

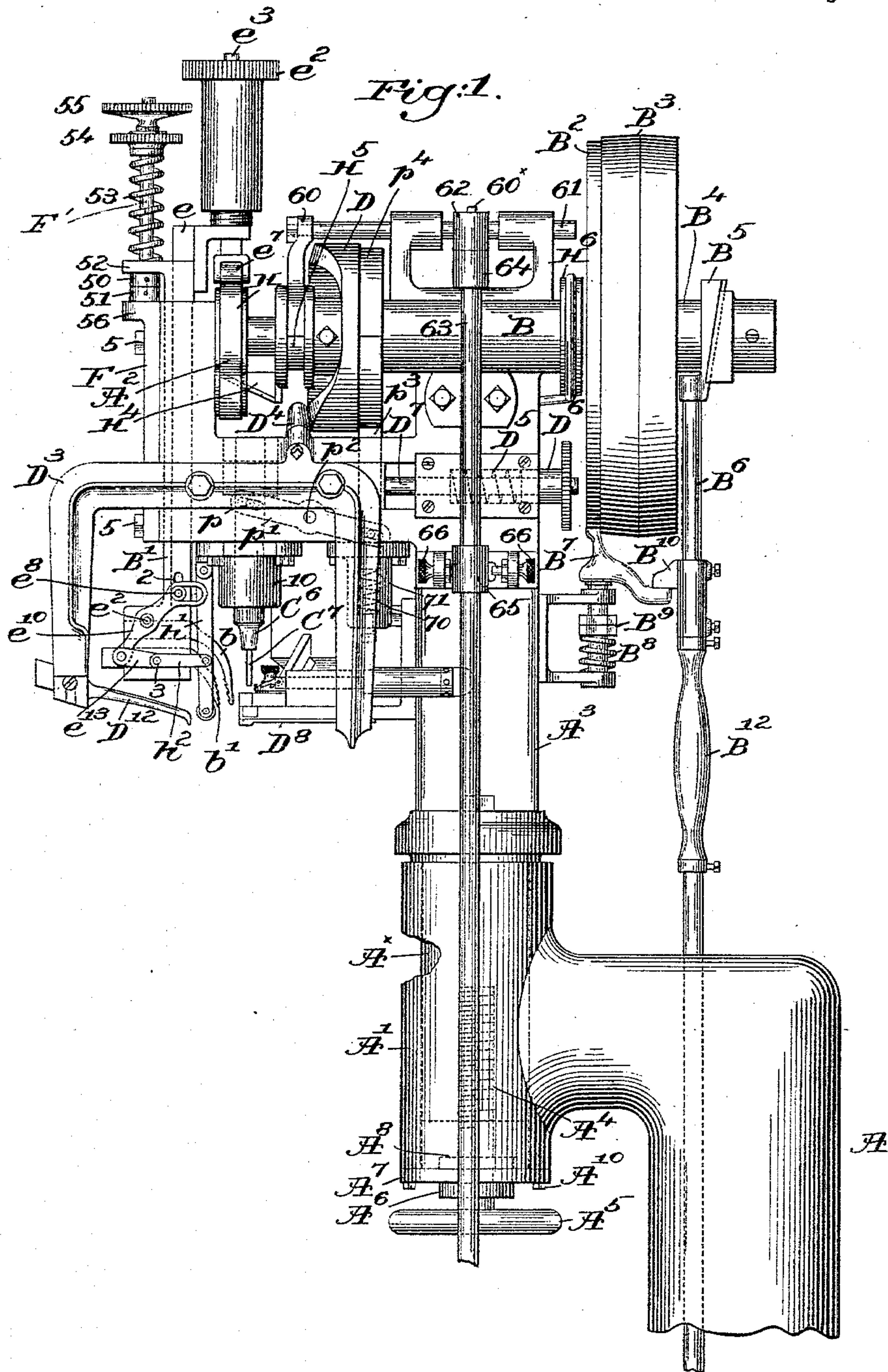
(No Model.)

3 Sheets—Sheet 1.

C. P. LAWRENCE.  
LASTING MACHINE.

No. 559,724.

Patented May 5, 1896.



Witnesses.

Fred S. Grunke.  
W. C. Harmon.

Inventor.  
Charles P. Lawrence.  
by Crosby Gregory  
attys.

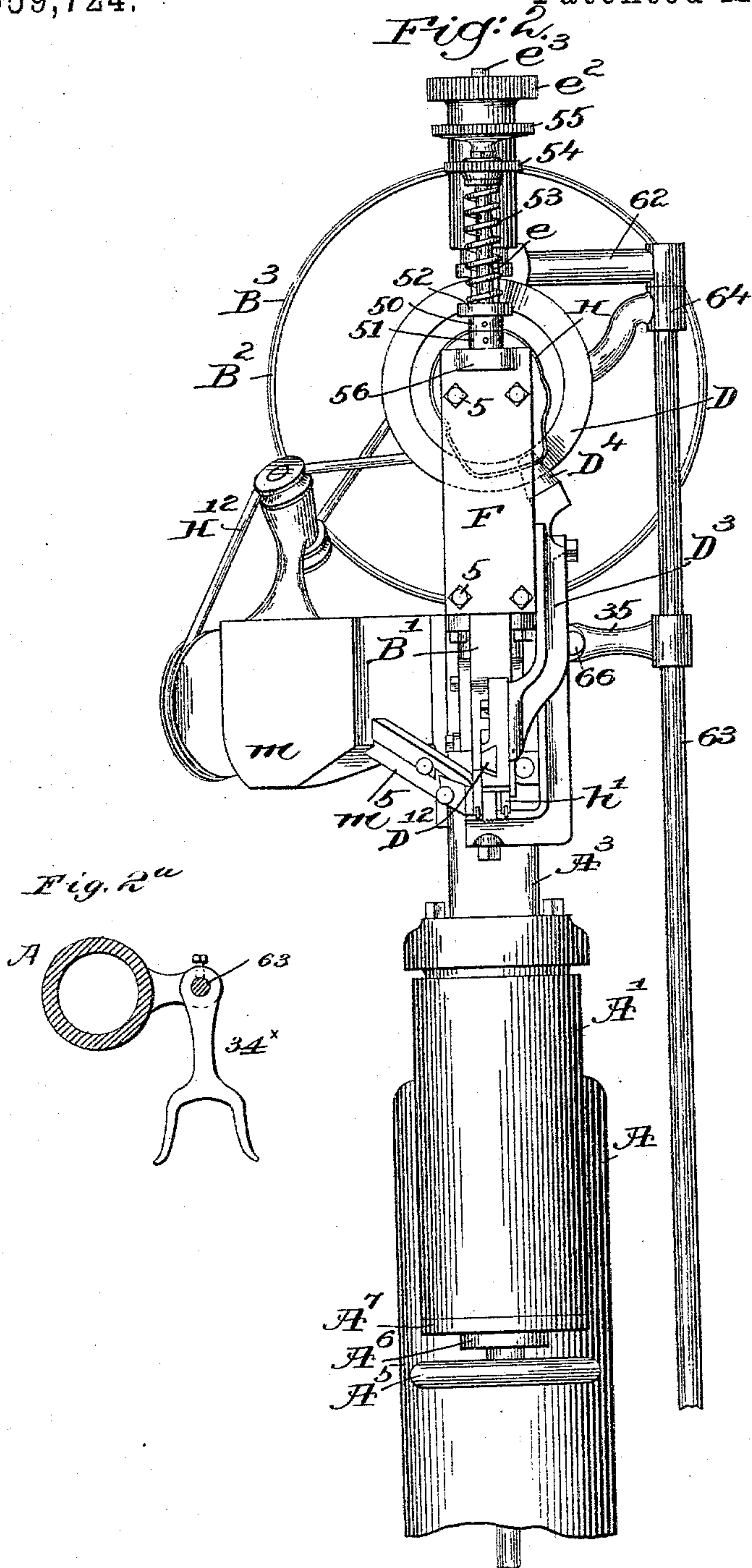
(No Model.)

3 Sheets—Sheet 2.

C. P. LAWRENCE.  
LASTING MACHINE.

No. 559,724.

Patented May 5, 1896.



witnesses.

Fred S. Grunkap.  
A. B. Harmon.

Inventor:  
Charles P. Lawrence,  
by Crosby Gregory,  
attys.



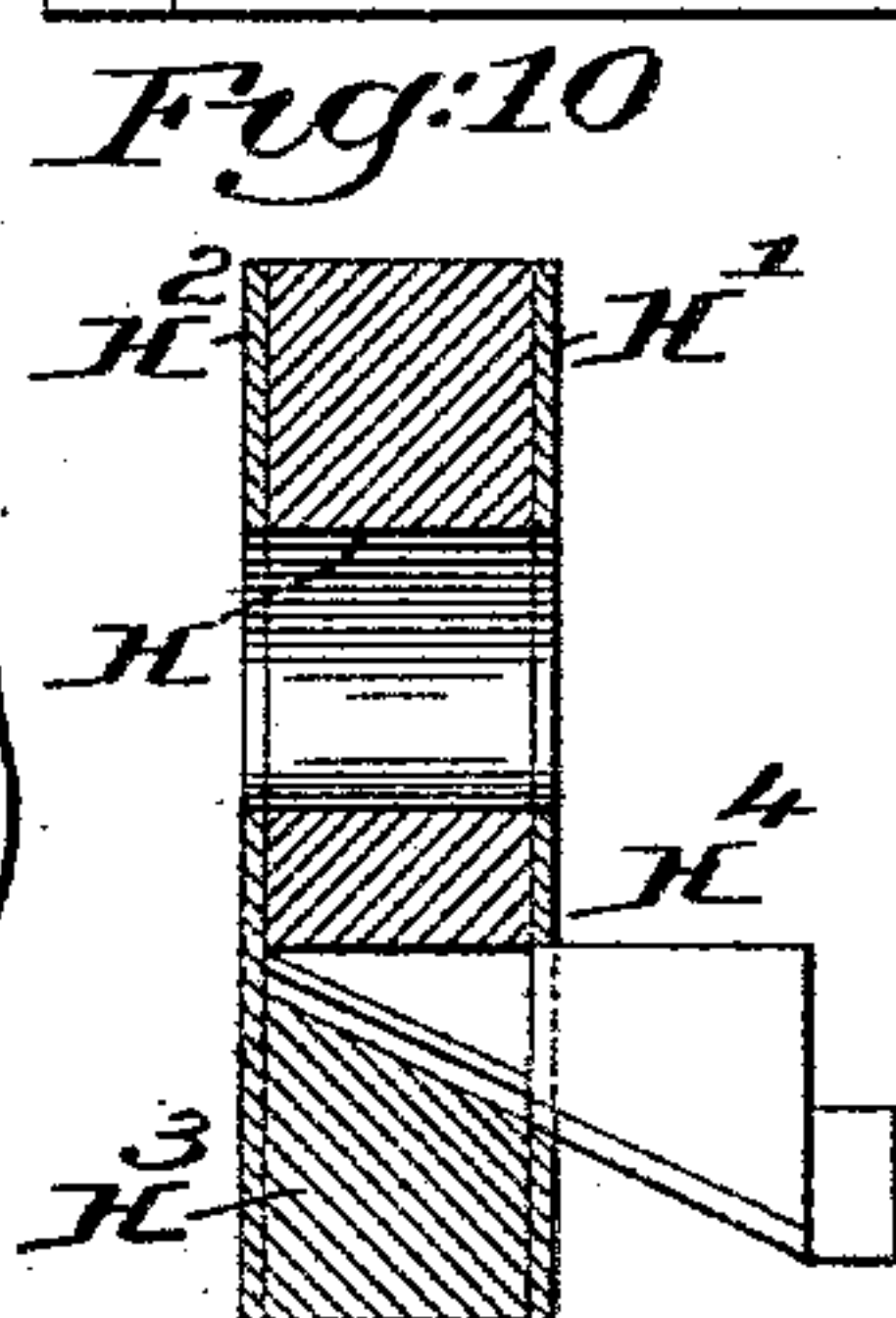
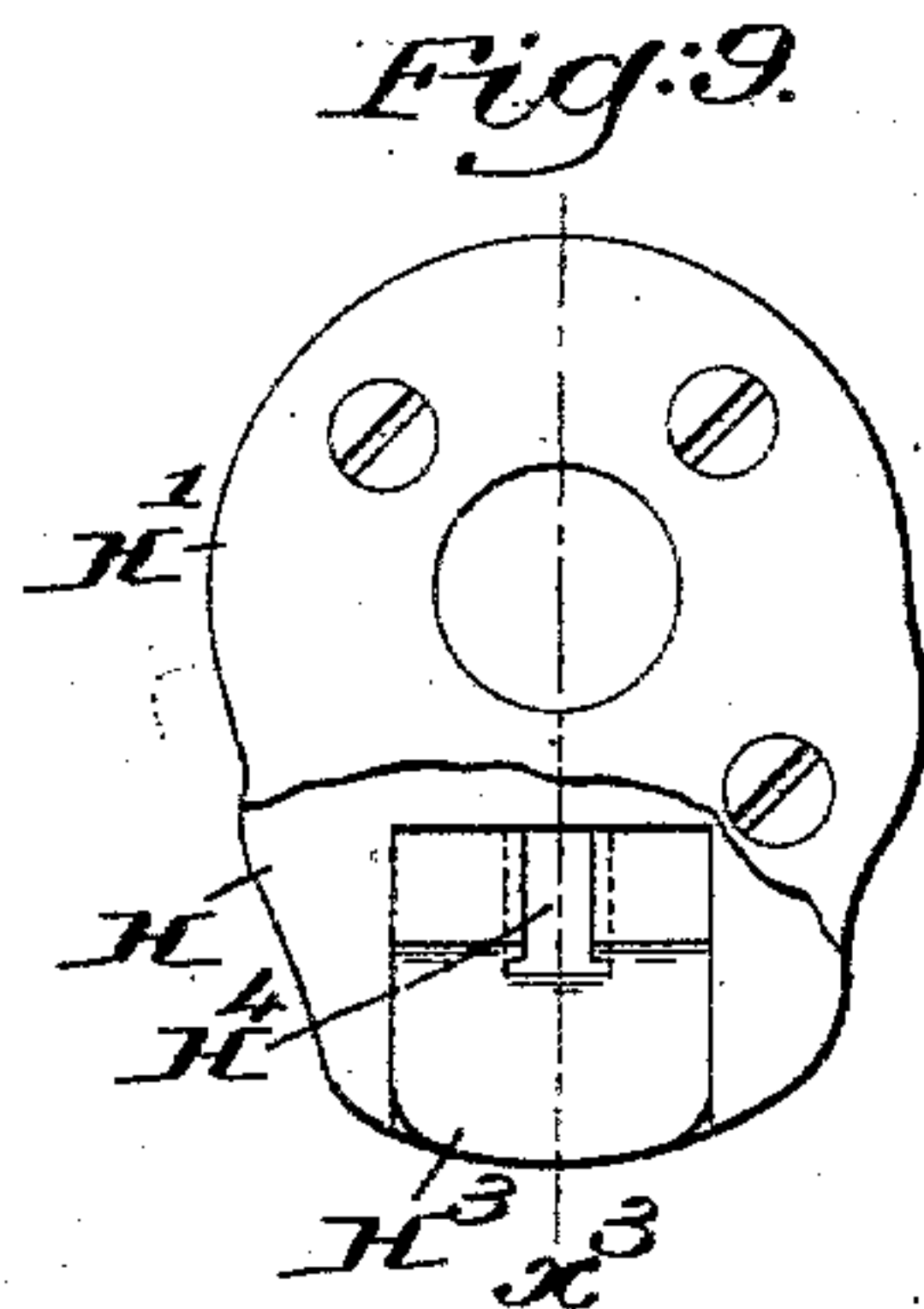
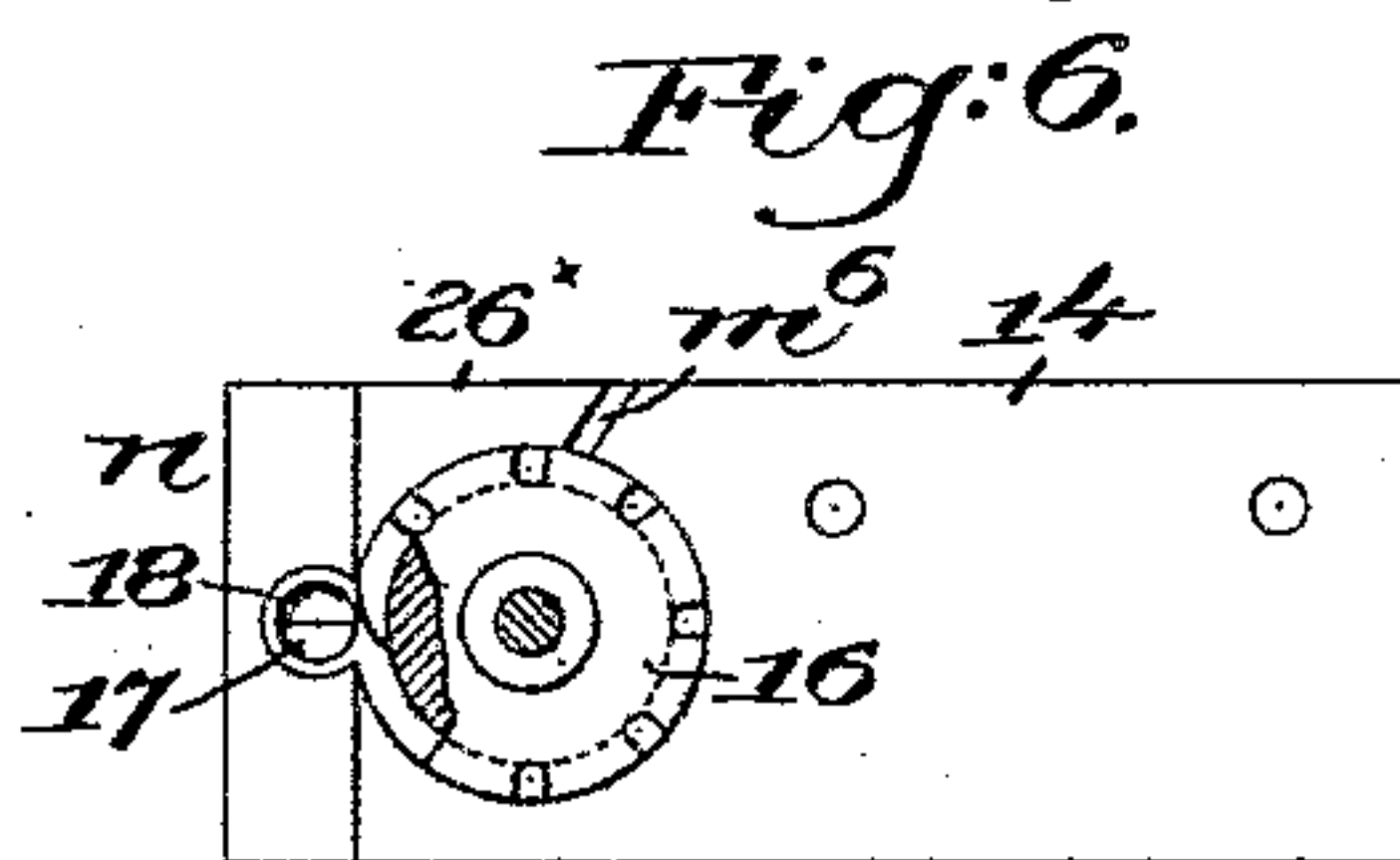
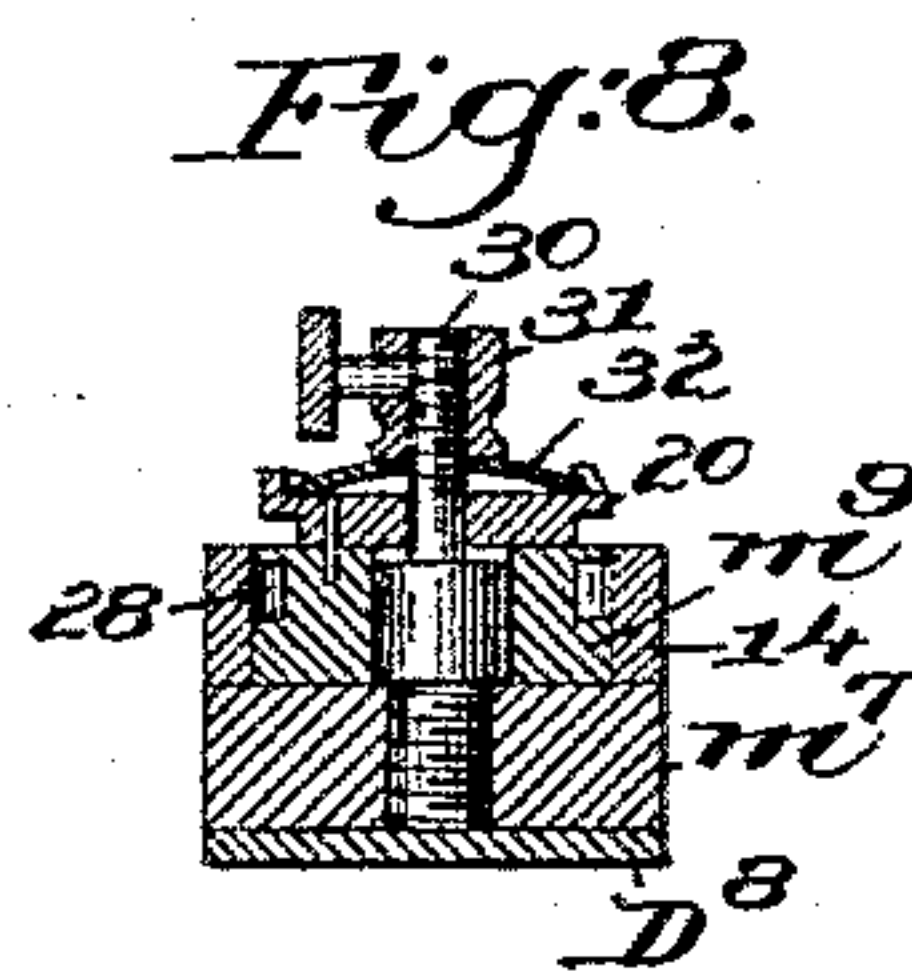
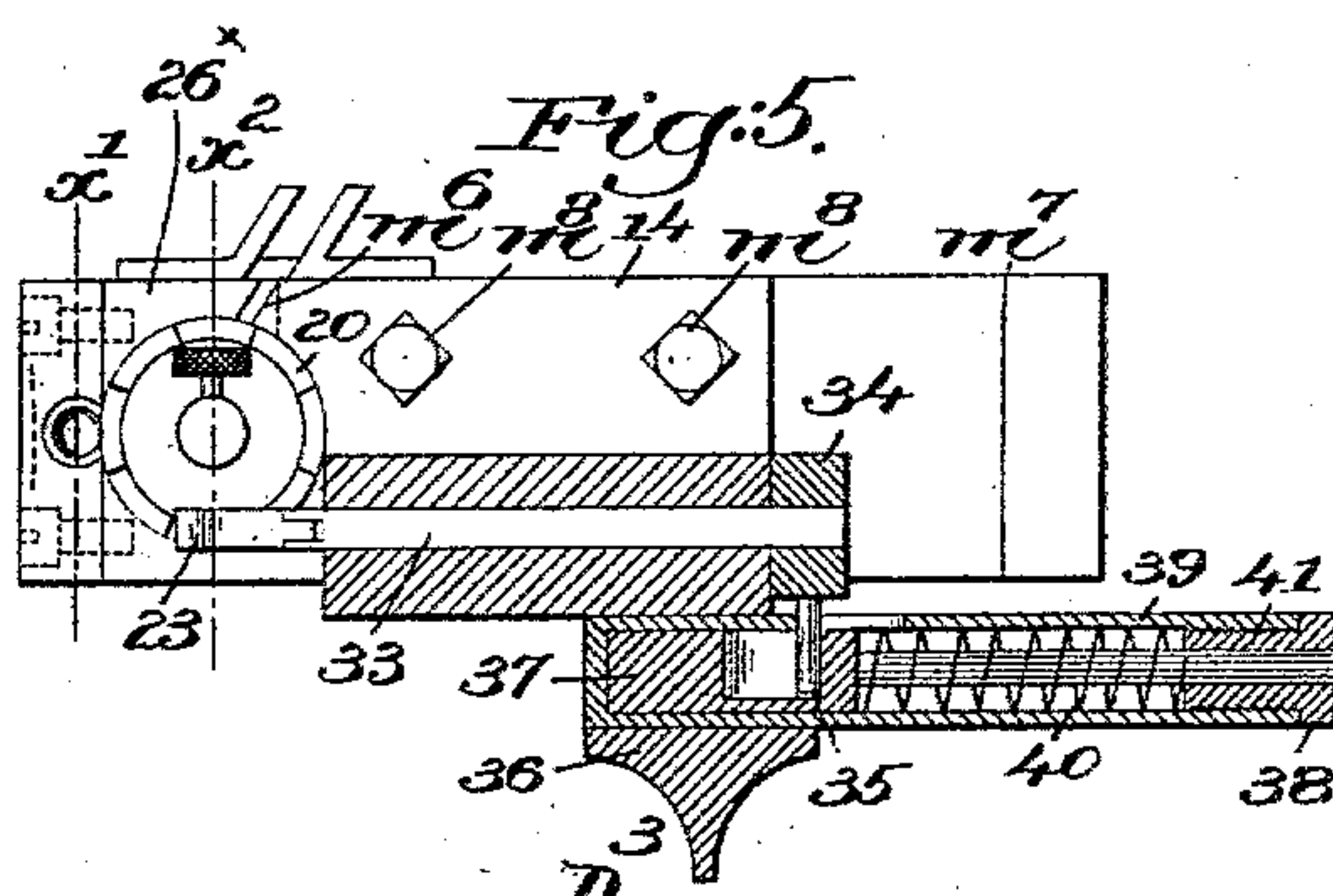
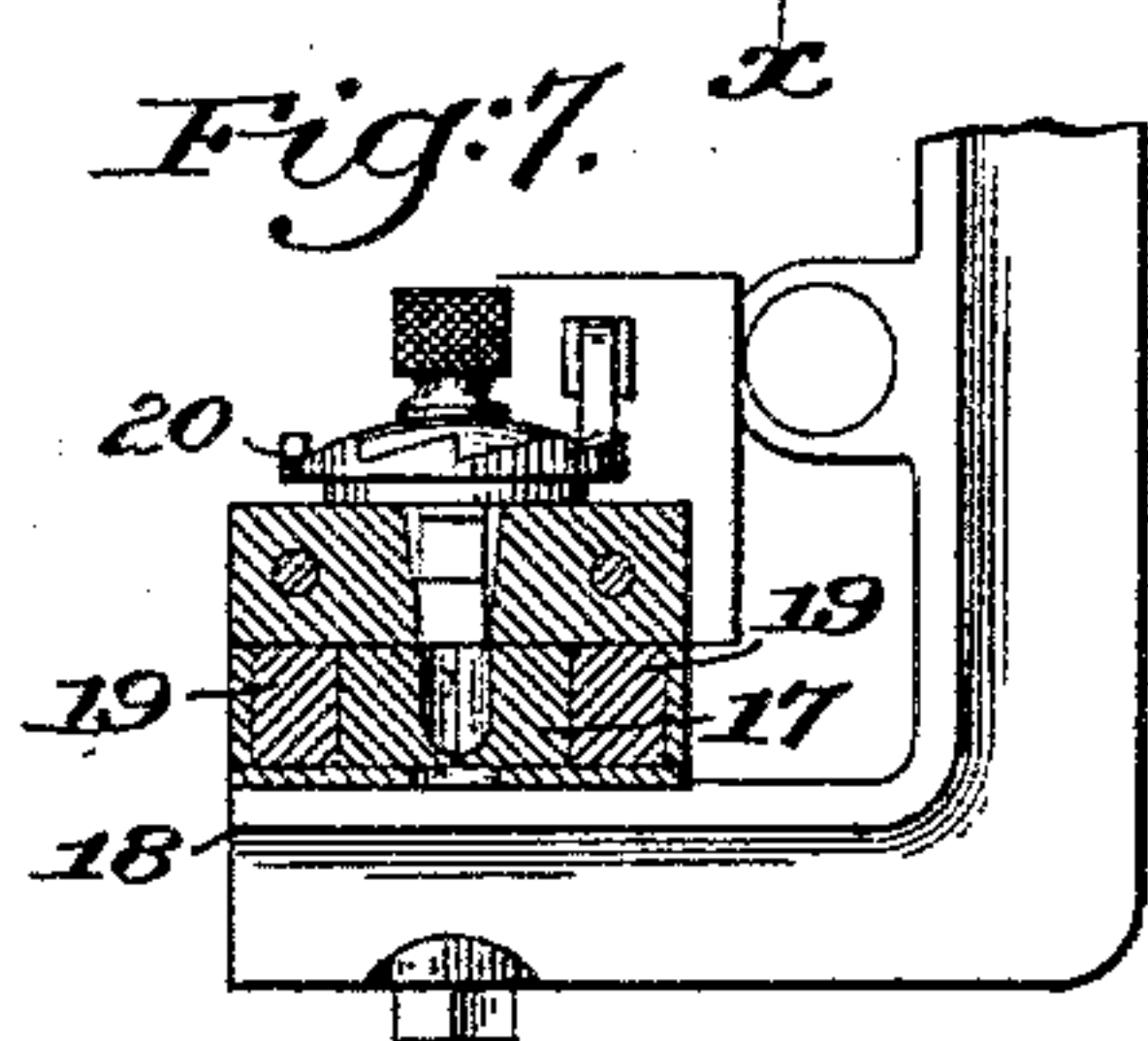
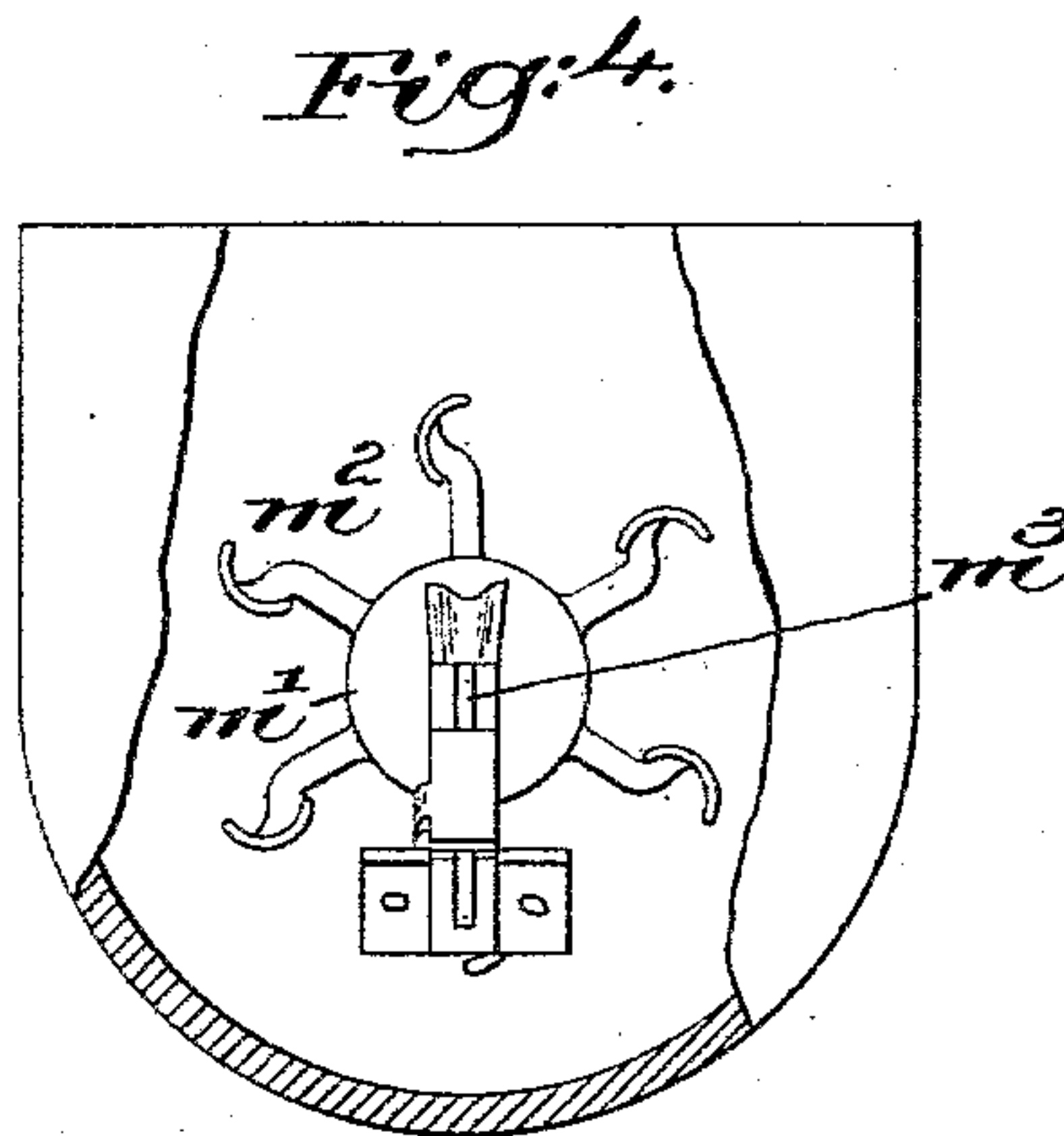
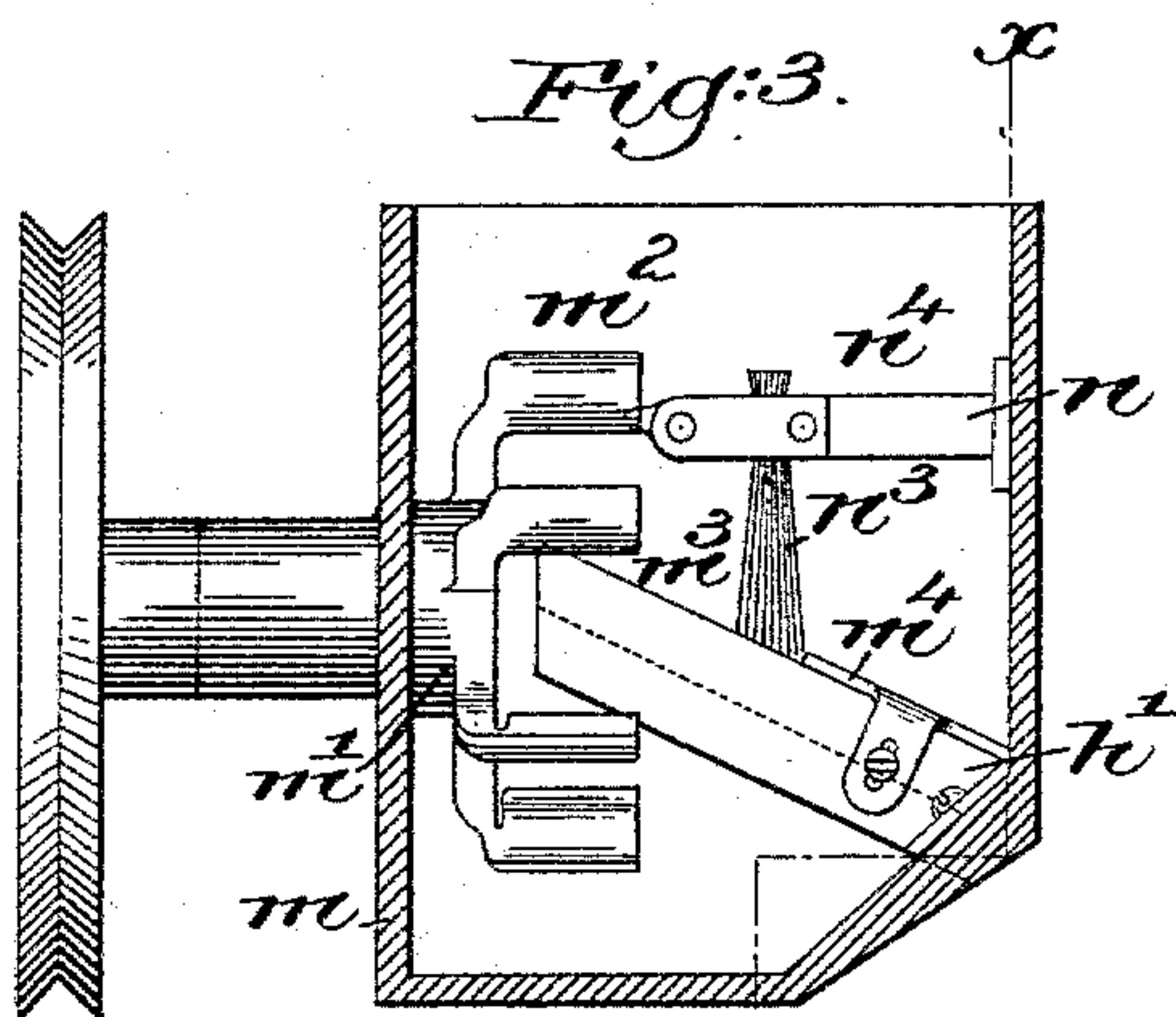
(No Model.)

3 Sheets—Sheet 3.

C. P. LAWRENCE.  
LASTING MACHINE.

No. 559,724.

Patented May 5, 1896.



witnesses.

Fred S. Grubb of  
A.C. Harmon.

Inventor  
Charles P. Lawrence,  
by Crosby, Gregory,  
Attys.



# UNITED STATES PATENT OFFICE.

CHARLES P. LAWRENCE, OF NORWAY, MAINE.

## LASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 559,724, dated May 5, 1896.

Application filed January 22, 1894. Serial No. 497,614. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES P. LAWRENCE, of Norway, county of Oxford, State of Maine, have invented an Improvement in Lasting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve the class of lasting-machine represented in United States Patent No. 476,206, granted to me May 31, 1892, said machine having a pair of pincers which are automatically closed upon the upper, and are then, while closed, lifted to draw and fit the upper about the last, the edge of the upper (the latter having been properly stretched) being carried over on the bottom of the last or on an inner sole thereon and being there secured by a tack or nail driven automatically.

The particular features of improvement on the said machine will be hereinafter described and made the subject of the claims at the end of this specification.

Figure 1 of the drawings is a partial side elevation of a lasting-machine embodying my invention; Fig. 2, a front end elevation of the machine shown in Fig. 1; Fig. 2<sup>a</sup>, a detail of the knee-lever on rock-shaft 63. Fig. 3 is an enlarged detail of the lifting mechanism for putting the tacks in the upper end of the roadway; Fig. 4, a view to the left of the dotted line  $x$ , Fig. 3. Fig. 5 is a detail showing part of the framework with the device for carrying the tacks from the roadway into the driver-passage and some of the operating mechanism for the said carriers. Fig. 6 is a detail showing the plate in which the carrier is mounted, said plate having the driver-passage. Fig. 7 is a section of Fig. 5 in the dotted line  $x'$ . Fig. 8 is a section of Fig. 5 in the dotted line  $x''$ . Fig. 9 is an enlarged view of the cam for actuating the pincers, one of the side walls of the cam being broken away to show the adjustable throw-point of the cam; and Fig. 10, a section of the cam in the dotted line  $x'''$ , Fig. 9.

The framework consists, essentially, of a column A, having a suitable foot to rest upon the floor, said column having a suitable cylindrical bearing A' to receive a shank A<sup>x</sup>, forming part of the head A<sup>3</sup> of the machine,

said head having proper bearings for the working parts to be described.

The head A<sup>3</sup> has to be adjusted at times to suit the height of the particular workman, and to enable this to be done I have provided the shank A<sup>x</sup> with a tapped hole in which I have inserted a threaded screw A<sup>4</sup>, provided with a suitable hand-wheel A<sup>5</sup>, said screw having fixed to it a collar A<sup>6</sup>, which lies at one side of the detachable bottom A<sup>7</sup>, secured to the tubular bearing A' by suitable bolts A<sup>10</sup>, a second collar A<sup>8</sup> (shown by dotted lines and also attached to said screw) acting against the inner side of said bottom, so that said screw may rotate, but it cannot move longitudinally, and consequently by rotating said screw in one or the other direction the operator may raise or lower the head, as may be desired.

The head A<sup>3</sup> has a suitable bearing B for the main shaft A<sup>2</sup> of the machine, said shaft having fast upon it one half B<sup>2</sup> of a friction-pulley, preferably of conical shape at one side, it entering the other half B<sup>3</sup> of the friction-pulley, said half being supposed to be loose on the shaft, the hub B<sup>4</sup> of the loose part being acted upon by the wedge B<sup>5</sup>, connected to the rod B<sup>6</sup>, carried in practice down to the floor, and having a suitable treadle by which to depress the rod and cause the wedge to force the loose pulley against the fast pulley in usual manner.

I have provided a brake B<sup>7</sup>, which is normally kept elevated against the fast pulley B<sup>2</sup> by a spring B<sup>8</sup>, said brake having a tailpiece B<sup>9</sup>, which is adapted to be acted upon by a toe B<sup>10</sup> of a casting attached to the rod B<sup>6</sup>, so that when the rod B<sup>6</sup> is depressed to start the machine the brake will be removed from the fast pulley, and when the rod B<sup>6</sup> is relieved from pressure the spring B<sup>8</sup> immediately acts to cause the brake to operate and at the same time aids in lifting the rod B<sup>6</sup>. The rod B<sup>6</sup> will be made in two parts united by the coupling B<sup>12</sup>, so that the said rod may be adjusted to the height of the machine and the operator.

The shaft A<sup>2</sup> has fast upon it a cam D, which acts upon a suitable roller or other stud D<sup>4</sup>, connected to the yoke D<sup>3</sup>, substantially such a yoke as designated by like letters in my said patent, said yoke having attached to it a suitable strut or downhold, as D<sup>12</sup>, said yoke having also a suitable edge gage, as D<sup>8</sup>, against



which the upper at the edge of the sole on the bottom of the last is pressed while the yoke is being slid to carry the sole under the pincers preparatory to tacking the edge of the upper to the sole, the cam D then moving the said yoke positively in the direction of the arrow just above it, in Fig. 1. A spring D<sup>5</sup> (shown by dotted lines) surrounds a rod D<sup>7</sup>, attached to the yoke, and said rod has screwed upon it a nut D<sup>6</sup>, which bears against the spring, so that the latter acts to keep the roller or other stud D<sup>4</sup> against the said cam. This yoke is fitted to suitable guideways of the framework substantially as provided for in my said patent.

The carriage B', adapted to be slid vertically in guideways, the head a<sup>3</sup>, the lever e<sup>10</sup>, pivoted on the carriage at e<sup>12</sup> and jointed by link e<sup>13</sup>, engaging a pin 3, extended from the shank of the movable nipper b', the fixed nipper b, the nipper-actuating bar e, provided with a pin e<sup>8</sup>, extended through a slot 2 of the carriage B', the rod e<sup>3</sup>, extended through the upper end of the bar e, its roll e<sup>7</sup> and hollow nut e<sup>2</sup>, inclosing and acting on a suitable spiral spring surrounding rod e<sup>3</sup>, screwed upon a threaded portion of bar e, and the driver-bar C<sup>6</sup>, the driver C<sup>7</sup>, the case 10, in which the driver-bar is reciprocated, and the pulley h<sup>6</sup>, fast on the main shaft and serving to rotate by belt H<sup>12</sup> the hopper in which the nails or tacks are placed in bulk, are and may be all substantially as in my said patent. The hopper has connected with it a thin spring n<sup>4</sup>, (see Fig. 3,) carrying a brush n<sup>3</sup>, a projection from the spring being acted upon successively by the lifters m<sup>2</sup>, so that the said brush is made to brush from the raceway any tacks which are wrongly placed thereon.

The face-plate F, secured to the head by suitable bolts 5, has attached to it a threaded rod F', provided with two nuts, as 50 51, one being a set-nut, the nut 50 acting by its position as a stop to arrest the downward movement of the carriage and nippers according to the upper being operated upon and according to the extent of movement to be given to the carriage B' to stretch the upper. The ear 52 at the upper end of the carriage is acted upon by a spring 53, in turn acted upon by a nut 54, the adjustment of the latter serving to compress the spring 53. The stronger the spring the tighter the grasp of the pincers on the upper.

In the machine herein described the nippers are first closed upon the upper, and then lifted more or less while so closed, that depending upon the nature of the leather or material of the shoe.

In the patent referred to the cam coöperating with the roll e<sup>7</sup> was not variable and the upward pull was always the same within the limits fixed by the operator in adjusting the tension of the spring within nut e<sup>2</sup>; but I have devised a peculiar cam to positively vary the pulling movement of the nippers, either increasing or decreasing the same by corre-

spondingly varying the throw of the rod e<sup>3</sup>, so that if the spiral spring surrounding this rod is set at a tension corresponding to or slightly less than the tearing tension of the leather, then the operator, by means of this cam, may, within the limits of this tension, determine just how far the leather is to be pulled, or if the spring be omitted, then the operator determines the pulling movement of the nippers within all ranges of tension on the leather. This cam is best shown in Figs. 9 and 10, where it will be seen that the cam is composed of a body H and two side plates H' H<sup>2</sup>, the body having an adjustable throw-point H<sup>3</sup>, having a dovetailed groove, in which is entered a dovetailed edge of a wedge H<sup>4</sup>, said wedge being connected with a grooved collar H<sup>5</sup>, splined on the main shaft A<sup>2</sup>, so as to rotate therewith, but so that it may be slid longitudinally thereon to cause the wedge to move the throw-point out or in according to the extent it is desired to pull or stretch the upper during the rise of the nipper-carriage lifted by the nipper-closing bar e. This peculiar cam forms the subject of my application, Serial No. 536,574, filed February 7, 1895.

The operator while handling the shoes judges of the strain required by the behavior of the leather and has this under control in the following manner, viz: The collar H<sup>5</sup> receives a fork 60, connected with a rod 61, held in suitable bearings in the head, said rod having a suitable collar or projection 60<sup>x</sup>, which is engaged by arm 62, (shown best in Fig. 2,) attached to the upper end of a rock-shaft 63, supported in suitable bearings 34, (only one being shown,) said shaft in practice having connected to it a suitable knee-lever arm 34<sup>x</sup>, (shown in the detail Fig. 2<sup>a</sup>,) against which the operator may bear his knee while the nippers are rising, the knee of the operator meeting said yoke naturally while his foot is on the treadle for depressing the rod B<sup>6</sup>.

I have provided the shaft 63 with an arm 35, the free end of which may move for a limited distance between suitable adjustable stops 66 66.

In the patent referred to the hopper containing the tacks to be driven is rotated; but herein the hopper m is supposed to be stationary, it containing, however, a rotating lifter composed of a disk m', having a series of cup-shaped arms m<sup>2</sup>, adapted to take up tacks from the bottom of the hopper and discharge them into the open upper part of the raceway, as at m<sup>3</sup>, the said tacks properly lodged on the raceway h' passing under a plate m<sup>4</sup>, and thence down the roadway into the throat m<sup>6</sup> (best shown in Figs. 5 and 6) of the throat-plate 14, which is attached by bolts m<sup>8</sup> to a flange m<sup>7</sup>, forming part of the head of the machine. The throat-plate 14 receives within it a rotating carrier 16.

The throat-plate 14, the rotating notched carrier 16, the ratchet-wheel 20, pin 21, connecting it to the carrier 16, the brake or friction device 32, the nut 31, to adjust it, the



threaded stud screw or center 30 for the said carrier and carrying said nut, the yielding nail-holders 17 18 in the nose *n*, the spring 19, to normally keep them pressed together, but to let them separate as the nail is driven from between them into the edge of the upper, drawn over the last by the pullers or pincers, and the pawl 23 for actuating the ratchet-wheel 20 and the detachable cover-piece 26<sup>x</sup>, having a finger to enter one or another of the carrier-grooves 28 and strip the nails from the carrier into the driver-passage in the nose *n*, are and may be all as in my application, Serial No. 439,992, filed July 14, 1892, where like parts are designated by the same characters, except the nose-piece. Herein the pawl 23, employed to rotate the carrier 16 step by step, is attached to a slide-bar 33, upon the opposite end of which is a collar 34, having a pin 35, which enters a slot 36 in a block 37, connected to a rod 38, placed within a tube 39, secured to the yoke D<sup>3</sup>. The block 37 is acted upon by one end of a spiral spring 40, the other end of the spiral spring being acted upon by a nut 41, screwed into the tube and loose on the rod. The pawl 23 derives its movement through the action of the block 37 on the pin 35, the block acting, however, with a yielding pressure through the spring 40, the latter pushing the block forward; but if for any reason the rotation of the carrier should be arrested by a tack or otherwise the tube may continue to move and the spring will be compressed, thus avoiding breaking of the parts.

In practice in some classes of work difficulty has been experienced in the use of the machine described in said patent owing to the raising of the inner sole at its edges in contact with the upper at the point at which the upper is being stretched. So to prevent this I have provided the machine with an auxiliary downhold, which occupies a position close to the edge of the inner sole during the vertical stretching movement of the nippers, it retiring, however, from the edge of the inner sole preparatory to the movement of the nippers in a direction to lay the edge of the upper over upon the inner sole.

The auxiliary downhold is herein shown as a leg *h'*, pivoted at its upper end on the head of the machine, said downhold at its lower end being bifurcated (see Fig. 2) and provided with, preferably, two small antifriction-rolls, the downhold being carried forward with the movable pincer *b'* by or through a link *h*<sup>2</sup>, connected with the stud 3 and with the downhold. The downhold obviates any tendency of the edge of the sole to rise as the upper is being drawn across it in the outward movement of yoke D<sup>3</sup>, the employment of the rolls in the downhold being of very considerable advantage because they enable the upper to be drawn readily between the downhold and the edge of the inner sole on the last.

A downhold moved substantially up to and

then back away from the edge of the inner sole at the point where the nippers are operating will effectually keep the edge of the inner sole firmly down on the bottom of the last.

Believing myself to be the first inventor of such a downhold, this invention is not limited to the particular means shown for imparting movement to the said downhold, as it might derive its movement from other devices without departing from my present invention.

In the present invention the driver-bar has a stud *p*, (see dotted lines, Fig. 1,) which enters a slot in a lever *p'*, pivoted at *p*<sup>2</sup> on the head, said lever being connected by a slot-and-pin connection with a rod *p*<sup>3</sup>, supported by a strong spring 70 in a sleeve 71, the said rod being depressed during each rotation of the shaft A<sup>2</sup> by a cam *p*<sup>4</sup>, said cam having an abrupt heel, as common with driver-bar-actuating cams, so that as soon as the heel passes the pin the spring may act quickly and powerfully to depress the driver-bar.

In my application, Serial No. 493,992, I have shown an auxiliary downhold; but such device is not therein claimed, because it has been made the subject of broad claims in this present case.

This invention is not limited to the exact shape shown for the adjusting device between the column and head, and instead of the same I may use any other usual or suitable mechanical device.

In the patent referred to I employed a separate lever and cam to lift the carriage carrying the pincer members, but herein the said carriage is lifted by the pin *e*<sup>8</sup> in the slot 2.

The term "variable cam" as herein employed comprehends a cam capable of giving a variable throw by and at the will of the operator.

Having described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a lasting-machine, the combination with nippers, and means for closing the same upon the edge of the upper upon the last and for moving the nippers to stretch the upper, of an auxiliary downhold pivoted at its upper end on the head of the machine and having a movement toward and from the upper and the edge of the inner sole at the point where the nippers engage the upper, to thereby prevent uplifting of the edge of the inner sole, substantially as described.

2. The shaft A<sup>2</sup>, a cam thereon having a throw-piece and means to adjust said throw-piece, combined with actuating mechanism to operate said cam, nippers or pincers to grasp the upper, a carriage supporting said nippers or pincers, the nipper-closing rod, and devices between it and the movable jaw of the nippers or pincers, substantially as described.

3. The head; the carriage B' therein carrying the nippers or pincers *b*, *b'*, and provided



with an ear 52, combined with a stop interposed between said ear and the head of the machine, and a spring acting on the upper side of said ear, substantially as described.

4. In a machine of the class described, the combination with pulling-nippers, a power-shaft, and intermediate devices between said shaft and nippers for imparting to the latter by the former a definite and positive pulling movement, of manually-controlled devices for varying the said positive pulling movement during the running of the machine, substantially as described.

5. In a machine of the class described, the combination with pulling-nippers, and a power-shaft, of a variable cam on said shaft, for imparting to said nippers a normal definite and positive pulling movement, and manually-controlled devices for varying the said cam whenever desired to impart an abnormal positive and definite pulling movement to the said nippers, substantially as described.

6. In a machine of the class described, the combination with pulling-nippers, of a variable cam to operate the same, and means under the control of the operator to vary the said cam at any time to thereby positively and definitely vary the pulling movement of the nippers, substantially as described.

7. In a lasting-machine having pulling-nippers reciprocable together and also movable relatively to each other, mechanism to cause said reciprocal and relative movement, and means acting on said mechanism to at the

will of the operator vary said reciprocal movement during the running of the machine, substantially as described.

8. In a lasting-machine having pulling-nippers reciprocable together and also movable relatively to each other, mechanism to cause said relative movement, said mechanism also reciprocating said nippers, and means, comprising a variable cam, acting on said mechanism to vary said reciprocal movement, substantially as described.

9. In a lasting-machine, a pair of nippers, one of which is movable relatively to the other, the actuating-bar to move said movable nipper into and out of nipping relation with the said other nipper, and means under the control of the operator to positively vary the movement of said actuating-bar, substantially as described.

10. In a machine of the class described, the combination with pulling-nippers, a power-shaft, and intermediate devices between said shaft and nippers for imparting to the latter by the former a definite and positive pulling movement, of means, under the control of the operator, for definitely varying the length of said positive pulling movement from the same initial point, substantially as described.

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

CHARLES P. LAWRENCE.

Witnesses:

HENRY S. HAMILTON,

ALFRED S. KIMBALL.