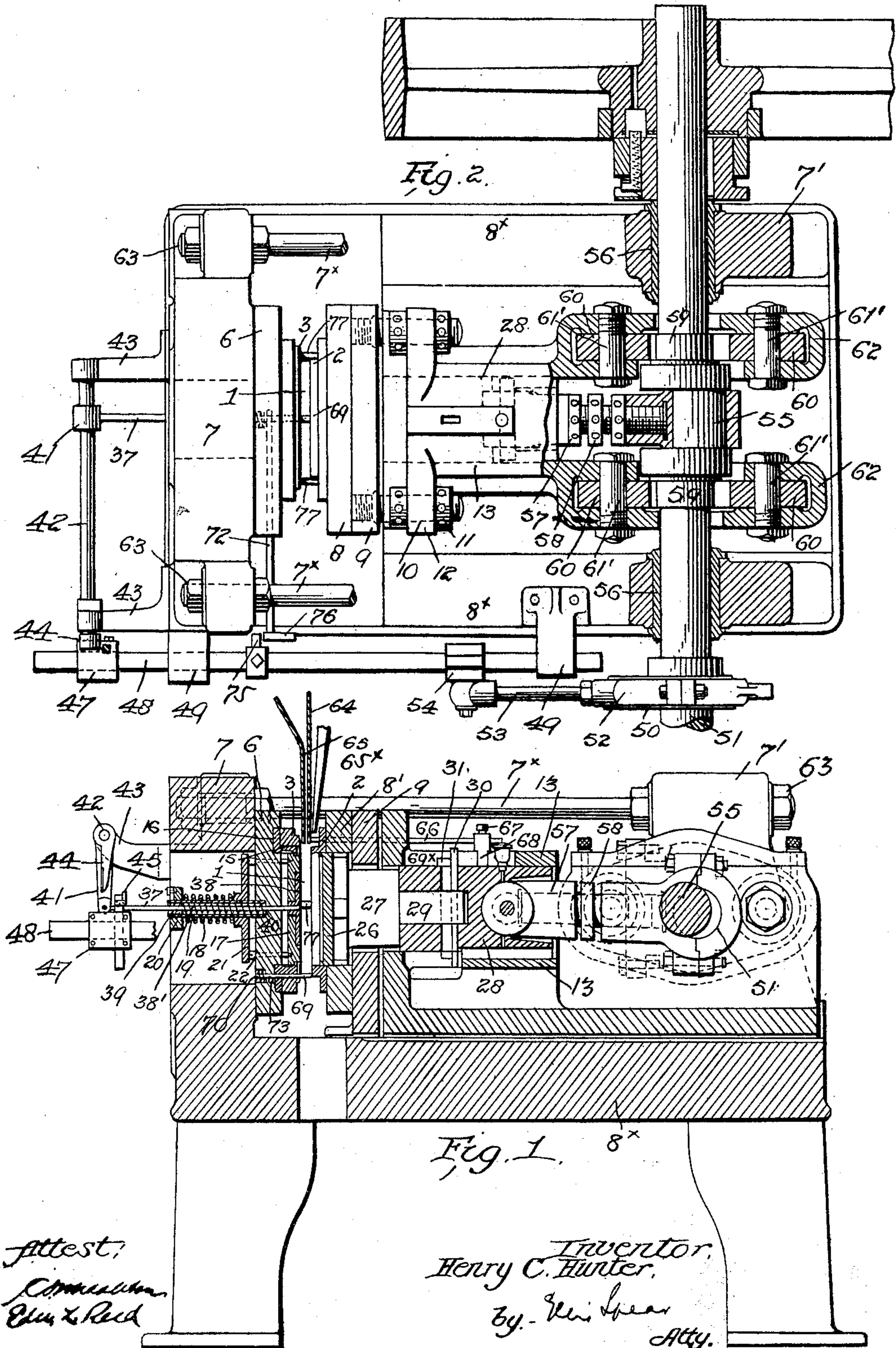


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A. HUNTER, ADMINISTRATRIX.
METAL DRAWING PRESS.
APPLICATION FILED SEPT. 10, 1902. RENEWED DEC. 15, 1908.

929,594.

Patented July 27, 1909.

8 SHEETS—SHEET 1.



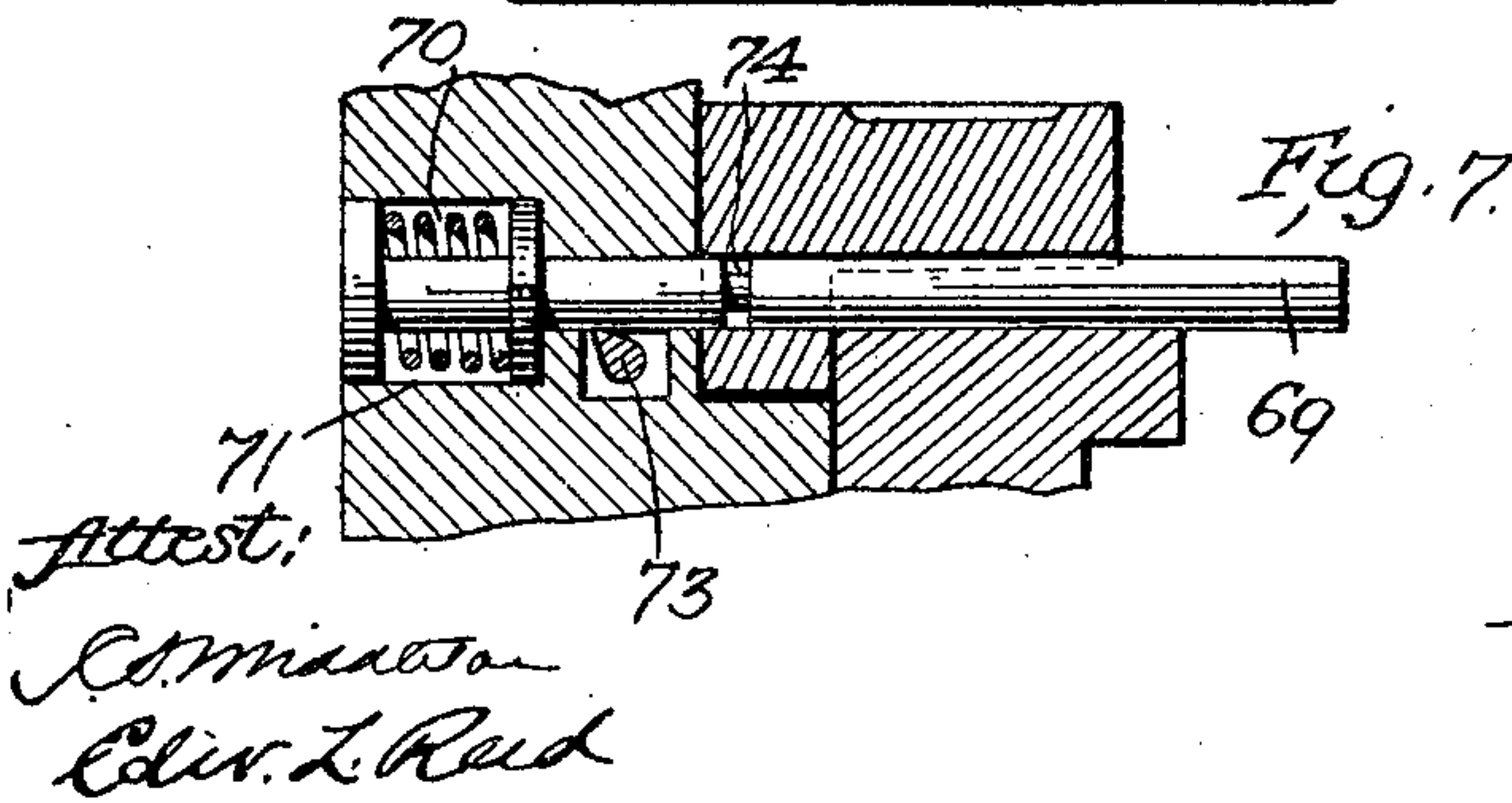
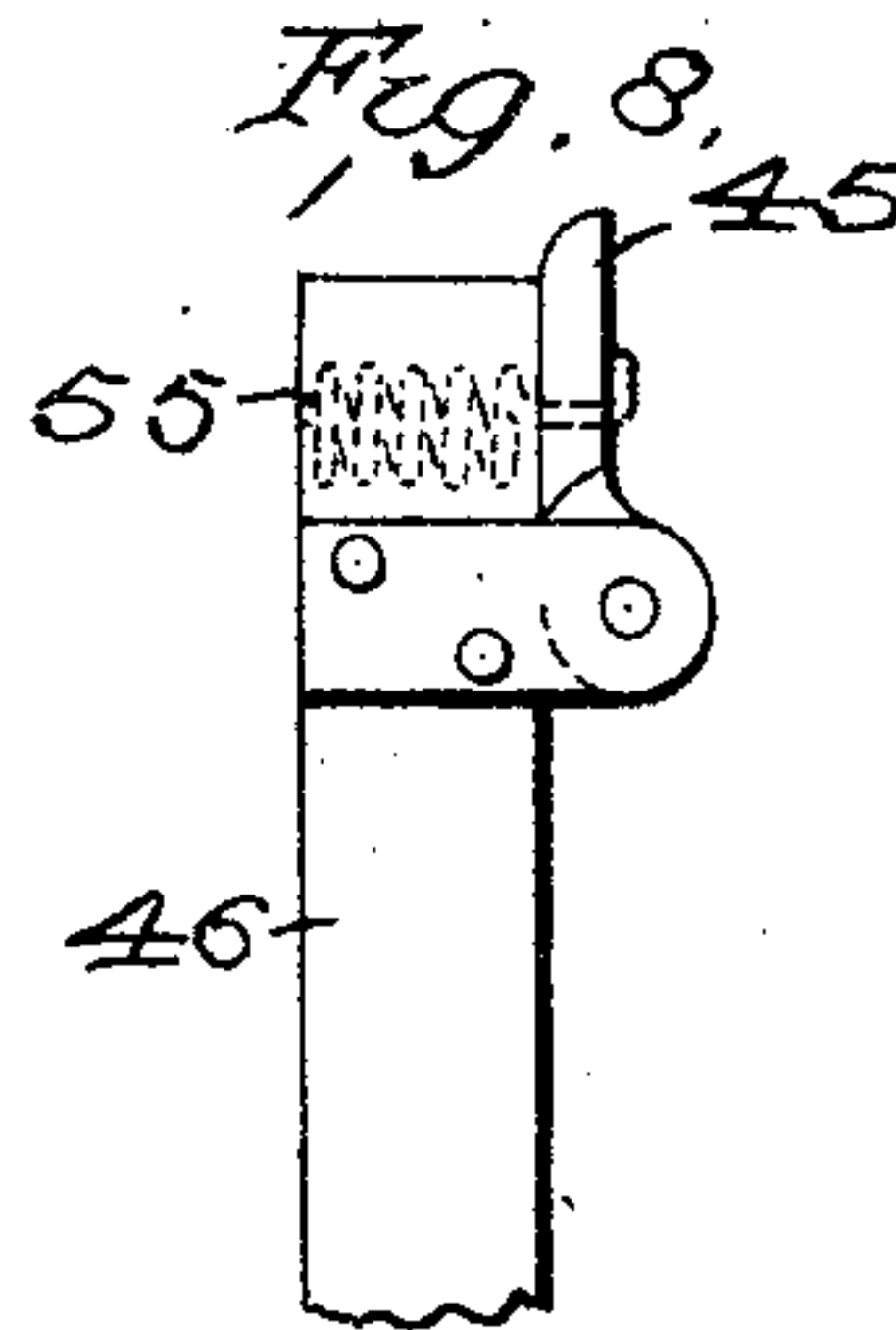
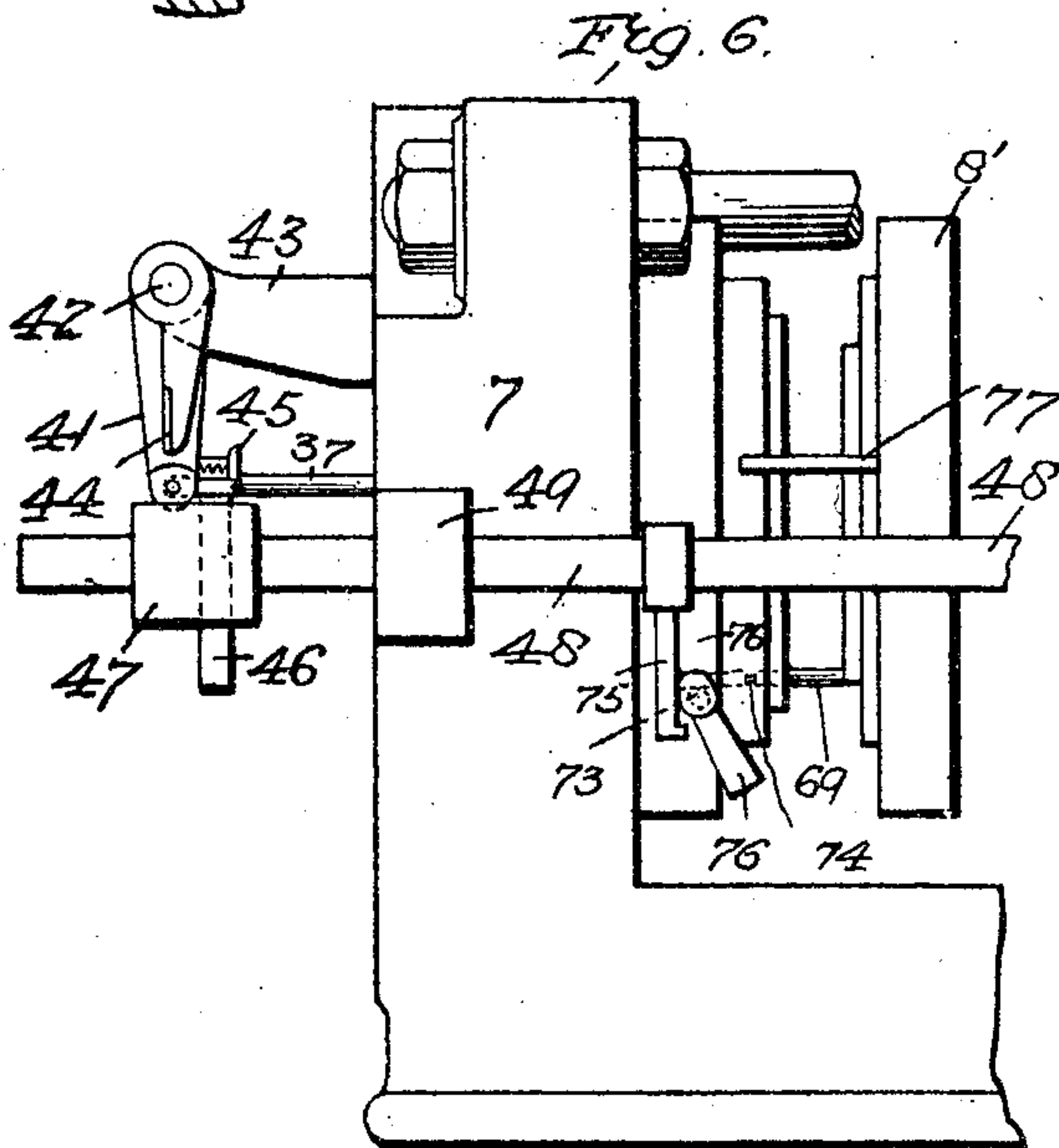
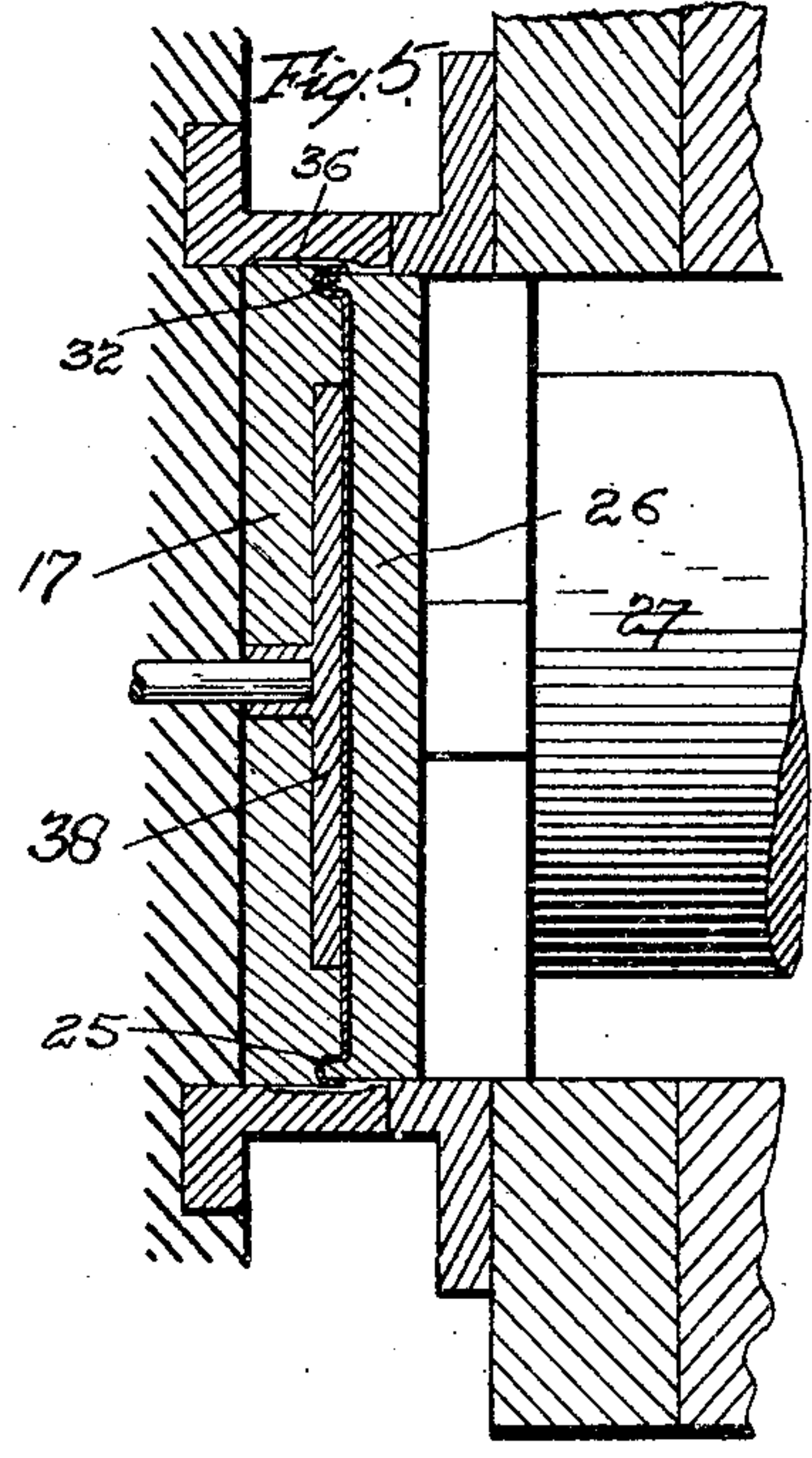
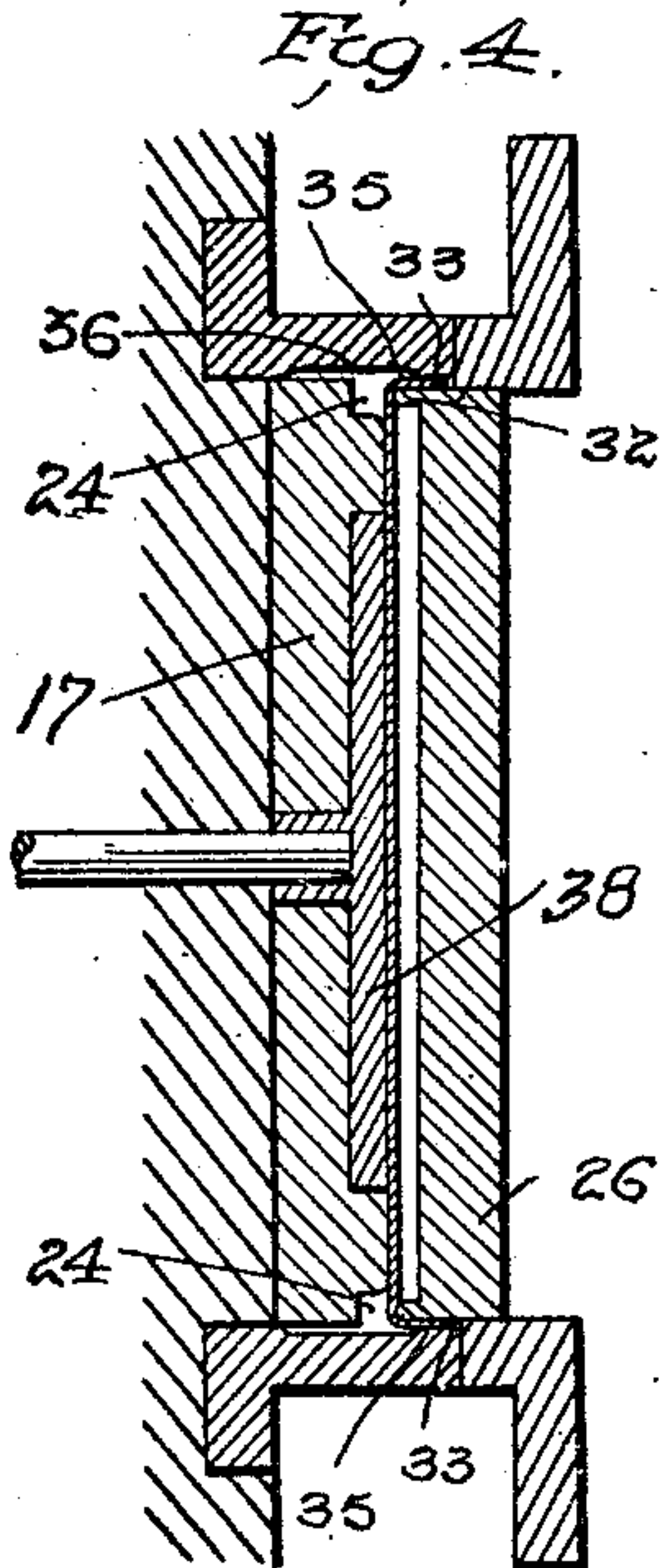
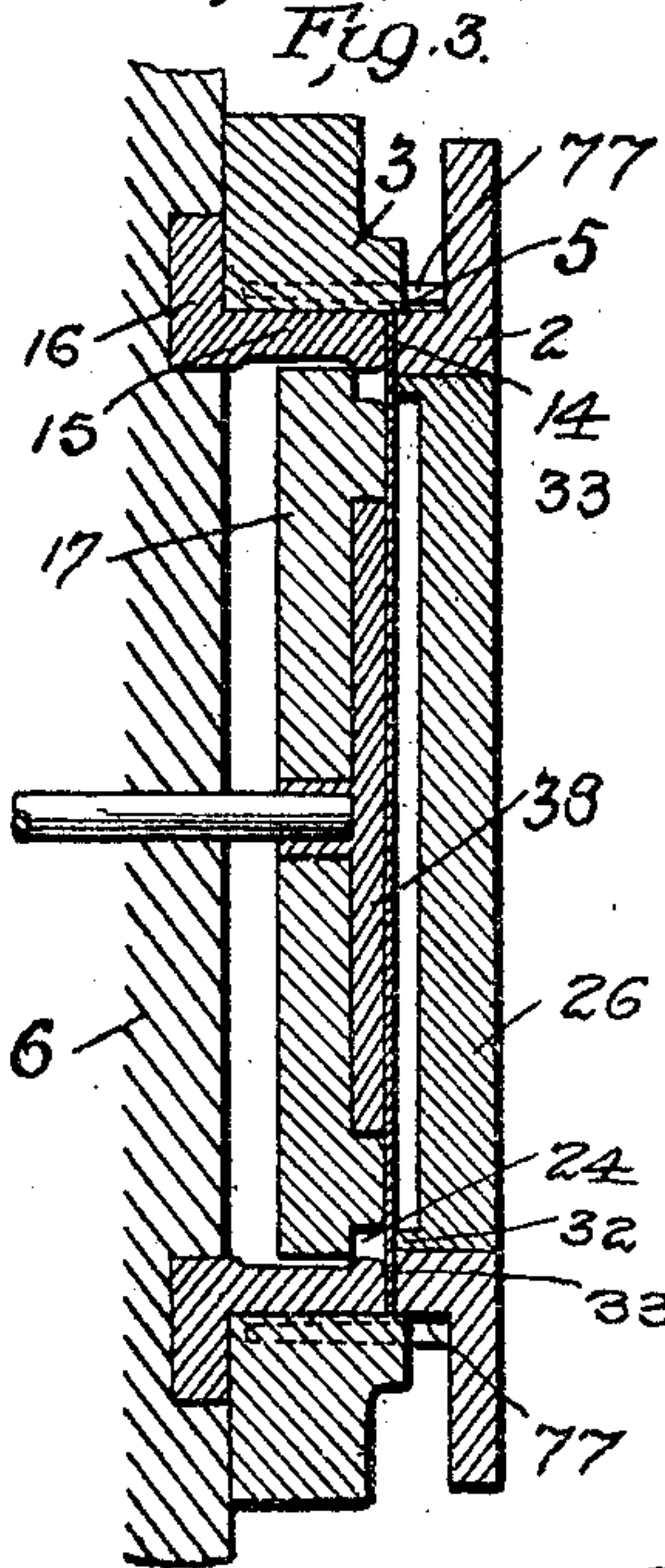
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2 SHEETS—SHEET 2.



Inventor,
Henry C. Hunter.
By: [Signature]
Atty.

UNITED STATES PATENT OFFICE.

HENRY C. HUNTER, OF JERSEY CITY, NEW JERSEY; AGNES HUNTER ADMINISTRATRIX OF SAID HENRY C. HUNTER, DECEASED.

METAL-DRAWING PRESS.

No. 929,594.

Specification of Letters Patent.

Patented July 27, 1909.

Application filed September 10, 1902, Serial No. 122,884. Renewed December 15, 1908. Serial No. 467,688.

To all whom it may concern:

Be it known that I, HENRY C. HUNTER, a citizen of the United States, residing at Jersey City, Hudson county, New Jersey, have invented certain new and useful Improvements in Metal-Drawing Presses, of which the following is a specification.

The invention is particularly designed to form sheet metal heads for packing vessels.

The object of the invention is to provide a machine for embracing cutting and forming members for sheet metal so arranged that all the working parts are convenient of access and the heavy slide or reciprocating head necessary in such machines is not suspended to reciprocate vertically but all the parts are so placed that they will move without jar and noiselessly and be compact and in such a position that delivery will be facilitated, and further to so arrange the forming members that after the operation of cutting or clipping and holding the blank is performed, two distinct operations of forming or drawing will follow consecutively but will not interfere the one with the other. It is obvious this arrangement may be supplied with either individual blanks of proper size, the corners of which are to be clipped in the machine, or with blanks of exact size not requiring any cutting. It will be understood, however, that I do not limit myself to the use of the machine with blanks that have been cut either to an approximate or exact size previous to feeding the machine as the said machine may be fed in other ways with the material, as for instance by feeding in strips of metal of some length from which to cut several blanks of exact size.

In the accompanying drawings: Figure 1 is a vertical sectional view of the machine from front to rear with some of the parts in elevation taken substantially on the central line of the machine. Fig. 2 is a plan view partly in section. Figs. 3, 4 and 5 are detail views showing different steps in the drawing operation. Fig. 6 is a detail side elevation of means for controlling the operation of the kicker or discharge device. Fig. 7 is a detail sectional view relating to the registering pin. Fig. 8 is a detail view of a trigger used to control the operation of the kicker or discharge device.

The blanks previously cut to the approximate size or exact size or the strips of material from which the blanks are to be cut are

fed in between the members of the cutting and forming means, or in other words, into the space 1 and between cutting members 2, 3. The cutting member 2 is arranged so that its cutting edge will operate within the cutting edge 5 of the member 3 to cut the blank or clip the same to the exact size desired. The cutting member 3 is rigidly supported upon a backing or base plate 6 secured to a standard 7 which forms a part of the frame of the machine. The cutting member 2 is carried by a base plate 8' secured to the face plate 9 adjustably held by screws 10 and nuts 11 to ears 12 on a slide or frame 13 which is supported to reciprocate horizontally upon the stationary frame 8^x of the machine.

Each time the slide moves forwardly the cutting member 2 moving within the cutting member 3 will cut or clip the blank or strip of metal lying vertically in the space 1 between these parts and the blank will now be held between the flat face 14 of the cutting member 2 and a similar face on a draw rim or ring 15 which is arranged within the cutting member 3 and is supported by its flange 16 connected with the base plate 6.

The next operation is that of drawing the sheet metal blank to the shape desired. Within the draw rim or ring 15 I arrange a movable pad 17 forming part of a female die which pad is pressed normally forward to the position shown in Fig. 1 by a spring 18 supported upon a sleeve 19 and bearing at one end upon a collar 20 secured to said sleeve and at its other end upon a plate 21 arranged to have sliding movement on the said sleeve and connected by rods 22 with the pad 17, said rods passing through openings formed in the base plate 6. The pad has a groove 24 around its edge for the formation of the flanged rim 25 on the blank when the punch 26 coöperates therewith. The said punch 26 is carried by a head 27 in a plunger 28 arranged to reciprocate within and be guided by the slide 13 before mentioned. The head 27 has a stem 29 entering the plunger 28 and it is secured therein by a pin 30 and key 31. The punch 26 is normally retracted within the cutting member 2 and its base plate 8'. It is provided with a rim or flange 32 around its edge to coöperate with the groove in the female die of which the groove in the pad forms a part.

After the blank has been cut or clipped

and is held lightly between the flat faces of the cutting member 2 and the draw rim or ring 15, the punch 26 advances and engages the blank with its projecting flange or rim 32 and draws the said blank around the edge 33 of the draw rim or ring and within the same. The parts were in the position shown in Fig. 3 just before the drawing operation began and at the moment the punch engaged the blank. The first step in the drawing operation is illustrated in Fig. 4 and is that just described resulting from the movement of the punch within the draw ring. At this time the movable pad has receded under the pressure of the sheet metal blank as it is forced into the draw rim or ring and the said pad is now bottomed and firmly supported by the face of the base plate 6. The blank has now assumed a dished shape, shown in Fig. 4 and the first drawing operation is at this time entirely completed and the second drawing operation is about to begin. This latter operation does not begin until after the first operation has been completed and it results from the continued forward movement of the male die which causes the rim or flange 32 to enter the groove 24 of the female die and draw the flange 35 of the blank from the condition shown in Fig. 4 to that shown in Fig. 5. This drawing action of the flange 35 takes place around or over the rim or flange 32 of the punch.

In order to insure a perfect action and that the drawing effect will take place easily on the flange 32 I slightly cut away the inner surface of the draw ring at 36 opposite the point where the flange 35 of the blank lies or moves during the last drawing operation so that while the said flange is properly held or guided there will be practically no frictional resistance and the said flange will be free to draw around the projecting edge of the punch. The cut away part is shown exaggerated in Figs. 3, 4 and 5.

After the drawing operation has been completed the plunger and slide recede withdrawing the cutter 2 and the punch 26, the female pad 17 resumes its normal position shown in Fig. 1 and the completed article, in this case a can head, is discharged by means of a discharge plunger or kicker 37 having a disk 38 thereon fitting normally in a recess in the female pad. The said plunger is pressed by a spring 38' bearing at one end upon a collar 39 fixed to the plunger and at its other end upon the shoulder 40 on the base plate 6, the said spring being inclosed within the sleeve 19 and the said rod passing through the said sleeve. The rod is operated positively by an arm 41 connected therewith and carried by a rock shaft 42 supported in brackets 43 secured to the standard 7 of the press, the said rock shaft having an arm 44 which is operated by a trigger 45 pivoted to a rod 46 carried by a block 47 held on a

rod 48 slidably supported in bearings 49 and reciprocated from an eccentric 50 on the main cam shaft 51 of the machine through an eccentric strap 52 and rod 53 which is pivotally connected with a block 54 fixed to the said slide rod 48. The trigger is held in normal position by a spring 55 so that as the slide rod moves toward the left in Fig. 6 the trigger will yield as it strikes the arm 44 and the rock shaft and kicker will therefore remain at rest but when the slide rod moves in the opposite direction the trigger will cause the kicker to be operated to push the completed can head from the female pad and the draw ring into the open space 1.

The plunger 28 which carries the punch is reciprocated by a crank 55 forming part of the shaft 51 which is journaled in bearings 56 on the main frame. This crank 55 is connected with the plunger by a pitman 57 which is adjusted as at 58 to accurately adjust the position of the stroke of the punch. The slide 13 carrying the cutting member is operated from cams 59 on the shaft 51, which cams engage rollers 60, one on each side of each cam, the said rollers being journaled on pins 61' in the rearwardly extending arms 62 on the slide 13.

The bearings 56 for the cam shafts 51 are arranged in standards 7' forming part of the main frame and these standards 7 and 7' are connected by tie rods 7^x extending from end to end of the machine and held in place by nuts 63. As will be seen from Fig. 1 the reciprocating parts of the machine including the cutting and punch members and the slide and plunger therefor reciprocate horizontally instead of vertically.

In machines of this character the parts carrying the cutting and punch members are usually massive and when arranged to reciprocate vertically or at an inclination considerable jar and noise result from the action of the parts but with the horizontal arrangement herein disclosed the machine operates without jar and it is practically noiseless. This jar is a greater disadvantage than the noise it creates because it results from the taking up of all lost motion in the suspended parts before sufficient power can be delivered to cut the blank, thus practically retarding the progress and causing an uneven and an unmechanical action. When the horizontal arrangement is used the lost motion is taken up first. Further by this arrangement the feeding in and delivery of the blanks is facilitated as both the feeding and discharge actions may take place in vertical planes immediately from between the cutting and punch members and may be assisted by an air blast.

Referring now to the means for feeding and properly registering or positioning the blanks it will be seen that I employ a hopper 64 arranged so that its discharge spout 65

will deliver the blanks vertically or on edge into the space 1.

The exact point in the operation of the machine at which the blank is allowed to pass from the hopper into the space 1 is determined by a rod 66 having its end arranged to extend across the discharge spout of the hopper, the said rod being supported adjustably by a screw 67 in a post 68 extending down through a slot or opening 69^x in the slide 13 and secured to the plunger 28 of the punch as illustrated in Fig. 1. As the plunger retracts the rod 66 is withdrawn from across the discharge chute of the hopper and the sheet metal blank is allowed to fall into the space 1. It is arrested in this falling movement by a pin or pins 69 which registers the position of the blank vertically in respect to the cutting and punch members, the said pin or pins normally extending across the space 1. It is pressed normally outwardly by a spring 70, Fig. 7, arranged in a recess 71 of the base plate 6 and at its outer end it bears upon the cutter 2. It holds the blank in proper position between the cutting and punch members and when these come together it is pressed back by the cutter rim 2 so that it will not obstruct the vertical opening 1 when the punch and cutter recede for the discharge of the can head. This registering pin is held in its retracted position by a latch which may consist of a rod 72 journaled in the base plate 6 and having a latch point 73 to engage a groove 74 in the registering pin when this is retracted. This holds the registering pin back so that the can head can be discharged and after this takes place the latch is released from the registering pin by an arm 75 on the slide rod 48 which is adapted to engage an arm 76 connected with the latch rod 72.

The latch rod is weighted by the arm 76 so that its point tends to stand upright and this latch point will automatically engage the groove 74 of the registering rod when the same is thrust back. The arm 75 is adjustably held on the rod 48 and is set so that the release of the registering pin takes place about the time the feed controlling rod 66 retracts far enough to allow the blank to be discharged from the hopper spout or chute 65. The proper action of these parts in relation to each other may be accurately determined by adjustment, it being only necessary that the blank falling through the space 1 be caught and held by the registering pin 69. In addition to this pin the blank is registered in proper position by two or more pins 77 projecting from the base plate 8' across the space 1. These pins serve to engage the lateral edges of the blank and hold the same properly registered. The blank may fall into position slightly out of register but by reason of the tapered form of side pin it will be properly centered between the punch and die.

When square individual blanks are used the hopper is extended low enough to slightly engage the upper corners of the blank thus making it an element of the registering device when rectangular individual blanks are used. When, however, blanks of finished or exact size are used with rounded corners the hopper is eliminated as a part of the registering device and additional side pins are added to prevent the blank falling diagonally.

Air may be blown in through pipe 65^x to facilitate the inward feeding of the blanks and blow away clippings.

I claim as my invention:—

1. In combination, a pair of cutters, a pair of dies operating within the cutters, a draw rim interposed between one of the cutters and one of the dies which latter has a grooved edge adjacent the draw rim and means for operating the movable cutter and die members, substantially as described.

2. In combination, a pair of cutters, a pair of dies, a draw rim coöperating with the dies and means for operating the movable cutter and die members, one of the dies having a grooved edge substantially as described.

3. In combination, a pair of cutters, a draw rim independent of the cutters arranged within one of the cutters and arranged to coöperate with the face of the other cutter, for holding the blank and a pair of dies operating within the cutters and means for operating the movable die and cutter members, substantially as described.

4. In combination, a female die having a groove around its edge, a male die having a projecting edge and a draw rim within which the die members operate, the space between the lateral face of the projecting edge of the male die and the contiguous inner face of the draw rim being slightly enlarged to enable the flange of the blank to be drawn around the said projecting edge, substantially as described.

5. In combination, a draw rim, means coöperating with the draw rim to confine the edge of the blank between itself and the edge face of the draw rim, a die within the draw rim having a groove around its edge and a die with means for operating it within the draw rim said die having a projecting edge, substantially as described.

6. In combination with a draw rim, a die operating within the same to draw the blank over the edge of the draw rim to form a flange and a second die within the draw rim operating to draw the flange of the blank after the first drawing operation has been completed, one of the said dies having a grooved edge which groove is open laterally and the other die having a projecting edge to enter said groove substantially as described.

7. In combination, a draw rim and a pair of dies coöperating therewith to effect separate and consecutive drawing actions on the

blank, first, to form a flange on the blank, and then to convert said flange into a flanged rim, said rim presenting a channel or groove on one side substantially as described.

5 8. In combination with a draw rim, a yielding die within the same and a die co-operating with the said rim and the die first mentioned and means for limiting the movement of the yielding die whereby two separate and consecutive drawing actions will be
10 effected on the blank, substantially as described.

9. In combination, the two dies, one having a rim and the other a marginal groove
15 one of which is yielding and means arranged within the margin for discharging the completed articles from the yielding die, substantially as described.

10. In combination, the two dies one of
20 which is movable and one yielding, a reciprocating plunger carrying the movable die, a slide rod reciprocating with said plunger, a discharge rod extending through the yielding die and connections between the said discharge rod and sliding rod whereby the discharge rod is operated, substantially as described.
25

11. In combination in a draw press, the dies operating horizontally and having a vertical space between them for the reception of
30 the blanks, a registering pin at the lower

part of said space upon which the blank rests, said pin being movable across said space and means for controlling the movement of said pin, substantially as described. 35

12. In combination in a draw press, the dies operating horizontally and having a vertical space between them for the reception of the blanks, a registering pin at the lower part of said space upon which the blank rests,
40 said pin being movable across said space and means for controlling the movement of said pin, said means including a latch for holding the pin retracted and means for controlling the latch to release the pin, substantially as described. 45

13. In combination with vertically disposed die members means for moving the die members horizontally, a registering pin extending across the vertical space between the
50 die members to sustain the blank and side registering pins moving with the movable die member and tapered on their inner sides, substantially as described.

In testimony whereof, I have affixed my
55 signature in presence of two witnesses.

HENRY C. ^{his} × HUNTER.
mark

Witnesses:

HENRY L. REYNOLDS,
ERNEST E. MATHISON.