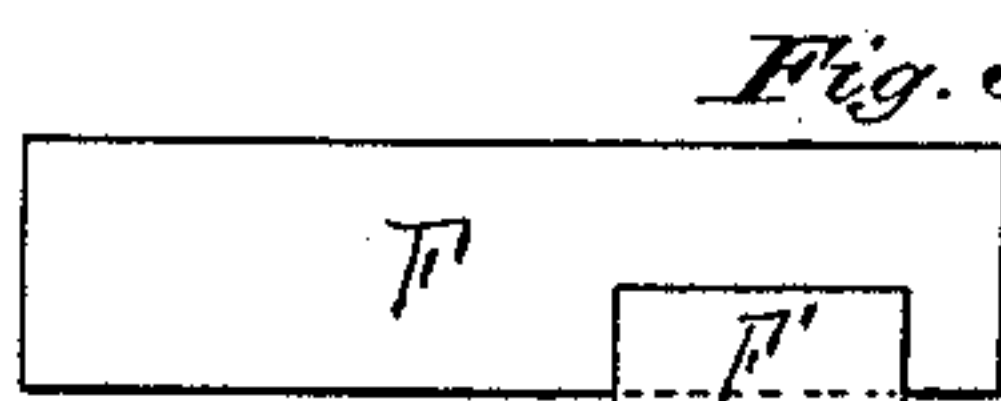
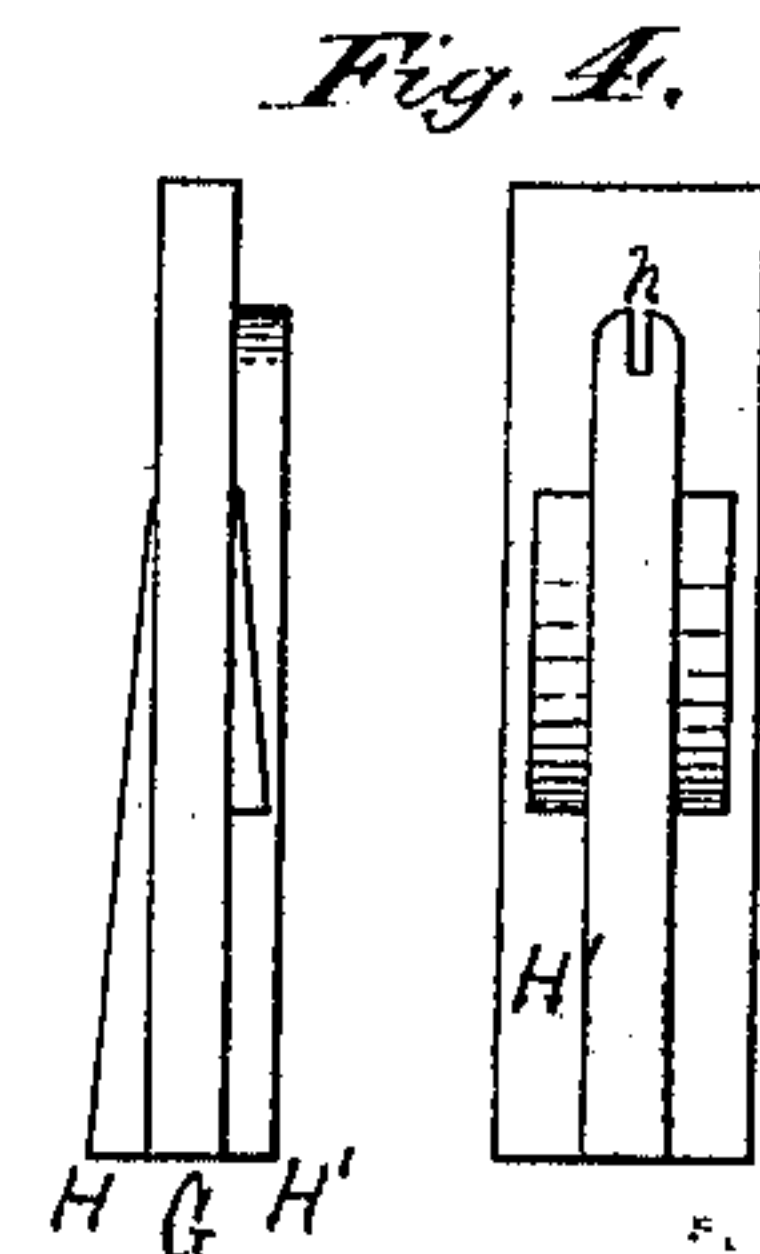
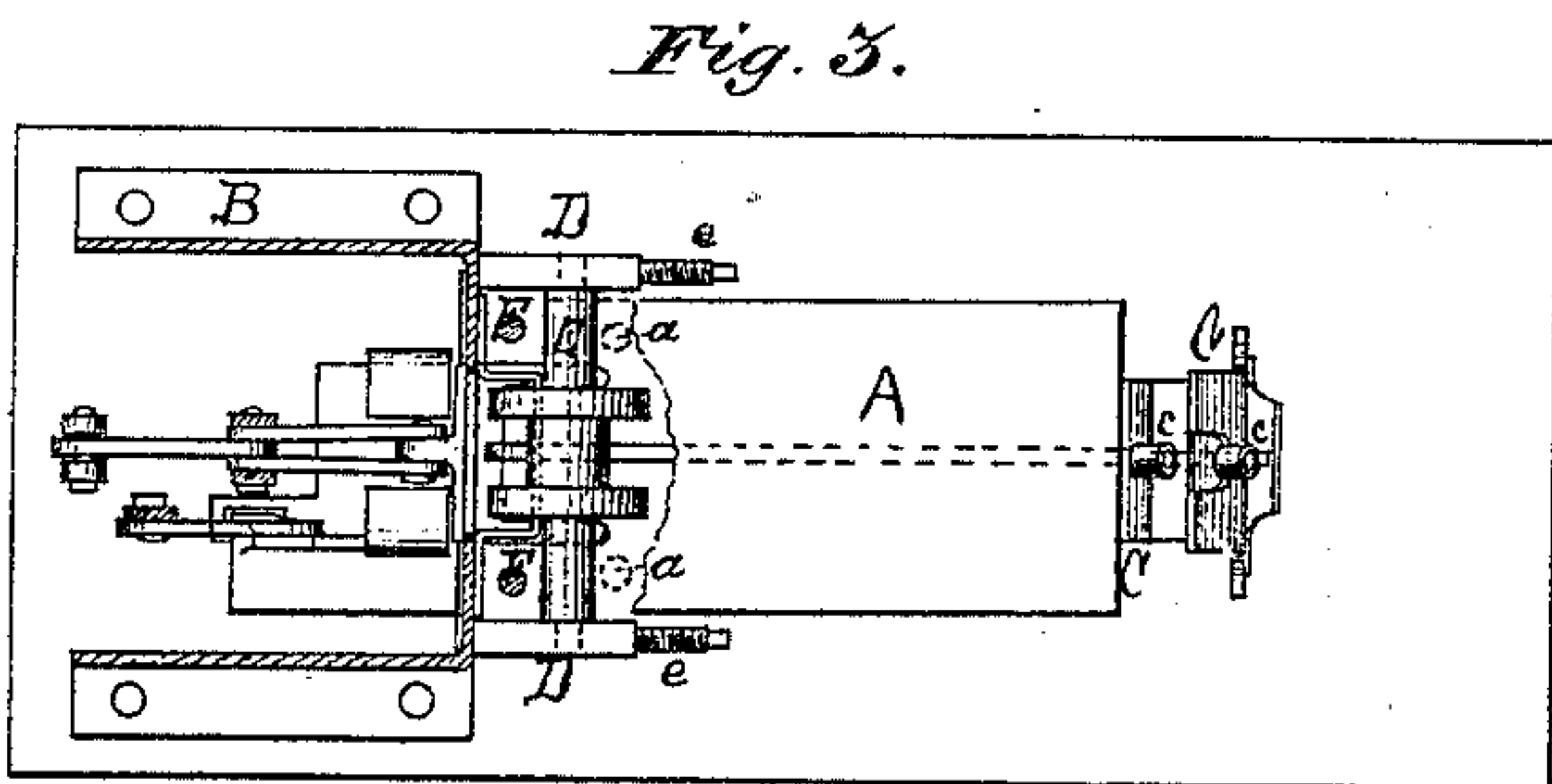
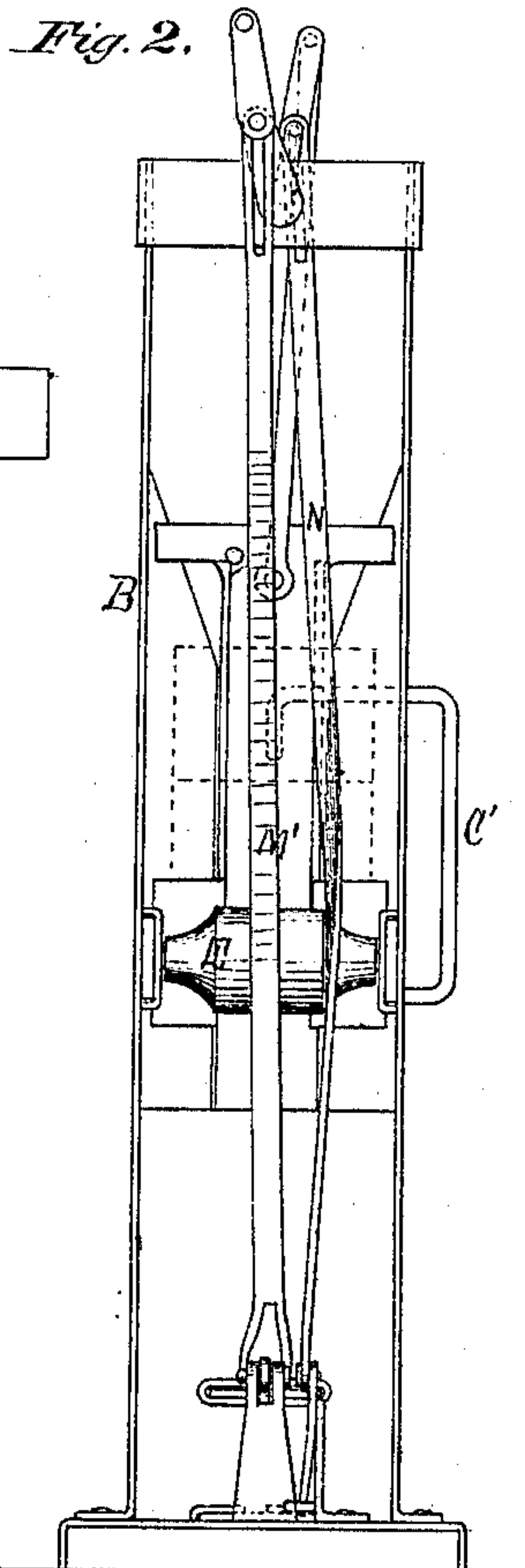
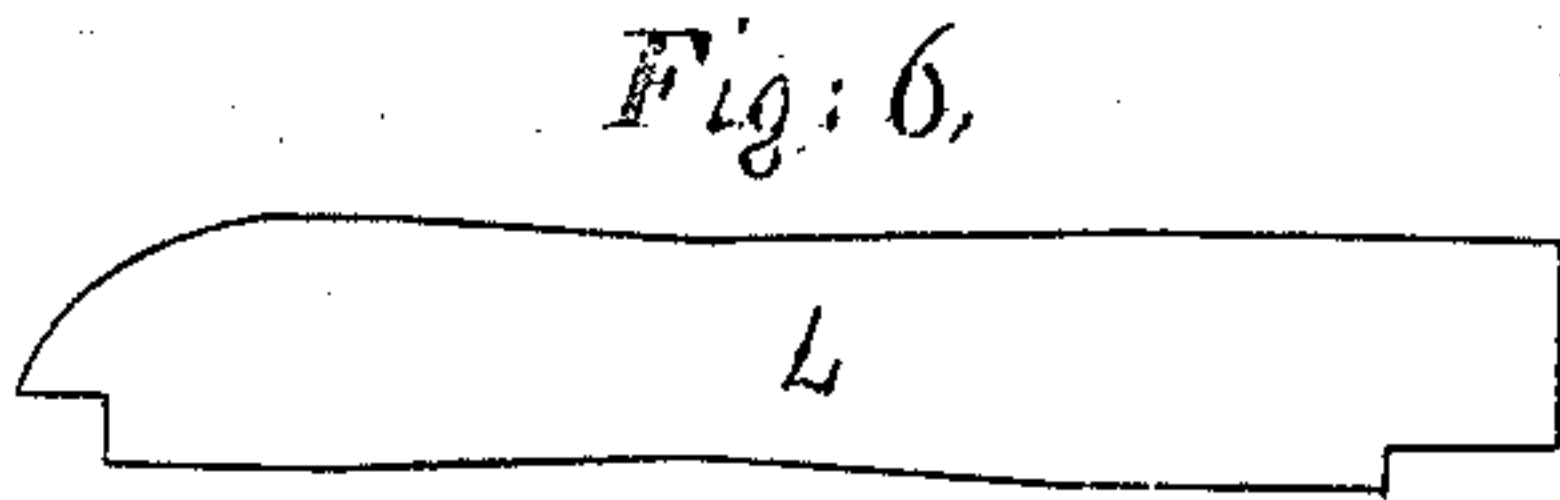
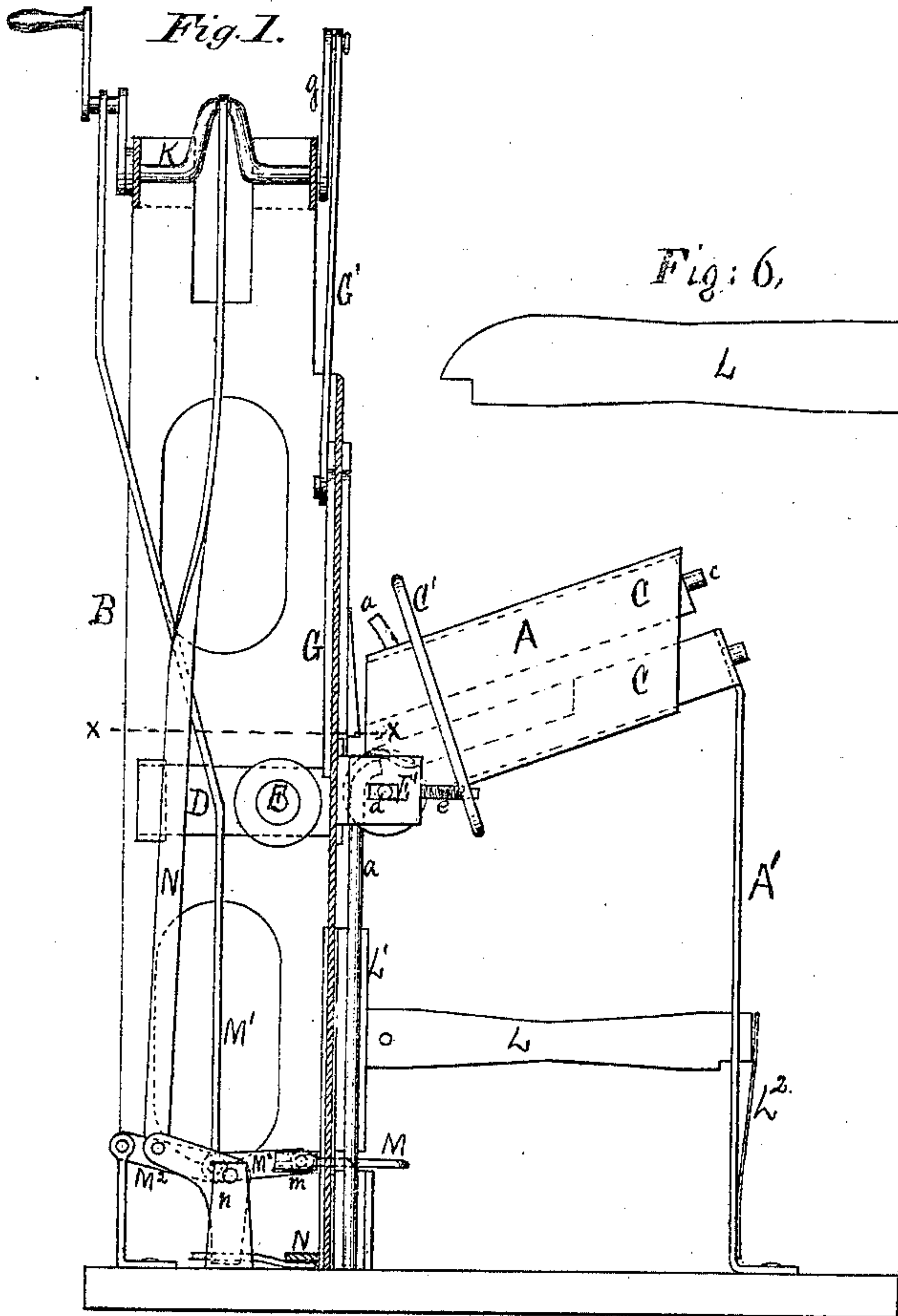


*B. Hershey,*

*Staple Mach.*

*No. 113663.*

*Patented Apr. 11. 1871*



*Witnesses:*  
*Edwin James*  
*Horace Brown*

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*per J. E. Holmead.*  
*Attorney.*

# UNITED STATES PATENT OFFICE.

BENJAMIN HERSHEY, OF ERIE, PENNSYLVANIA, ASSIGNOR TO HIMSELF,  
E. GEER, RICHARD DUDLEY, AND RICHARD F. GAGGIN.

## IMPROVEMENT IN STAPLE-MACHINES.

Specification forming part of Letters Patent No. **113,663**, dated April 11, 1871.

*To all whom it may concern:*

Be it known that I, BENJAMIN HERSHEY, of the town and county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Staple-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon, making part of this specification, in which—

Figure 1 is a side view, one of the plates of the main frame being removed. Fig. 2 is a front elevation. Fig. 3 is a horizontal sectional view on the line *x x*, Fig. 1. Fig. 4 is an enlarged view of the plunger-die. Fig. 5 is an enlarged view of the guide-plate in which the plunger-die works. Fig. 6 is a detached view of the plate that draws the staple off the die.

The object of the present invention is to furnish such an arrangement of mechanism that in its passage through the machine any suitable-sized straight metallic rod shall be converted into a finished staple.

To accomplish this, my invention, in the first place, consists in a novel arrangement of the tube or box through which the rods, which have been previously cut to a uniform length, are fed to the plunger-die and rollers, whereby only the ends of the rods in their transverse passage through the feed-box are subjected to the direct action of the heat. The advantage of this arrangement will readily suggest itself to all familiar with the art to which my invention relates, for while the staple-rod is, in fact, cut cold, which is far preferable to bending it while it is in a heated state, as the manufactured staple better resists the concussion of the hammer in driving when this is the case, still, at the same time, the ends of the rod are properly heated, and this is the only portion of the rod which it is advantageous to heat in order to properly convert it into a staple, as heat at this portion of their surface in no manner affects the finished staples, and at the same time renders the rod much easier manipulated than when its ends are cold.

My invention also consists in giving to the

opposite faces of the plunger-die such form that, in connection with rollers and guide-plates, through which it passes, and in combination with which it acts, by a single operation the straight rod is worked into the finished staple.

My invention also consists in an arrangement of mechanism whereby, at the desired moment, the staple is drawn off the plunger, substantially as hereinafter described.

My invention also consists in an ingenious arrangement of mechanism in the lower section of the discharge-tube whereby the staples are caught as they fall from the die, and cut of uniform length.

To enable others skilled in the art to make and use my invention, I will now proceed to describe its construction and operation.

A is the tubular box or receptacle through which the rods that are to form the staples are fed to the plunger-die. This box is supported by suitable bearings on the standard A' and the vertical frame B.

By reference to Fig. 1 it will be seen that this tube is so secured in its supports that it falls at a positive angle toward the frame B.

C C are two rectangular metallic bars or tubes, and are passed horizontally through the tubular box A, one being permanently secured to the upper and the other to the lower wall thereof. The relative dimensions of the tube A and the bars or tubes C C should be such that when the latter are secured in the former sufficient space should be left between the bars or tubes C C for the free insertion of the rods, as clearly shown in dotted lines, Fig. 1, so that when the space between the tubes C C is filled by the rods being placed transversely therein the entire unoccupied surface within the tubular box A shall be divided into four passages or flues, the same being at the four corners of the box A. Of course, to accomplish this result, before the rods are inserted they must be cut of such length that their ends shall touch, or nearly so, the side walls of the box A.

*a a* are four gas pipes or jets, and are so attached to the box A that they enter the same at the four corners of its lower section or discharge end, so that when the interior of the



tube is subdivided into four passages or flues, as hereinbefore stated, one gas-pipe shall heat each flue.

When the bars C C are of tubular form, as it is almost essential they should be, in order to effectively accomplish the result aimed to be attained by this portion of my invention—that is, only heating the ends of the rod and leaving the remainder of its surface cold—they are supplied with water-tubes C', through which water is supplied in a continuous stream at their lower sections and discharged at *c c*.

D D are two horizontal sliding plates, and are secured in suitable bearings in the sides of the frame B. In these plates D D are secured the pressure-roller E and the grooved or flanged roller E', E revolving in a fixed bearing and E' in a slot, *d*, the relative play of its axle therein being determined by the set-screws *e e*. This allows of the same machine being so adjusted as to allow of its working rods of varying sizes or diameters.

F F are two guide or flanged plates, and are permanently secured in the front face of the frame B. These plates are shown in enlarged view at Fig. 5, the plunger-die working between the same and in the recess which is formed by the flanges F' F'.

G is the plunger-die, and is connected by pivoted arms G' and *g* with the crank-shaft K, the arm *g* being securely bolted to the shaft. The plunger-die is a rectangular plate or bar, and is faced, as is clearly shown in enlarged view in Fig. 4. The outer or rear face, H, of the plunger-die is wedge-shaped in form, while its front or inner face, H', is only wedge-shaped at its sides, the center portion of the plate H' being longer than the wedged sides, and terminates in a circular head which has a slot, *h*, cut through its lower section.

L is a horizontal rod, and has its bearings in the standard A' and the outer wall of the chamber L<sup>1</sup>. The form of this rod is clearly shown in Fig. 6. L<sup>2</sup> is a spring resting against the outer end of the rod L, and so arranged that its power is constantly employed in driving the inner or curved and recessed end of the arm against the inner wall of the chamber L<sup>1</sup>. This chamber L<sup>1</sup> is slotted below its center line. In this slot and guide-bearing plates *m m*, projecting from the rear wall of the chamber L<sup>1</sup>, works the sliding shear or cutting-blade M, the front wall, *l*, of the chamber L<sup>1</sup> acting as the stationary knife, between which and the sliding blade M the blank ends of the staples are cut off. The sliding blade M receives its motion from the crank-shaft through the vertical arm M<sup>1</sup>, secured to the crank-shaft K, and the toggle-arms M<sup>2</sup>.

N is a sliding plate which closes the opening in the bottom of the chamber L<sup>1</sup>, and through which the finished staples are discharged. This plate is moved to and fro, so as to open at the desired moment for the discharge of the staple through the bottom of the chamber L<sup>1</sup>, by means of a vertical arm, N',

attached to the crank-shaft K and the bell-crank lever *n*.

Of course many of the features herein described might be varied without in any manner affecting my invention.

The gas-pipes *a a* could readily be dispensed with and the tubular box A heated by other means and still effect the same result.

The operation is as follows: A continuous stream of water is supplied to the tubes C C, and the gas-burners *a a* are lighted. Rods cut to a suitable length are now introduced between the tubes C C and transversely across the box A. To the ends of these rods, both on their upper and lower faces, an intense heat is applied, as it were, through four flues. Thus the ends are heated in order to be more readily manipulated by the die-face H' and roller E', while the centers of the rods, owing to their contact with the tubes C C, and supplied as they are with a continuous stream of fresh water, are kept comparatively cool, which secures to the finished staples all the advantages resulting from being bent cold, which, as is well known, always renders them firmer, and consequently better enables them to resist the concussion of the hammer in driving. The tube or box A being thus filled, motion is imparted to the entire operating mechanism through the crank-shaft K. This elevates the plunger-die G, which, falling on the lower rod, which has just escaped from the box A, carries it down between the rollers E E' and the flanged plates F F'.

The rear or wedge-shaped face of the die coming in contact with the roller E causes the plates D D to slide back, which brings the flanged faces of the roller E', owing to the wedge face H of the plunger-die, to bear with a powerful and gradually-increasing force on the rod, which now has already been bent by being driven between the center portion of the die-face H' and the plates F F'. This increasing pressure on the arms of the staples by the roller E, and they resting as they do against the wedge-shaped portion of the die-face H', gives the desired tapering form to the ends of the staple.

The plunger-die, after it passes through the rollers, strikes against the rod L, which, owing to its rounded head, yields readily to the pressure until the staple passes it, when, the spring L<sup>2</sup> driving it into the slot *h*, it catches the staple and draws it from around the center portion of the die-plate H'. The crank-shaft now lifts the plunger-die and the staple falls on the plate N, from which it is discharged at the opening at the bottom of the chamber L so soon as the shear has cut off its blank ends.

The shafts which impart motion to the plunger-die G, shear or blade A, and sliding plate N are so relatively connected with the crank that its motion at the desired moment imparts the necessary motion to the different features to insure the effective working of the machine.

Having thus fully described my invention, what I claim therein as new, and desire to se-



cure by Letters Patent of the United States, is—

1. The combination of the tubular feed-box A, tubes C C, water-pipes C' C', and gas-pipes a a, substantially as described.

2. The plunger-die G, having its rear face, H, wedge-shaped and its front face, H', formed as stated, in combination with the sliding plates D D and rollers E E', substantially as described.

3. The horizontal sliding plate L and spring L<sup>2</sup> and plunger-die G, having a slot, h, in its front face, H', when the same are so combined and arranged as to operate substantially as described.

4. The cutting-plate M and sliding plate N, when the same are arranged in the chamber L, in combination with mechanism, substantially as described, for operating said plates.

5. The improved machine for forming staples, when the same is constructed, arranged, and operated substantially as described.

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

BENJAMIN HERSHEY.

Witnesses:

J. F. WALTHER,  
E. STRENNER.