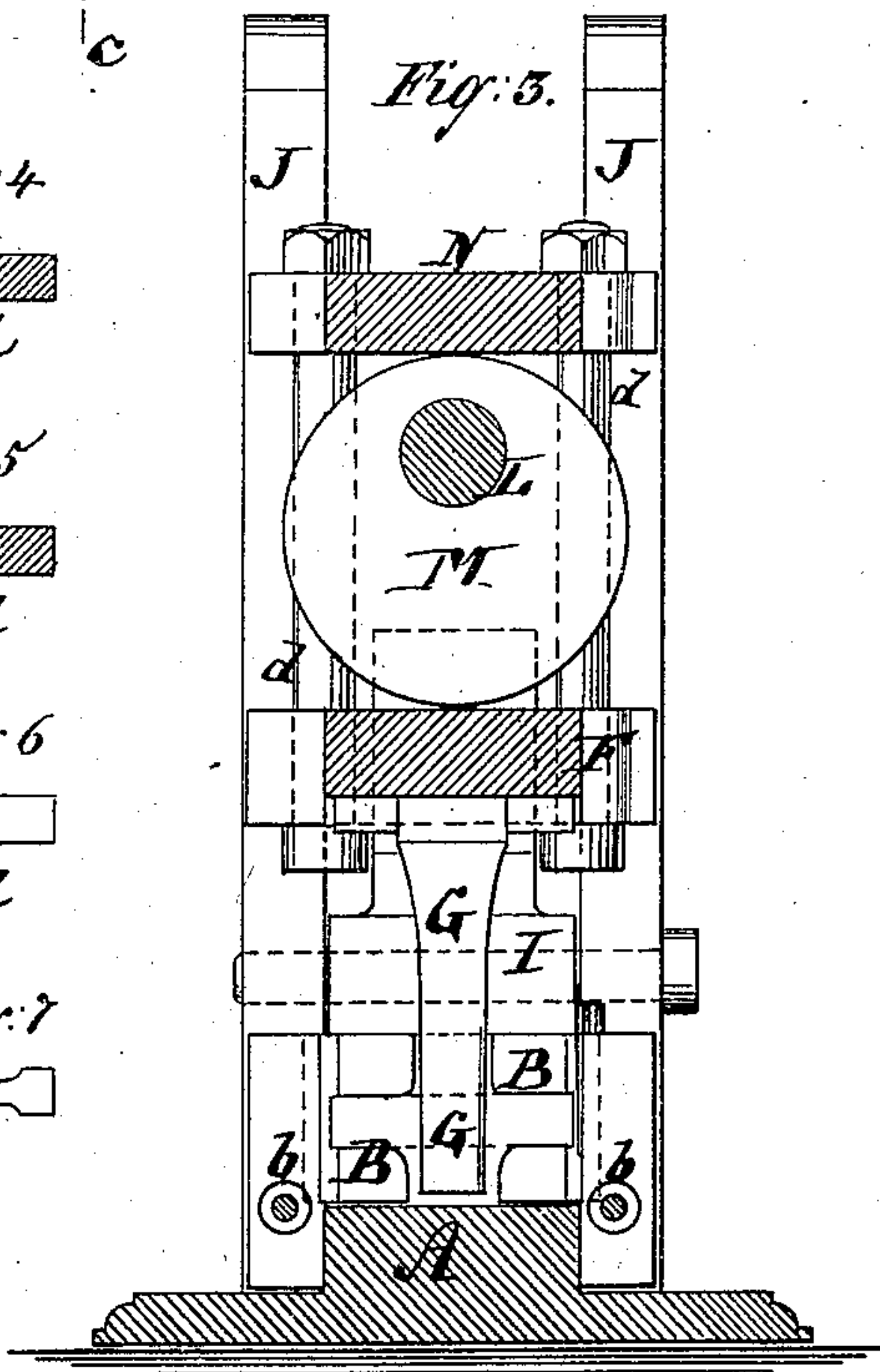
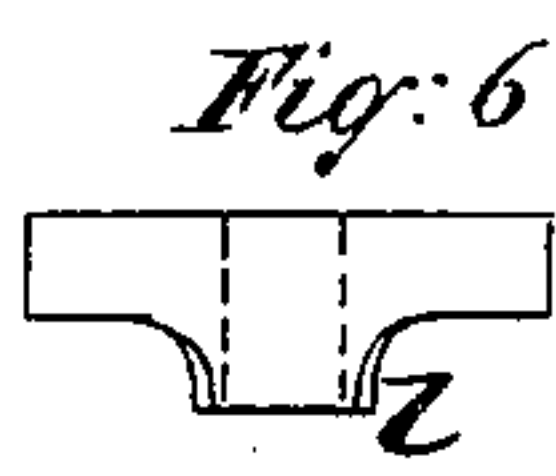
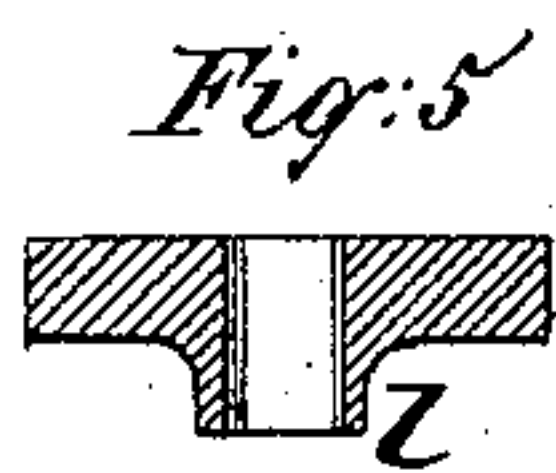
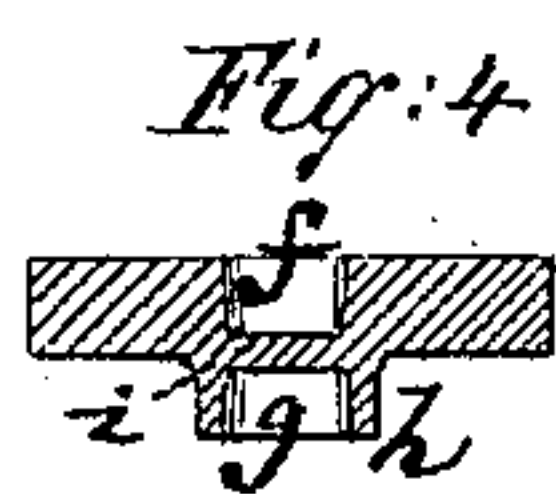
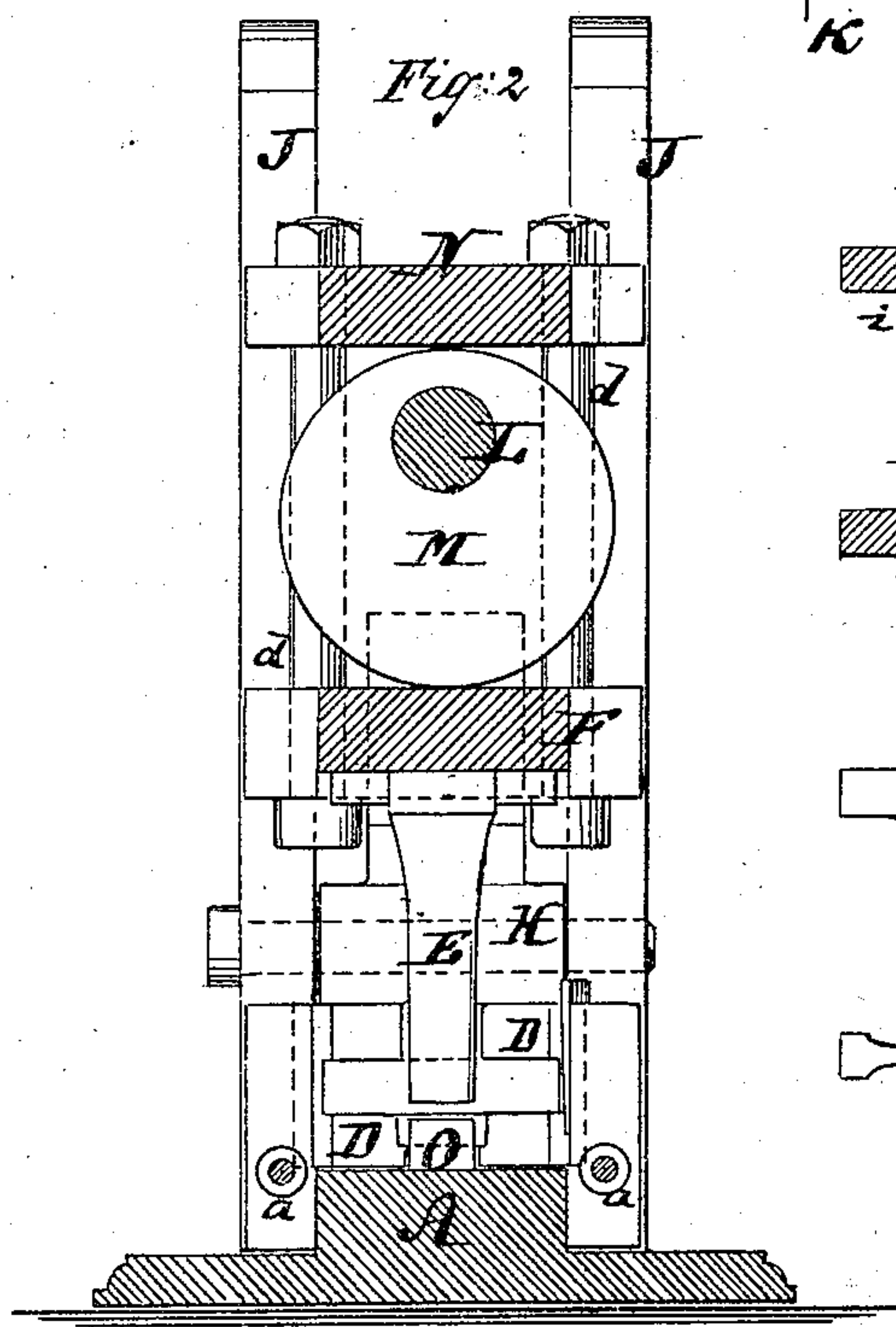
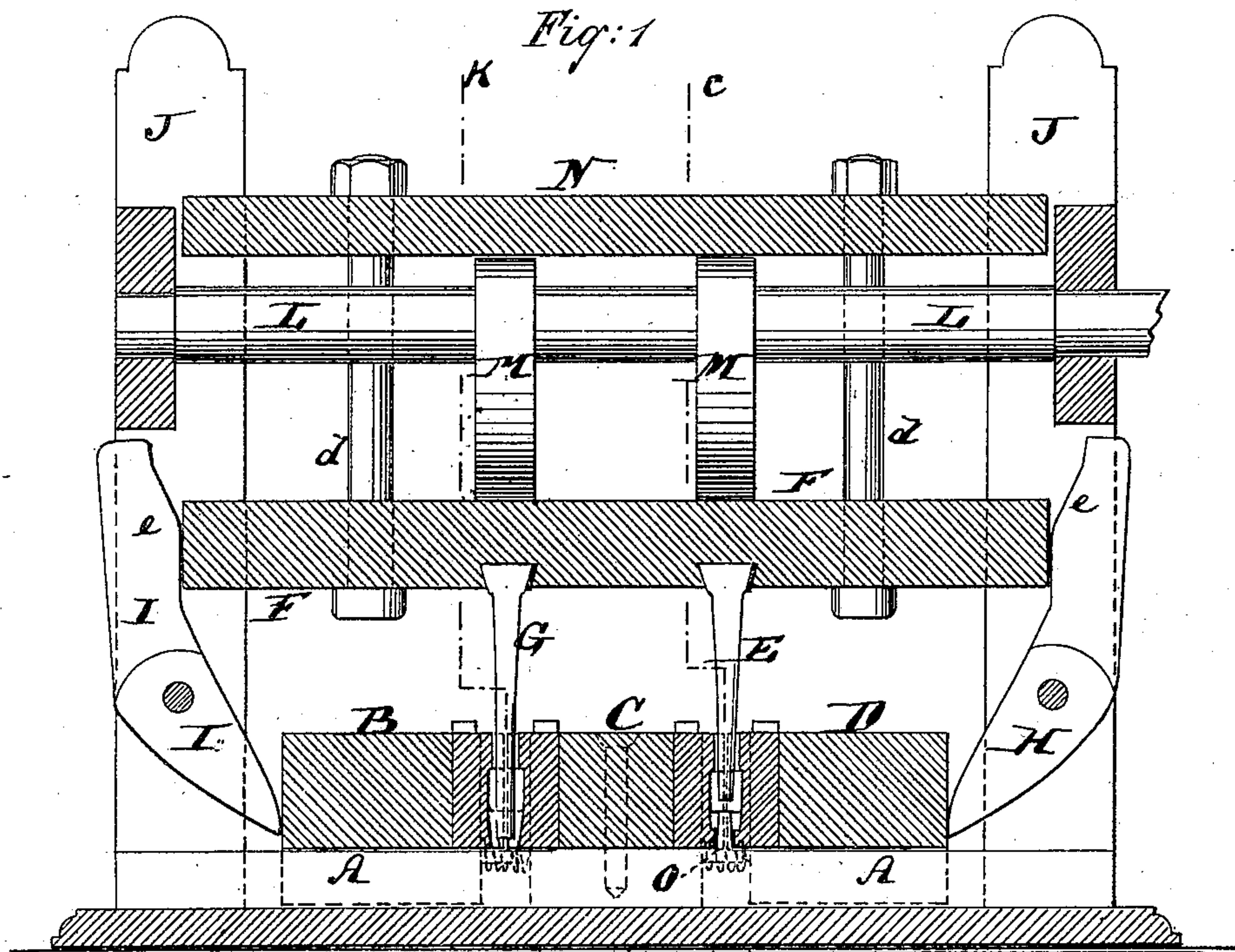


W. ANDREWS.

Machines for Forming the Eyes of Pick-Axes.

No. 153,228.

Patented July 21, 1874.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM ANDREWS, OF PORT RICHMOND, NEW YORK.

IMPROVEMENT IN MACHINES FOR FORMING THE EYES OF PICK-AXES.

Specification forming part of Letters Patent No. **153,228**, dated July 21, 1874; application filed April 25, 1874.

To all whom it may concern:

Be it known that I, WILLIAM ANDREWS, of Port Richmond, in the county of Richmond and State of New York, have invented a new and Improved Machine for Forming the Eyes of Pick-Axes, &c., of which the following is a specification:

Figure 1 is a vertical longitudinal section of my machine for forming the eyes of pick-axes. Fig. 2 is a vertical transverse section thereof taken on the plane of the line C C, Fig. 1. Fig. 3 is a vertical transverse section taken on the line K K, Fig. 1. Fig. 4 is a longitudinal section of the blank as it appears after the first operation. Fig. 5 is a longitudinal section of the eye as completed. Fig. 6 is a side view of the completed eye, and Fig. 7 is a top view of the same.

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

This invention has for its object to produce a machine for forming the eyes of pick-axes and other tools by two operations; and consists, first, in using for the first operation a stationary punch combined and in line with a movable punch, and combined also with two cheek-pieces for holding the blank in position, one of said cheek-pieces being stationary and the other horizontally movable; secondly, my invention consists in combining with the aforementioned two movable cheek-pieces two pivoted levers, and the head of the two punches, so that said head, when descending, will act upon the levers and move the two movable cheek-pieces toward the stationary cheek-pieces, and lock the blanks in position before they are reached by the punches.

In the accompanying drawing, the letter A represents the base or bed of my machine. B C D are the blocks which form the cheek-pieces for the two operations. The central block, C, is firmly secured upon the bed A by means of bolts or other fastenings, said central block being arranged between the movable blocks B and D. The space which is formed between the blocks C and D is intended for holding and shaping the blank at the first operation, while the space which is formed between B and C is intended for holding and shaping it at the second operation. E is a punch, which is suspended from a head

or cross-piece, F, in line with the space formed between the blocks C and D. G is another punch, suspended from the aforementioned head F in line with the space formed between the blocks B and C. The block D rests upon the bed A, and is not fastened thereto, it being at liberty to slide in suitable guides or ways toward and away from the block C. Springs *a*, which are introduced between the blocks C and D near their ends, are intended to keep the block D away from the block C, and in contact with a lever, H. In a similar manner is the block B made movable toward and away from the central block C, springs *b* being introduced between the two for keeping the block B away from the block C, and in contact with a lever, I. The levers H and I are pivoted at opposite ends of the frame J of the machine, and the ends of the reciprocating head F are in contact with said levers, in the manner clearly shown in Fig. 1. A horizontal shaft, L, is hung in the frame J, above the head F, and carries one or more cams, M, as shown. By means of these cams reciprocating motion is imparted in a vertical direction to the cross-head F, and the same is moved up and down in the frame J, because a bar, N, which is, by suitable rods *d*, connected with the cross-head F, rests upon the cams M, as shown. Whenever the cross-head F is moved down it carries down with it the punches E and G into the spaces which are formed, respectively, between the blocks C and D, and between the blocks B and C, and, while thus descending, the cross-head F affects the position of the levers H and I, inasmuch as it passes along the inclined edges *e* of said levers, and thereby swings them, so as to carry their lower ends nearer together, and consequently bring the blocks B and D nearer to the block C, and contracting the springs *b* and *a*. Directly beneath the punch E is formed, on the body A, a fixed and stationary projection which I will call the stationary punch O. The same enters the space between the blocks C and D to a certain height, said height being defined by the lower end of the punch E, a very short space being left between the ends of E and O when E is in the lower position, as indicated in Fig. 1.

The blank into which the eye is to be formed

is, in the form of a prismatic bar, introduced first between the blocks C and D, said blocks having chambers formed in their inner sides, or cheek-pieces corresponding in form to the outer shape which is to be imparted at the first operation to the blank. When the blank is inserted between C and D the head F is in its upper position, and then the shaft L is turned, and the head F, with its punch E, forced down, and the lever H vibrated on its pivot. Now, before the lower end of the punch E reaches the blank the lever H has been swung so as to carry the block D or cheek-piece as near as it can be moved toward the block C, so that the blank will be firmly held and confined by and between the said blocks or cheek-pieces C and D. The lower face of the blank is then directly above the upper end of the stationary punch O, which will be readily understood by reference to Fig. 2. As the punch E is descending it reaches the blank and enters the same, and, as the cheek-pieces are, during such motion, immovable, so as to prevent the blank from yielding under the influence of the entering wedge or punch, the only means for the displacement of the metal, caused by such entering of the punch, is for the metal to be forced downward around the stationary punch O. This will be the effect produced, and the metal will be hollowed by the punch E nearly to the lower edge of the blank, while at the same time the displaced metal will embrace the stationary punch O and form a collar round the same, of which the hollow is formed by said punch O. In fact, the blank, which was a plain bar when introduced between the cheek-pieces C and D, will, after such first operation, come out in the shape shown in Fig. 4, with the upper cavity, *f*, formed by the punch E, and the lower cavity, *g*, formed by the stationary punch O, the lower cavity being formed in the downwardly-projecting collar *h*, as clearly shown. The blank from the first operation, having the shape shown in Fig. 4, is, after the head F is raised, next inserted between the cheek-pieces B and C, which are shaped to receive it, the cavities formed in them for the reception of the collar *h* being extended downward slightly below the collar. The punch G is longer than the punch E, as shown in Fig. 1, so that when the cross-head F descends with the punch G it will carry the lower end of the latter farther down than it does the lower end of the punch E. The first effect of the downward motion of the cross-head F will now be to swing the lever I against the cheek-piece B, crowding the cheek-piece B against C, and thus confining the blank in position between such cheek-pieces. Thereupon the punch G will reach the blank and will first

enter the cavity *f* in the same, and will then reach the small diaphragm or partition *i*, which was left by the first operation between the chambers *f* and *g*. This diaphragm or partition the punch G must pierce; but, as there is no room for the metal of the blank to escape sidewise, this piercing process will necessarily displace the metal farther downward, and thereby fill the chamber formed between the cheek-pieces B and C entirely, the final result of this operation being an eye of the kind shown in Figs. 5, 6, and 7, said eye extending clearly through the body of the blank and through the downwardly-projecting collar *l* which is formed therein. Thus it is that, by two simple operations, I transform a plain bar not only into a perforated bar, but also provide it with the necessary neck which constitutes the longer eye usually required in pick-axes and other tools.

I am aware that machines have heretofore been made for producing the same results—that is to say, for transforming a plain bar into an article of the style shown in Figs. 6 and 7; but all former machines for this purpose were made very much more complicated than mine. They all have at least four cheek-pieces where I have but three, and they all rely in the first operation on the movable punch alone for starting the eye in the blank.

In practice it has been found a wrong principle to use only a movable punch for starting the eye, because said movable punch would have on it the whole burden of displacing the metal, while by using the stationary punch O in combination with the movable punch the labor is equally divided between the two, and the displacement of the metal also divided, and less strain put upon the machine.

It will be observed also that in my machine I can always operate on two blanks simultaneously, one blank being subjected to the first operation and the second blank to the second operation.

I claim as my invention—

1. In a machine for forming eyes in pick-axes and other tools, the combination of the movable punch E with the stationary punch O and with the cheek-pieces C and D, of which one only is horizontally movable, substantially as described.

2. The combination of the reciprocating head F, which carries the punches E and G, with the two levers H and I, and movable cheek-pieces D and B, substantially as shown and described.

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