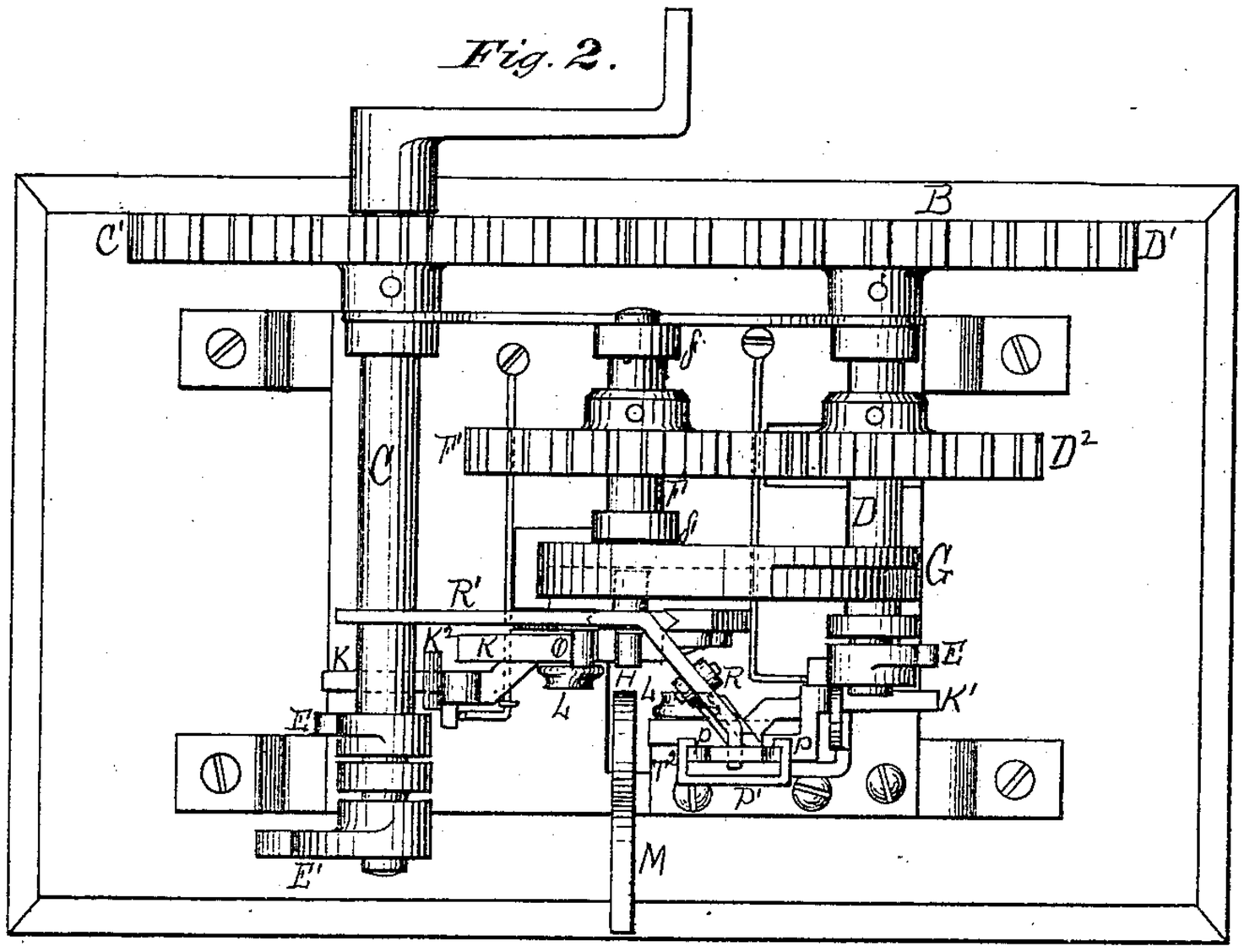


Fig. 2.



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2 Sheets--Sheet 2.

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Fig. 3.

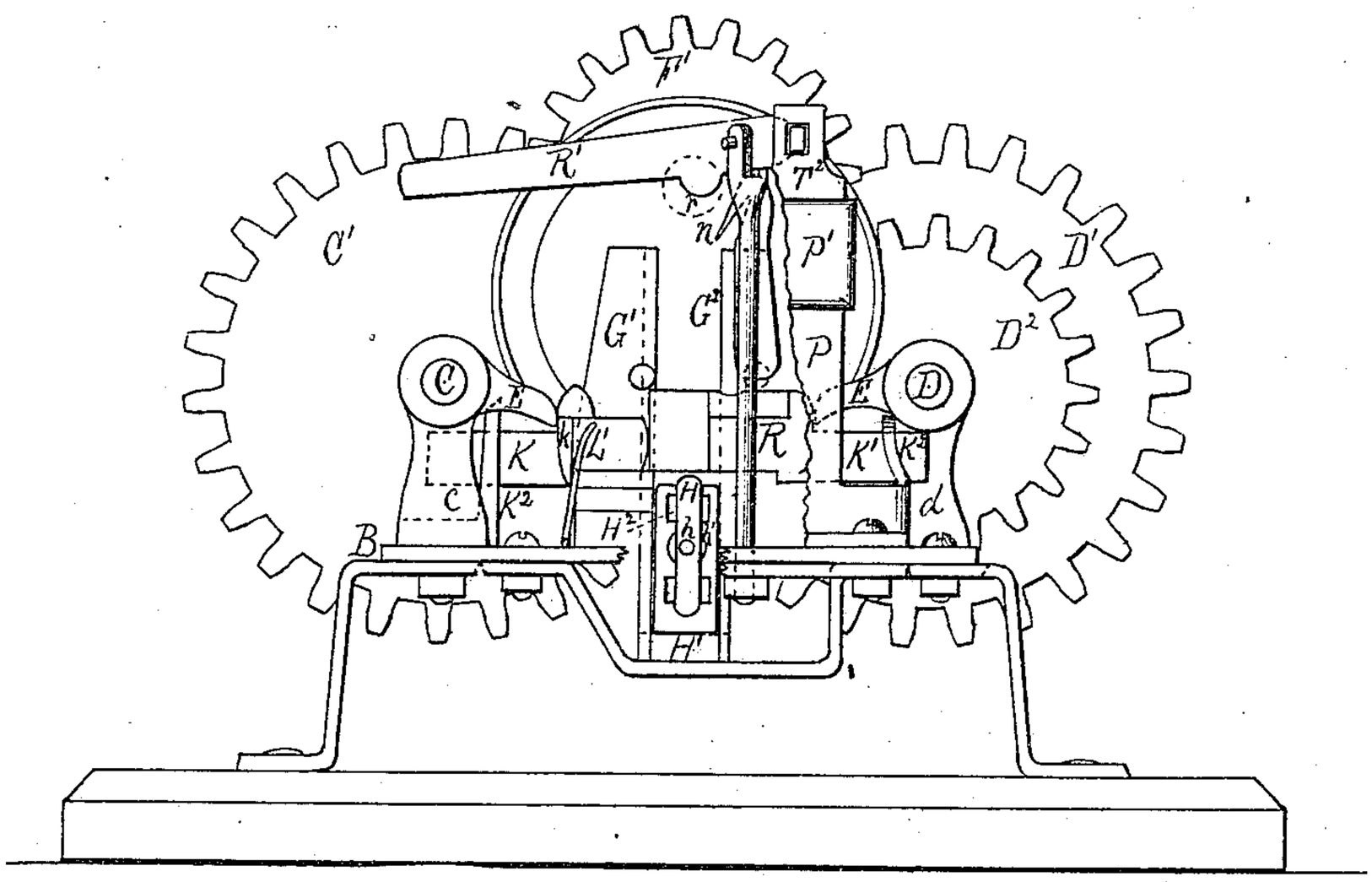
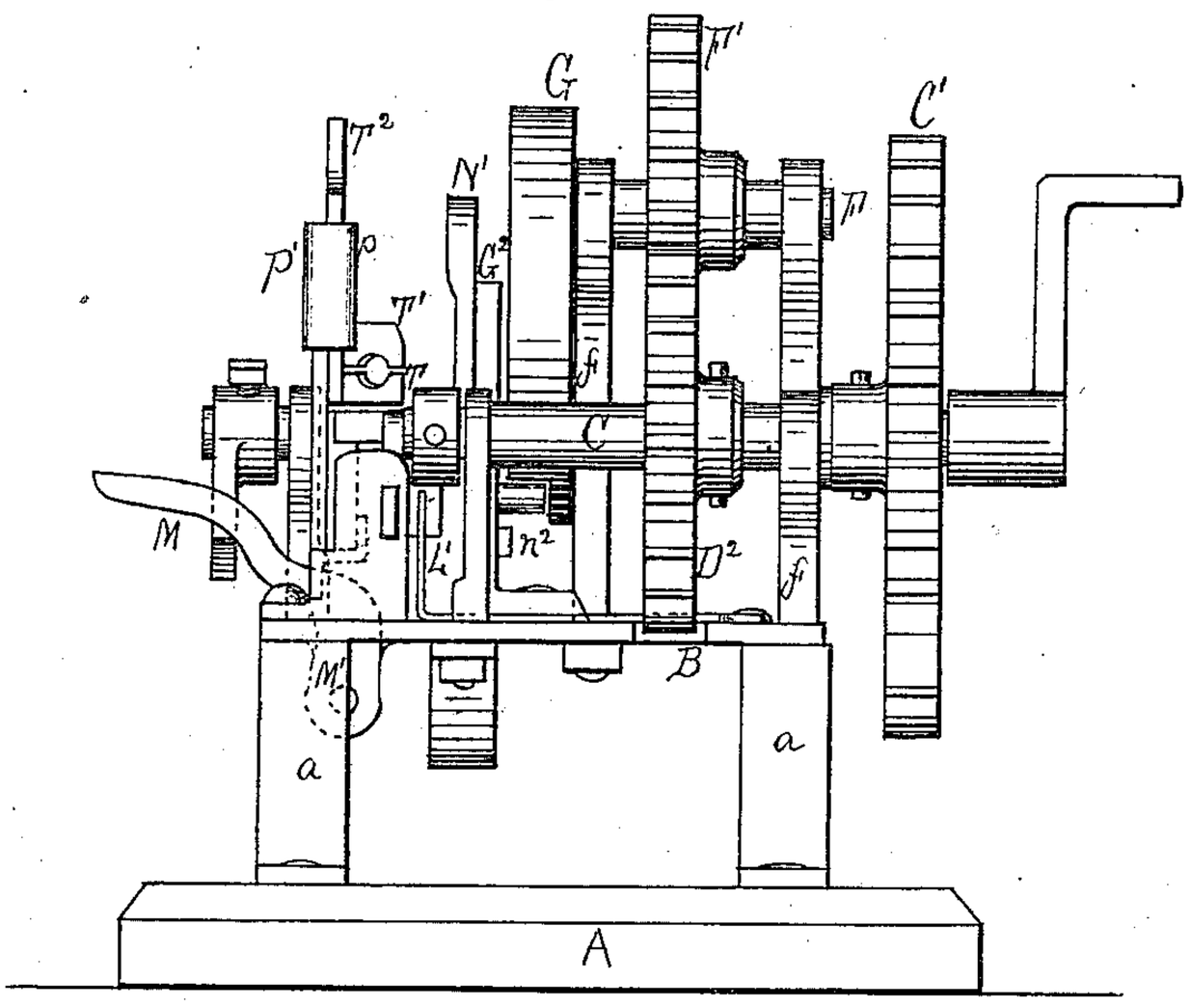


Fig. 4.



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UNITED STATES PATENT OFFICE.

BENJAMIN HERSHEY, OF ERIE, PENNSYLVANIA, ASSIGNOR TO PITTSBURGH CHAIN AND CAR-LINK MANUFACTURING COMPANY.

IMPROVEMENT IN MACHINES FOR BENDING CHAIN-LINKS.

Specification forming part of Letters Patent No. **166,375**, dated August 3, 1875; application filed April 9, 1875.

To all whom it may concern:

Be it known that I, BENJAMIN HERSHEY, of the city and county of Erie, and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Bending Chain-Links, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, and the letters of reference marked thereon, making part of this specification, in which—

Figure 1 is a front view. Fig. 2 is a top-plan view. Fig. 3 is a front view, parts being broken away. Fig. 4 is an end view.

My present improvement relates to a machine for forming or bending railway coupling-links, chain-links, &c.

The nature of my invention consists in securing, within a sash-frame attached to a vertical slide-plate or plunger, the mandrel or former, the same being secured within its sash, and so combined and arranged in relation to the bending-rollers that, when through the action of the cam the plunger is raised to such position as will leave space sufficient between the mandrel or former and the surface of the bending-rollers, for the blank to occupy, the spring catch or latch which retains the mandrel or former shall automatically be released, when, through the action of a spring, the mandrel or former shall be driven out over the section of the blank, which is immediately above the opening between the rollers, and in such position as to force the blank down between the rollers, and which the return movement of the cam accomplishes, and thus bends the link. The mandrel is forced back at the proper time by an eccentric lever operated through a lever on the main driving-shaft. The mandrel, when returned, is again caught and retained by the spring-latch, and the link, bent to the desired form or contour, is left free to fall from the machine. My invention also consists in recessing the head of one of the horizontal bars or carriers that moves the bending-roller forward over the head of the mandrel, and in so arranging in connection therewith a friction-roller that, after the link is bent, and at the proper time, through the action of the friction-roller, the horizontal bar shall be pressed down, and the bending-roller made to descend on the opposite side of the mandrel, so as to round and complete the link. My invention also consists in arranging the walking-beam or lever that operates the movable knife in such manner, in connection with the sliding plate or plunger that carries the mandrel, that just before the plunger is elevated to or reaches the point at which the mandrel is released or thrown forward, the lever shall be so lifted as to cause the knife to cut the blank, and leave the same on the rollers for the action of the mandrel.

The construction and operation of my invention are as follows:

A is the base or platform, on which are seated the legs *a a*, which support the bed B of the machine. On this bed B, and in suitable bearings *c c*, are journaled the ends of the main driving-shaft C, and to which is secured the cog-wheel C′. On the opposite side of the bed, and in suitable bearings *d d*, are journaled the ends of the supplemental shaft D, to which is secured the cog-wheel D^1. This cog-wheel D^1 is of the same diameter as the cog-wheel C′, and they are relatively so arranged that their teeth mesh, and by which means the power communicated to the driving-shaft C is transmitted to the supplemental shaft D, and a uniform and simultaneous movement is imparted to both. On these shafts C D are secured short levers or arms E E, which, at regular intervals, push forward the horizontal bars or carriers of the bending-rollers, as hereinafter described.

On the main shaft C, and at the outer section thereof, is also secured a lever, E′, which operates the pivoted or eccentric lever M, through whose action, after the link is formed, the mandrel is automatically returned. On the bed B there is also journaled, in suitable bearings *f f*, the cam-shaft F, to which are secured the cam-wheel G and the cog-wheel F′, which latter gears with and receives power from the cog-wheel D^2, which is secured to the supplemental shaft D, and at or near the center thereof. In the face of the wheel G there is a cam-shaped groove, *g*, the form or outline of which is clearly shown in Fig. 1. In this groove *g* rests and works the bearing of the sliding plate or plunger that carries the man-

drel or former. At or near the center of the bed B are seated or secured uprights G^1 G^2, between which rests and travels the sliding plate or plunger H^1, which carries the mandrel or former H. The inner faces of these uprights G^1 G^2 are grooved, as shown in dotted lines, Fig. 3, which grooves serve as guides or tracks for the sliding plate, and which insures of its always working with a true and direct vertical movement. On this sliding plate H^1 is secured the open frame or sash H^2, in which rests and works the mandrel or former H. At the center of the mandrel or former H, as clearly shown in Figs. 1 and 3, is a bearing-pin, *h*, which projects from the rear of said mandrel. Around this pin rests and is supported a coil-spring, *h'*. This spring is so arranged, in connection with the mandrel or former, that its tension is constantly employed to drive or thrust out the mandrel, causing it to project beyond its sash H^2, as shown in Fig. 1, and which is its position during the operation of bending the link. Toward the sides of the bed B, and in front of the shafts C D and the uprights G^1 G^2, are secured the slotted guides or supports K^2 K^2, in which rest and travel the horizontal bars or carriers K K^1 of the bending-rollers L L, and which latter are secured on pivot-centers *l l* at the front of said movable bars. Around the periphery of each of these rollers is a groove, which receives the link as it is carried down between the rollers through the action of the mandrel H. L' L' are two torsion-springs, the lateral lever-arms *l' l'* of which rest and act against the shoulders or flanges *k k* of the carrier-bars K K^1. These springs L' L' serve to hold the dies or rollers L L so apart as to leave the necessary opening between them for the action of the mandrel as it bends and forces the blank down between the grooved peripheries of the rollers; and they also serve to return the carriers K K^1 after the same have been pushed forward through the action of the driving-arms E E on the shafts C D.

On a line in front of the mandrel H, and working through a slot in the bed B, and secured in suitable bearings M' on the under face of said bed, is pivoted the reverse or double-curved lever M. The form and arrangement of this lever are clearly shown in Fig. 4.

When, through the action of the lever E' on the main shaft C, this lever M is elevated, it presses back the mandrel H until it is caught by the spring-latch N, which retains it until, through the elevation of the sliding plate H^1, the latch is released by its curved end being passed under the inclined shoulder *n* of the upright arm N', as clearly shown in Fig. 1. This spring-latch N is secured to the side of the sash or frame H^2, and its latch-pin works through an opening in said sash, and engages at the proper time with the upper shoulder or bearing n^2, formed on the back of the mandrel H, said shoulders working in slots cut in the back of the sliding plate H^1. The upright arm N', to which is attached the latch-releasing bearing *n*, is secured to the upright G^2, and which is one of the guide-bearings of the sliding plate or plunger H^1.

On the upright G^1 is secured a short horizontal roller, O, which is so arranged in relation to the upper recessed face *k'* of the horizontal bar K, Fig. 1, that when this bar is pushed forward through the action of the arm E, which is on the main driving-shaft, and its bending-roller is immediately over the head of the mandrel, this friction-roller O is directly in the concavity *k'*; consequently any further movement of the bar will cause the friction-roller to pass up the curved wall of the hollow or concavity, which, of course, will depress the bar *k'*, forcing its bending-roller L down over the opposite edge of the mandrel, and which presses the open sections of the end of the link into a nicely-rounded form, ready for welding. At the front of the bed B, Figs. 3 and 4, is secured an upright plate, P, to which is attached the stationary knife or blade T. At the upper section of this upright P is an open sleeve or bearing, P', in the rear flanged sections *p p* of which rest and travel the sliding plate T^2, to which the movable knife or blade T^1 is attached, as shown in Fig. 4. R is a post secured to the bed-plate B, and immediately at the rear of the upright plate P. In the slotted head of this post is pivoted the walking-beam or lever R', which is connected with the sliding plate T^2, that carries the movable knife T^1. This lever R' is provided with a shoulder, *r*, which is immediately above the sliding plate H', as shown in Fig. 1, and which sliding plate, when elevated through the mechanism and arrangement described and shown, is thus caused to operate the movable knife. The form of these cutting-blades T T^1 is to be such as to so cut the bar as to leave the slanting or tapering ends, which, when brought together and welded, form the link of uniform dimensions.

From the foregoing description, the operation of my machine will be readily understood. Power from any suitable motor is applied to the main driving-shaft C, which, through the cog or ratchet wheels C' B^1, imparts a simultaneous and uniform movement to both shafts C D, and the levers or arms attached thereto. The wheel B^2 on the shaft D, gearing with the wheel F', operates the shaft F, and, of course, the cam G. The bar or rod from which the blank that forms the link is to be cut is pushed through between the open cutters on such a line as to be obliquely over the bending-rollers. Motion being now imparted to the machine, as the sliding plate or plunger H^1 is elevated, it strikes the shoulder *r* on the lever R' and raises it, which movement drives down the plate T^2 and movable knife T^1, causing it to cut off the blank, and leaving it in proper position on the rollers L L for the action of the mandrel or former H, the springs L' L' holding the rollers so apart as to leave an opening between them for the passage of the former as it carries down

the blank in the operation of bending the same to form the link. The various parts of the machine are now in position shown in Fig. 1. The plunger H^1 having by the cam been elevated, and the latch or catch N being pulled back by its curved end passing under the inclined shoulder, leaves the former or mandrel H free, when the spring h' at its rear immediately drives it out, and the cam, forcing it down, causes it to carry the blank down between the grooved peripheries of the bending-rollers. Just as the mandrel or former passes the lower section of the rollers, the arms E E on the shafts C D are brought to such position that they push in the bending-rollers, and thus bend the blank down around the head of the mandrel, as described. The arm E′ on the main shaft C now strikes the lever M, driving it against the mandrel, and pushing the same back into the sash, which leaves the bent link free, and causes the catch N to again engage with and secure the mandrel. The revolution of the shafts carries the arms or levers E E and E′ to such position that they no longer press on the horizontal traveling bars K K^1 of the bending-rollers or the lever M. The springs L′ L′ now return the bars, and the lever drops by its own gravity, and the machine is in condition to cut and form the next link.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of the sliding plate or plunger H^1, mandrel or former H, spring h', spring-latch N, inclined shoulder n, levers E′ and M, and dies L L, the whole being constructed and arranged as shown, and so as to operate substantially as described.

2. The combination of the horizontal arm K, having its upper face recessed, as shown at k', roller O, mandrel H, and arm E, when the whole are constructed and arranged to operate substantially as described.

3. In combination with the plunger H^1, that carries the mandrel, the lever R′, movable knife T^1, and stationary knife T, the whole being constructed and arranged to operate substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJ. HERSHEY.

Witnesses:

ELLIS SMITH,

E. STREUBER.