

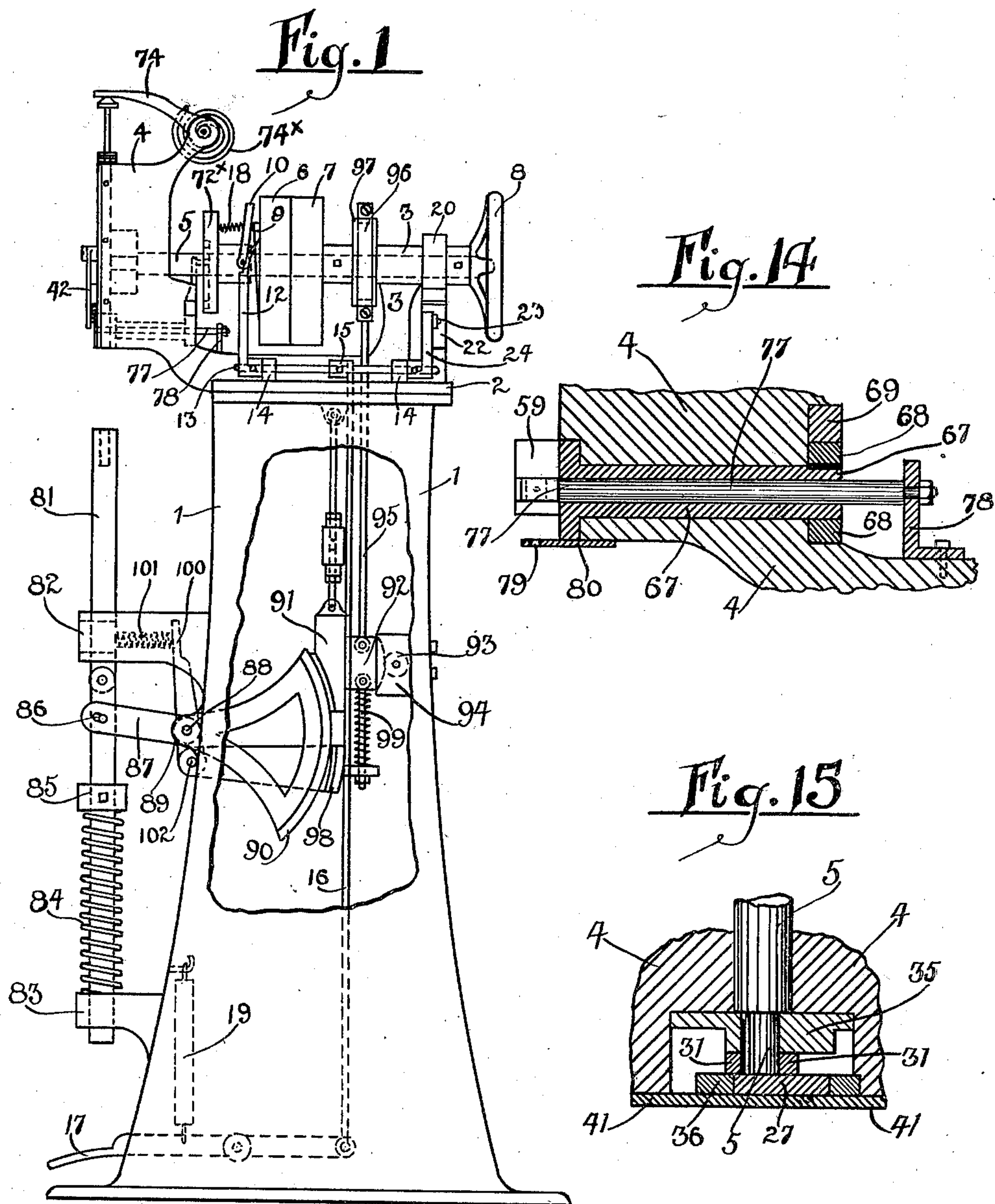
No. 755,489.

PATENTED MAR. 22, 1904.

W. HEATON.  
SHOE NAILING MACHINE.  
APPLICATION FILED DEC. 17, 1900.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses  
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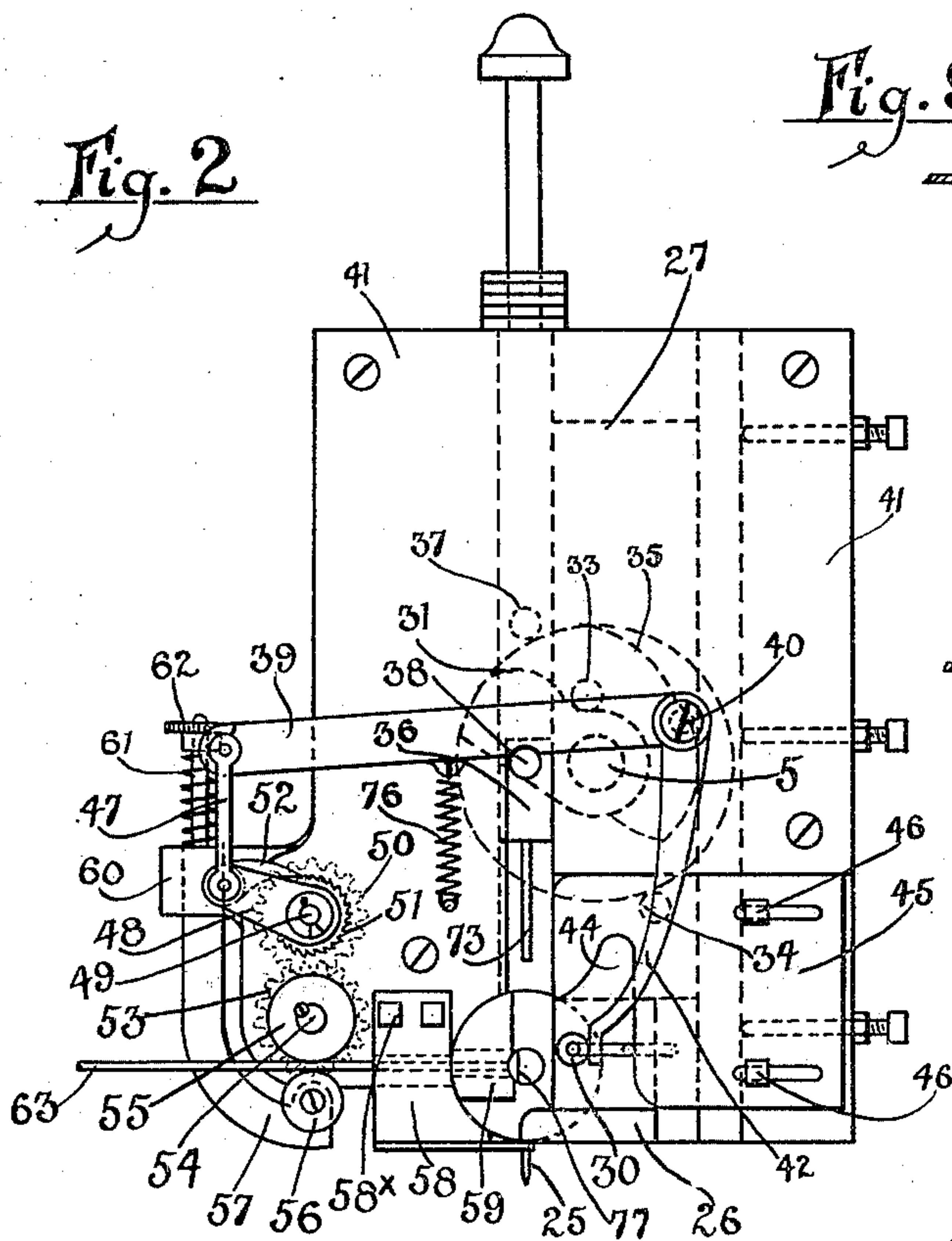
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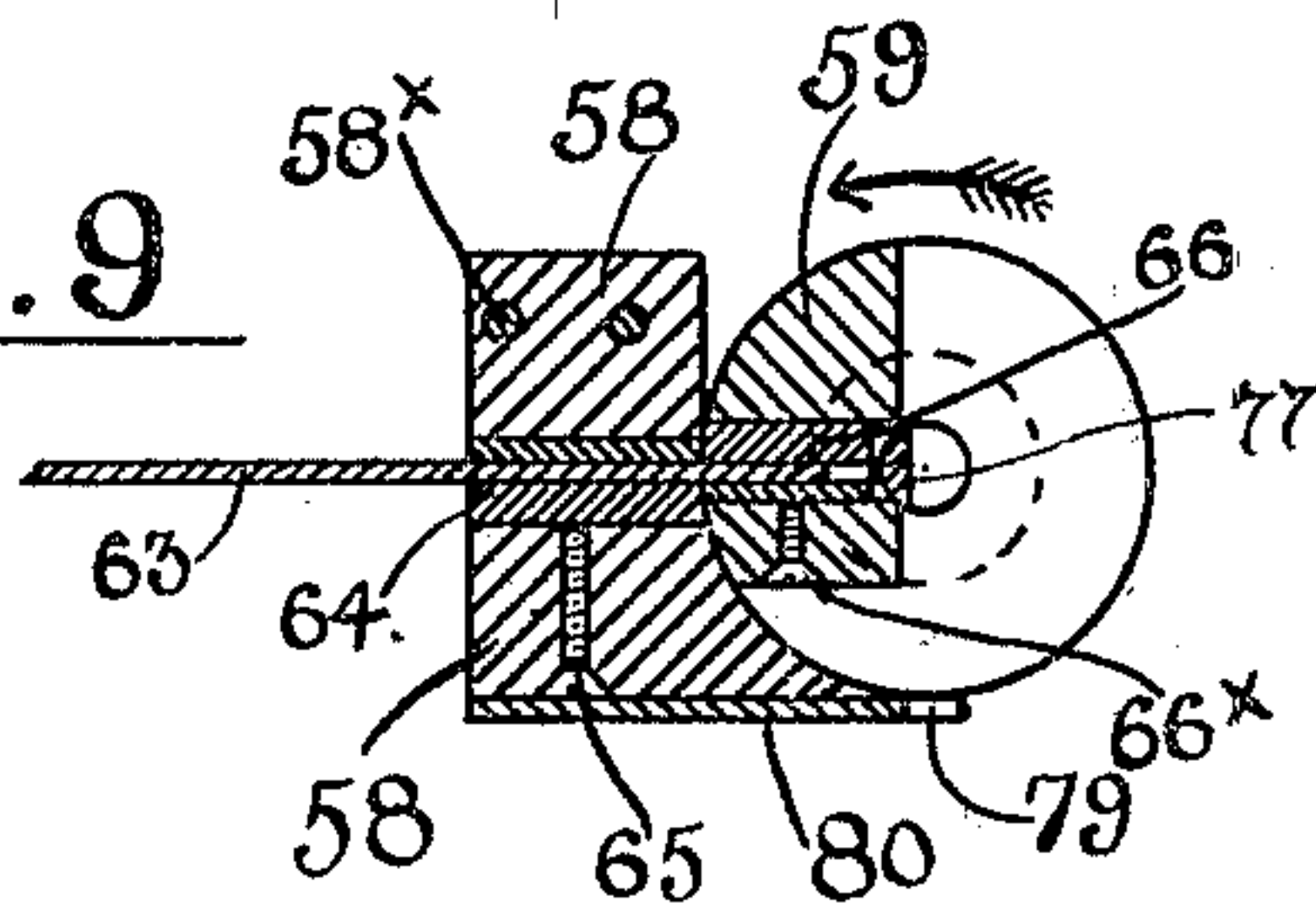
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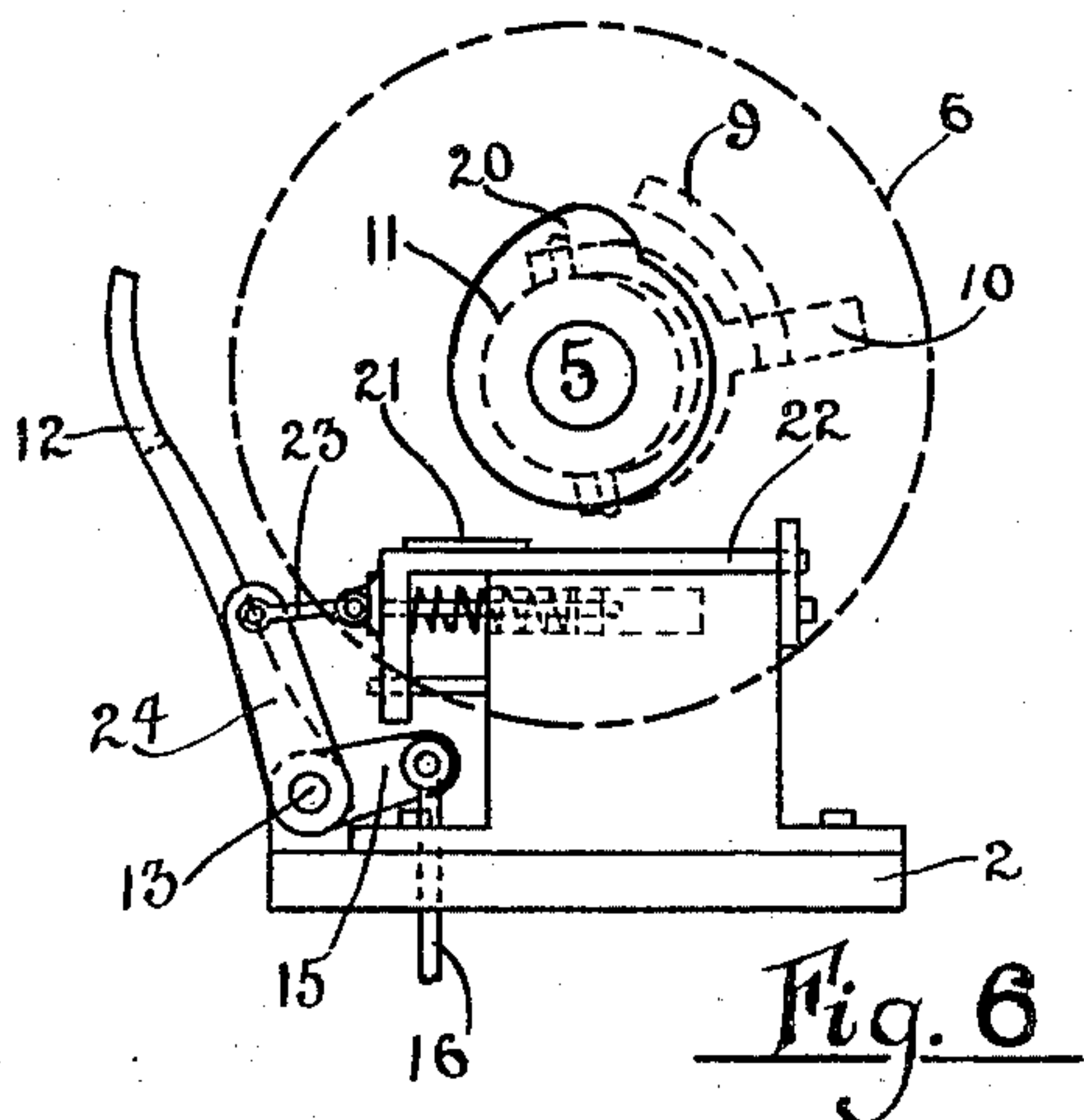
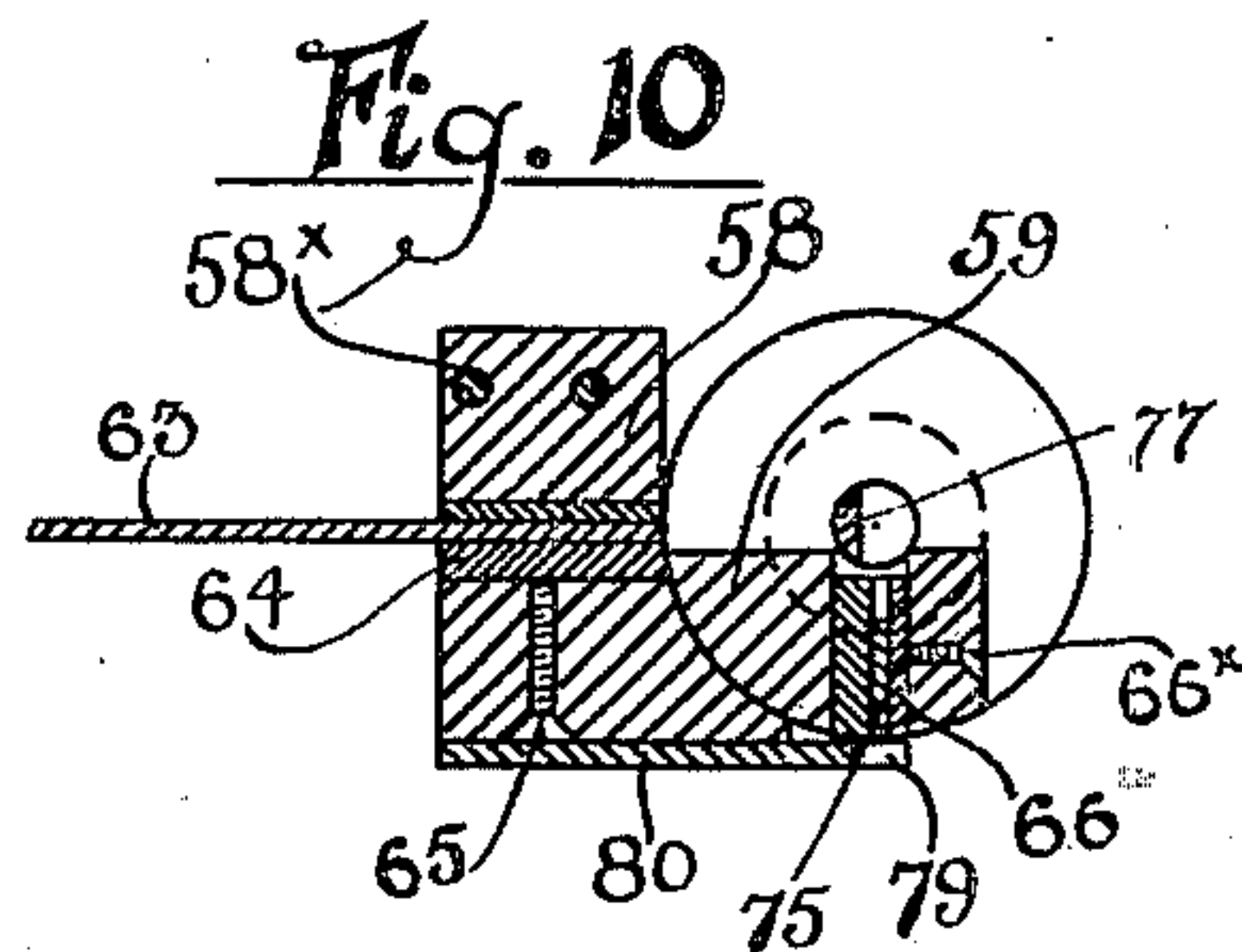
*Fig. 2*



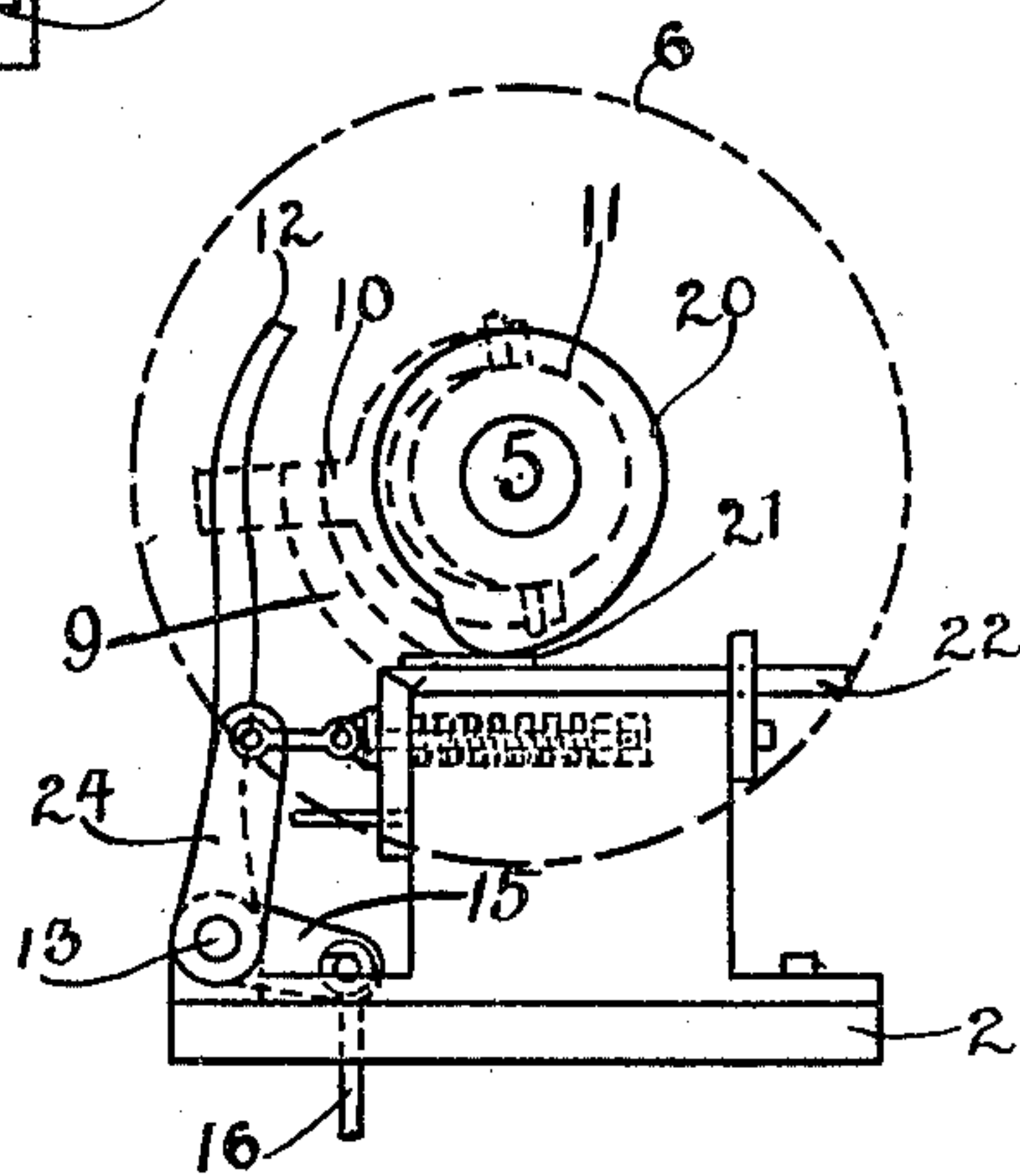
*Fig. 9*



*Fig. 10*



*Fig. 6*



*Fig. 7*

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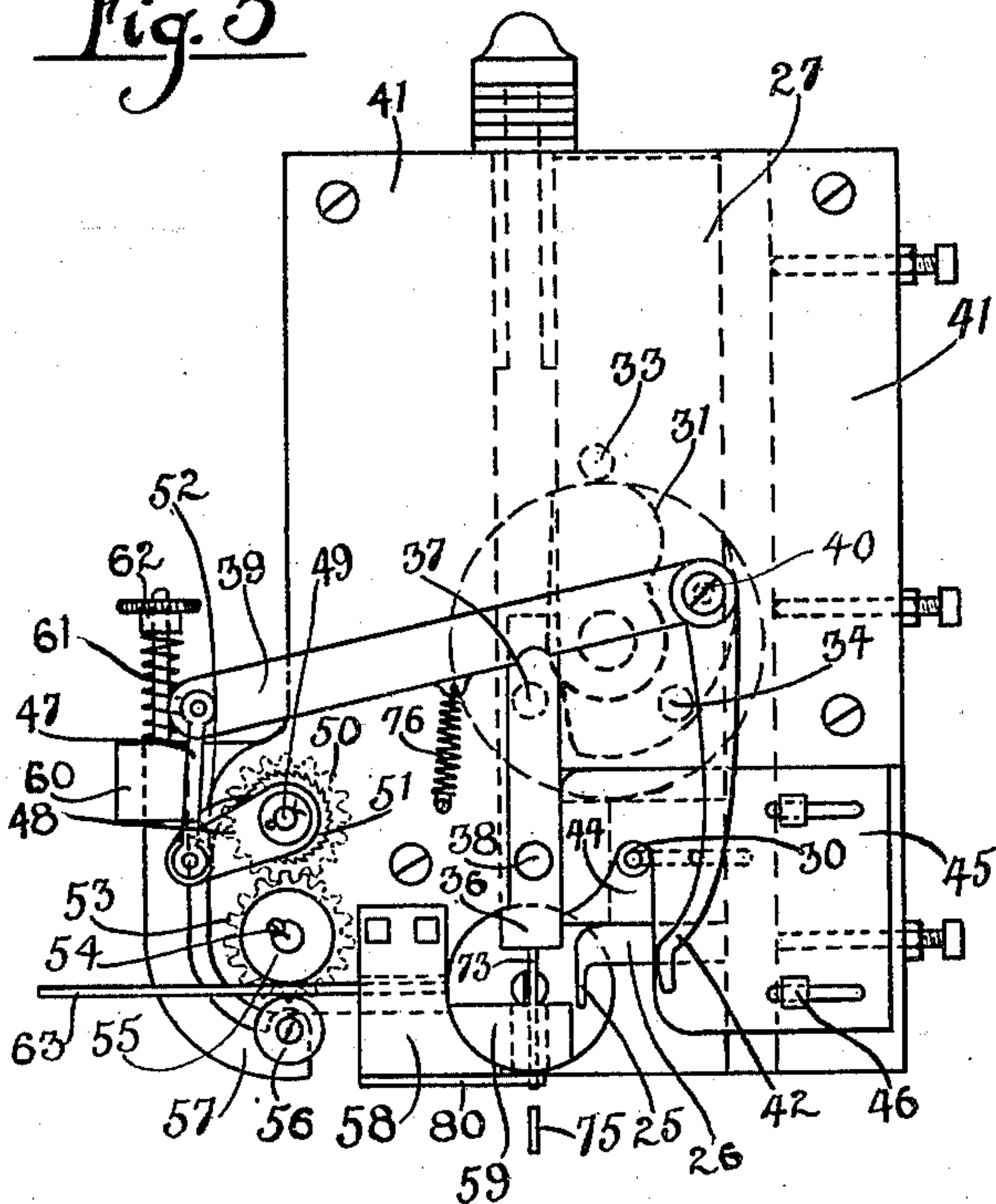
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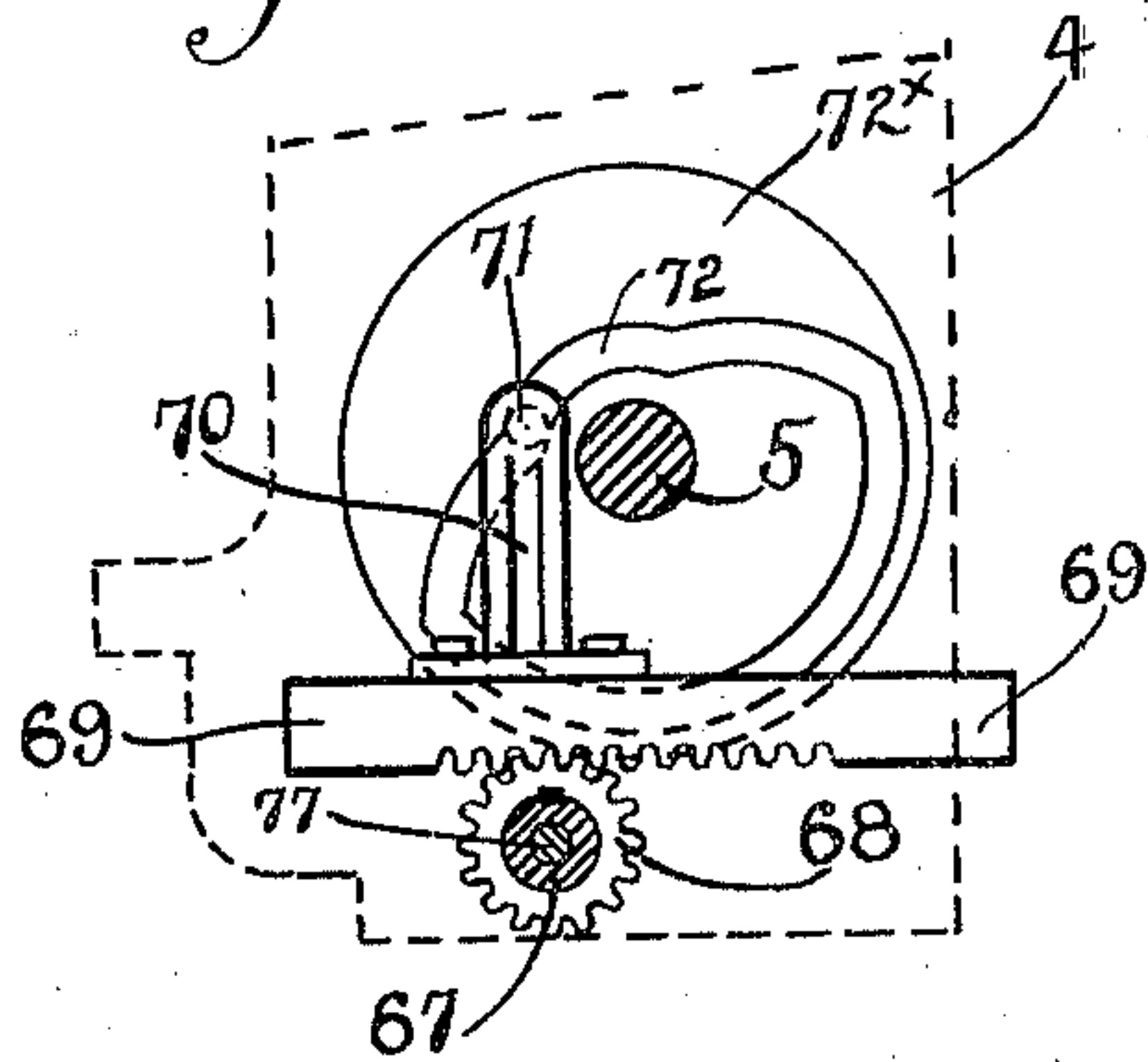
NO MODEL.

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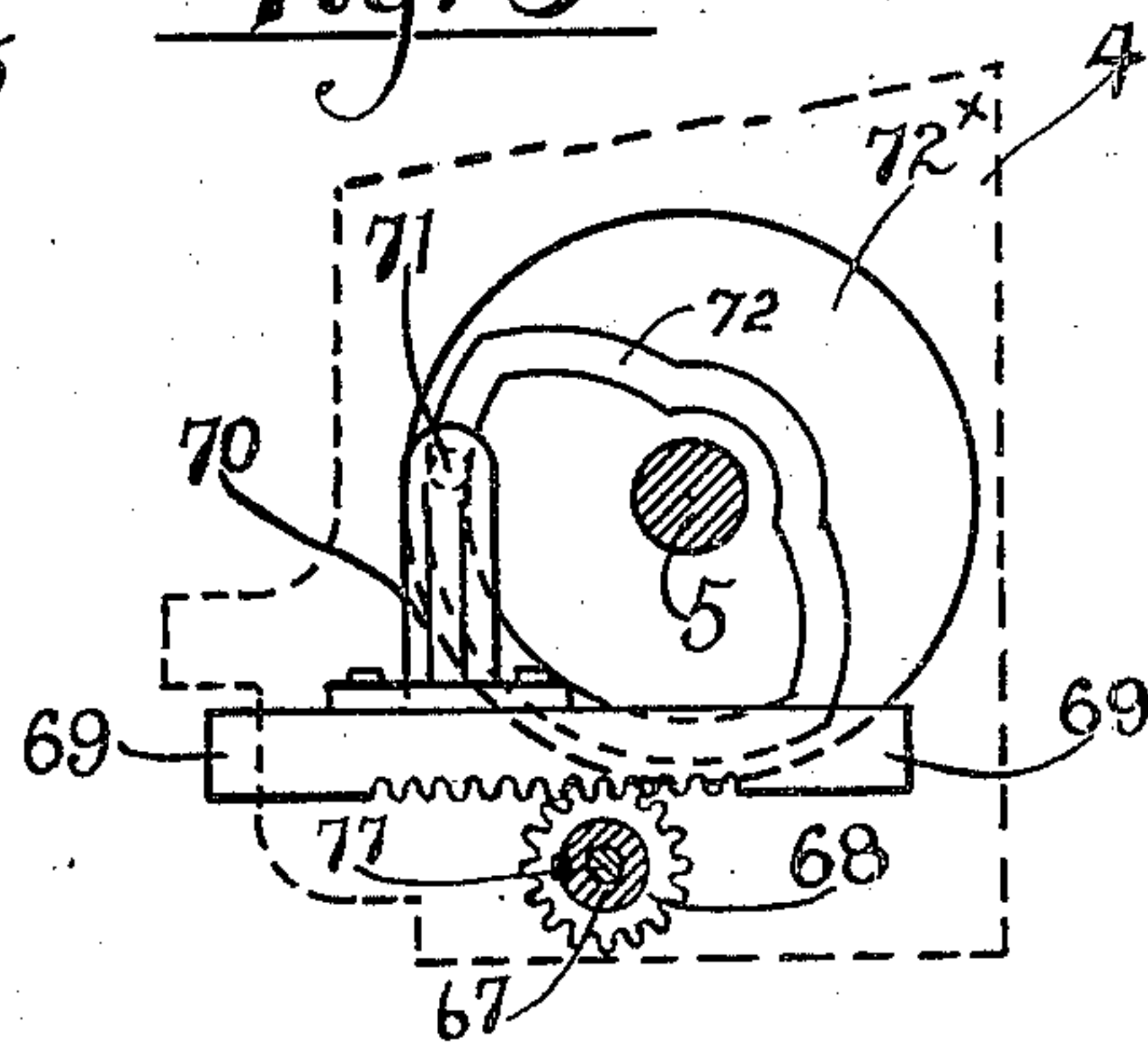
*Fig. 3*



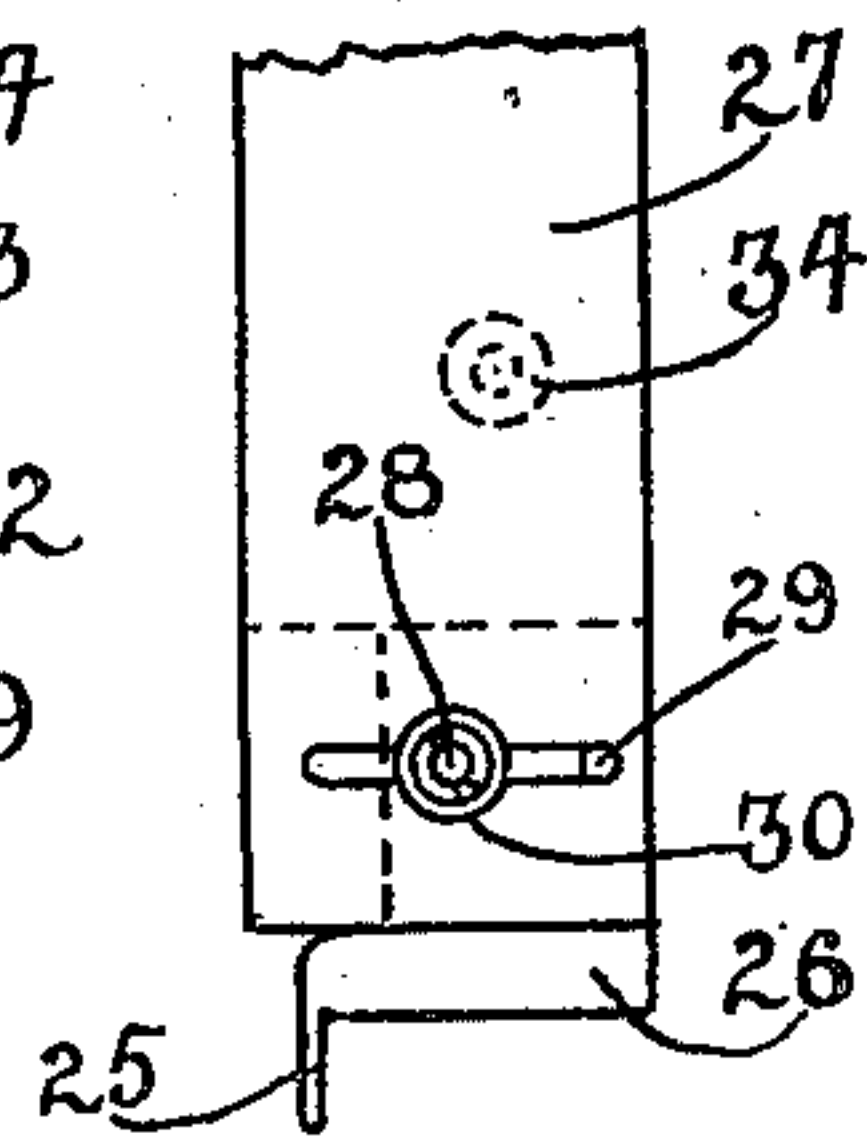
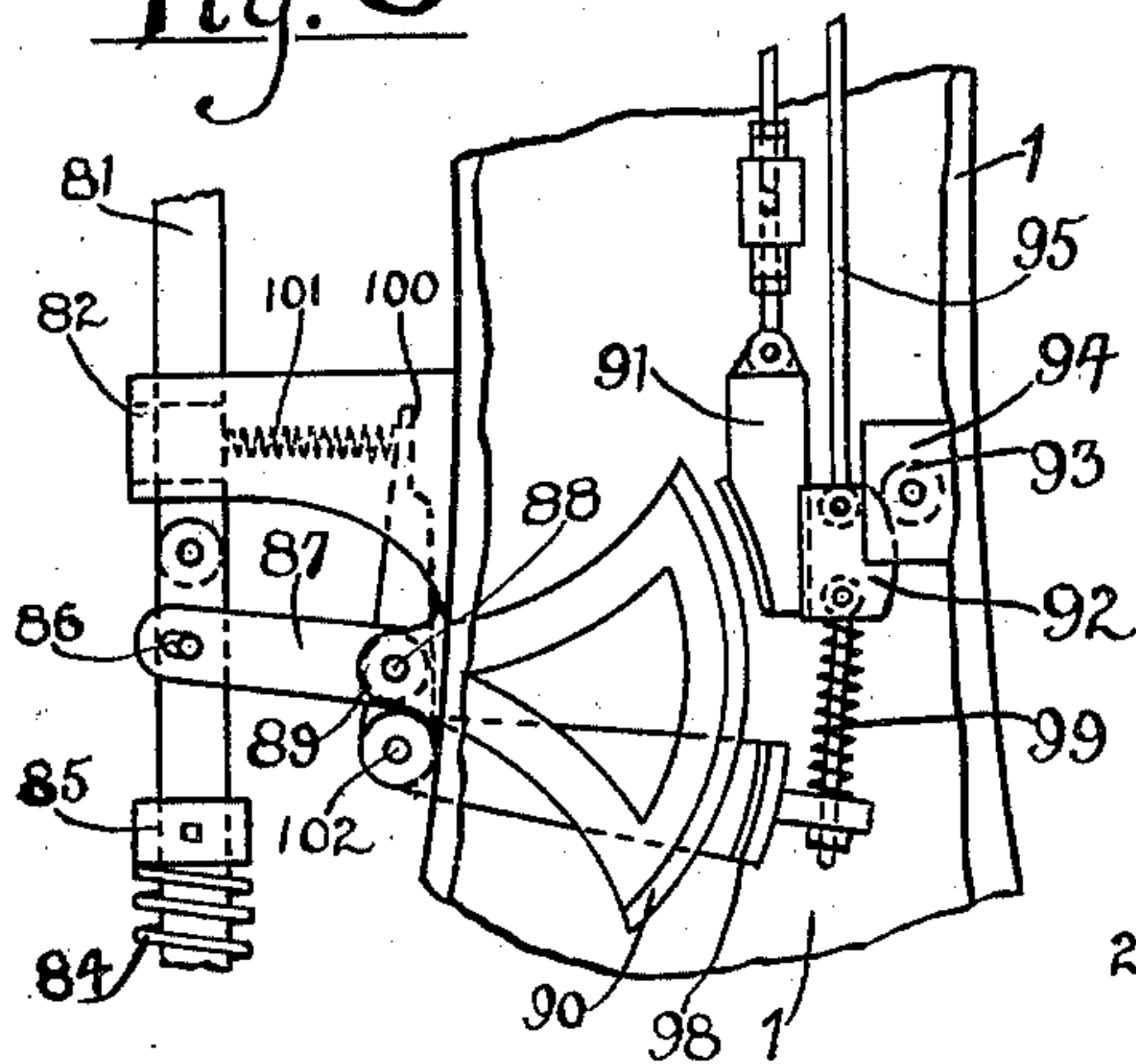
*Fig. 4*



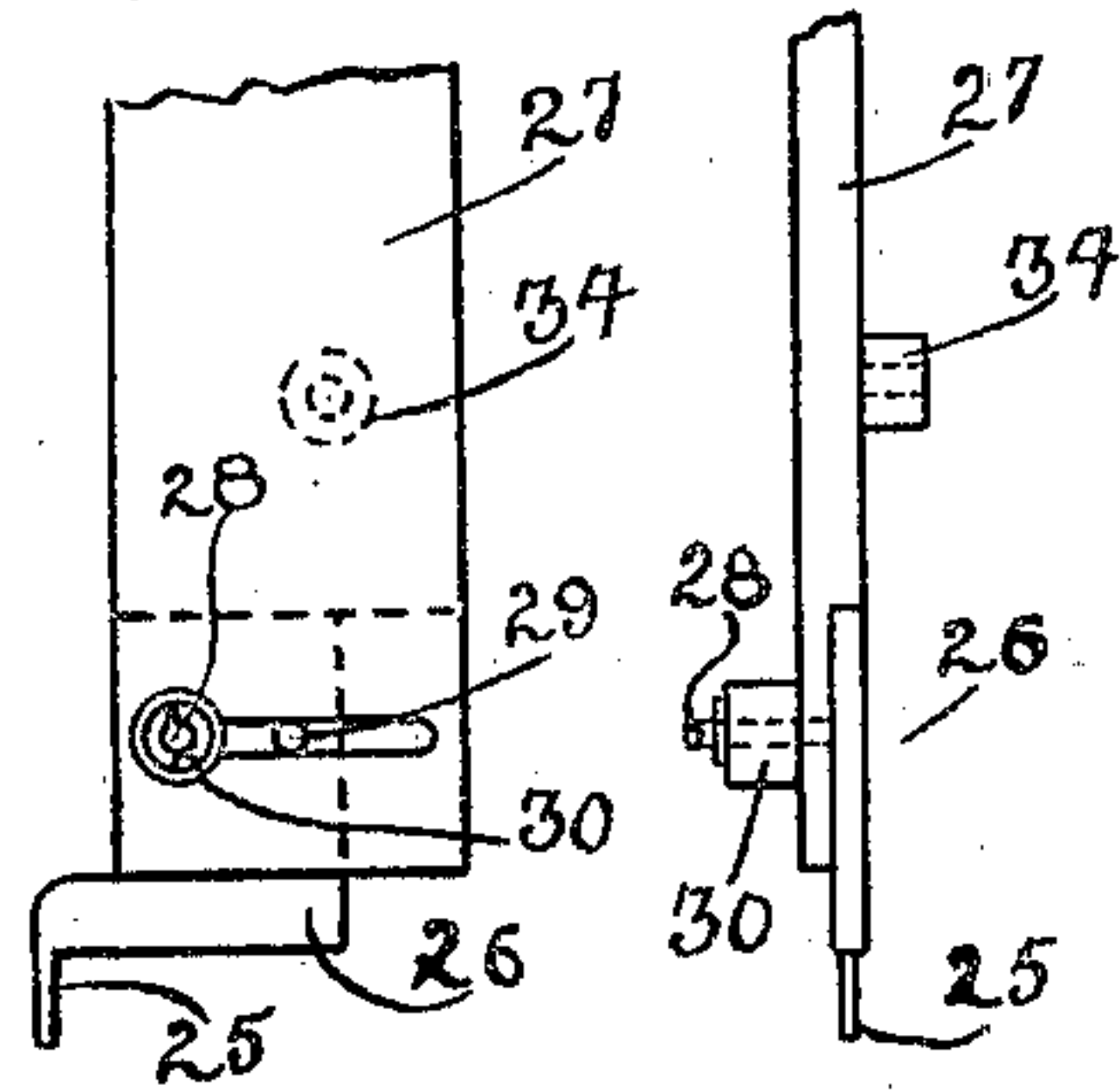
*Fig. 5*



*Fig. 8*



*Fig. 11*



*Fig. 12*

*Fig. 13*

*Witnesses*

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# UNITED STATES PATENT OFFICE.

WILLIAM HEATON, OF WOODLEY, NEAR STOCKPORT, ENGLAND.

## SHOE-NAILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 755,489, dated March 22, 1904.

Application filed December 17, 1900. Serial No. 40,152. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM HEATON, a subject of the Queen of Great Britain, residing at and whose post-office address is Woodley, near Stockport, England, have invented certain new and useful Improvements in Shoe-Nailing Machines, (for which Letters Patent have been applied for in Great Britain, application No. 9,117, dated May 17, 1900;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has for its object improvements in nailing and analogous machines employed in the manufacture of boots and shoes.

The nailing-machine to which my invention particularly relates is of the type in which a nail or short section of wire, hereinafter termed a "slug," is broken off the end of a roll or continuous length of wire and forcibly driven into a hole formed in a boot sole or heel by means of an awl or pricker, which may also be arranged to feed the work along under the driver.

Figure 1 is a side elevation of a machine constructed according to this invention and having part of the standard broken away to show the mechanism for locking and dropping the horn. Figs. 2 and 3 are front elevations of the stationary head of the machine in two different positions, the former when the awl is piercing the work and the latter when the driver is driving the slug into the work. Figs. 4 and 5 are detail views of the cam, rack, and pinion for oscillating the cutter. Figs. 6 and 7 are details of the brake mechanism for retarding the motion of the driving-shaft. Fig. 8 is a detail view of the horn locking and dropping mechanism in its released position. Figs. 9 and 10 are vertical sections of the stationary block and oscillating cutter. Figs. 11 and 12 are details of the vertical slide, awl-plate, and awl, showing the latter in its two different positions; and Fig. 13 is a side elevation of the same. Fig. 14 is a detail view in section of the oscillating cutter, stationary rod, and part of the head of the machine; and Fig. 15 is a segmental detail of the driver-bar, awl-slide, and cams for actuating same.

1 represents the standard or framing of the

machine, on the upper end of which is a bed-plate 2, fastened thereto by bolts or screws and carrying an upright bearing 3 and a stationary head 4, supporting a driving-shaft 5, Fig. 1, upon which are loosely mounted pulleys 6 7 centrally thereon, and a hand-wheel 8 on the end of same. On the side of the pulley 6 is an integral clutch 9, adapted to engage an arm or dog 10, connected to a boss 11, fast on the driving-shaft, as indicated in Figs. 1, 6, and 7. When the driving-shaft has made a complete revolution, the said dog comes into contact with the inclined upper end of a rocking disengaging lever 12, fixed on a rocking shaft 13, located in bearings 14 on the bed-plate and attached by means of a short arm 15 to a connecting-rod 16, pivoted to the treadle. When the operator depresses the treadle 17 by his foot, the connecting-rod 16 is raised, so as to rock the shaft 13 and move the disengaging lever 12 out of contact with the dog 10 and into the position shown in Fig. 6, whereupon the spring 18 forces the dog 10 in front of the nose of the clutch 9 to be engaged thereby and sets the driving-shaft 5 in motion. If the operator, having depressed the treadle 17, immediately removes his foot therefrom, the spring 19 will raise it, when the reverse action will take place, whereby the disengaging lever 12 is again moved into the path of the dog 10, so as to intercept it after having made a complete revolution, and thus bring the machine to rest. By the operator keeping his foot on the treadle the machine is continuous in action.

A cam 20, Figs. 1, 6, and 7, on the driving-shaft 5, just immediately prior to the latter completing a revolution, comes into contact with a friction-surface or brake-block 21, of leather or like material, carried on a sliding plate 22, connected by a link 23 to an arm 24 on the rock-shaft 13, so that as the disengaging lever 12 is withdrawn from contact with the dog 10 the friction-surface 21 is simultaneously withdrawn from under the retarding-cam 20, which is then free to move, and subsequently as the disengaging lever 12 is moved into the path of the dog 10 the brake-block 21 is moved into the path of the cam 20, so as to retard its motion, as hereinbefore described.

25 represents the awl or pricker fixed on the



end of a slide or carrier-plate 26 which, as hereinafter described, has imparted to it a vertical motion for perforating the work and a lateral motion to feed or move the work forward so that its last-formed hole is underneath the driver. For obtaining its vertical motion the awl-carrier plate 26 is connected to a vertical slide 27 (let into the front of the stationary head of the machine) by means of two pins 28 29, Figs. 11, 12, and 13, passing through a horizontal slot in the vertical slide 27. The former pin 28 carries an antifriction-roller 30 for purposes hereinafter described. The vertical slide 27 obtains its motion from a cam 31 (shown in dotted lines in Figs. 2 and 3) on the end of the driving-shaft 5, revolving between two pins and rollers 33 34, Figs. 2 and 3, on the back thereof. As the said cam moves under the upper pin 33 it raises the attached slide, and as it moves against the lower pin 34 it depresses the slide, in the latter case to cause the awl to pierce or perforate the work and in the former case to withdraw the awl from the work and leave the hole under the driver and in the position to receive the slug, as hereinafter described. During the time the vertical slide 27 and awl-carrier 26 descend to pierce the work another cam 35 at the back of cam 31, also on the driving-shaft 5, has commenced to raise the driver-bar 36 by contact with a pin 37, Figs. 2 and 3, on the back thereof. The driver-bar 36 has also a pin 38 on its front face, and when being raised, as just described, the said pin lifts the straight member 39 of an L-shaped lever, pivoted at 40 to the front plate 41, which movement causes the curved depending arm 42 thereof to bear against the roller 30 on the awl-plate 26 and move the latter along, so that the awl, which is still in the work, takes the latter with it, thereby feeding forward the work, so that the hole made is directly under the driver 43 and also in the proper position to receive the slug. The cam 31 next moves the vertical slide 27 upward, so as to withdraw the awl from the hole just formed in the work, and in order to at the same time move the awl-plate laterally and return it to its original position the latter by means of the roller 30 on its face moves up an inclined slot 44 in an adjustable plate 45, fixed by screws 46 to the front of the stationary head, and thus while moving upward with the vertical slide 27 also moves independently of it in a lateral direction, and is thus returned to its original position preparatory to descending to effect another perforation in the work.

The lever 39 has pivoted on its end a link 47, Figs. 2 and 3, pivoted also to a short arm 48, the opposite end of which is loose on a spindle 49, having its bearing in the front plate. The said spindle also carries a pinion 50 and a ratchet-wheel 51 both fast thereon.

A driving-clawker 52 is pivoted to the short arm 48 and gears with the ratchet-wheel

51, so that each time the short arm 48 is raised the clawker 52 is lifted with it and moves the ratchet-wheel 51 and pinion 50 forward together. The latter gears with a similar pinion 53 on an axle 54 in the front plate, and the latter pinion has also keyed fast with it on the same axle a milled edged roller 55, between which and a similar roller 56, revoluble on the end of an arm 57, the wire passes and is fed forward through the fixed block 58 into the throat in a rotary oscillating cutter 59.

The arm 57 passes through a guide 60 and terminates in a screwed spindle encircled by a spiral spring 61 and capped by a milled nut 62, which can be tightened or released to regulate the power of the spring and adjust the pressure of the roller 56 against the wire for feeding the latter forward and also for different gages of wire.

The block 58, as shown in Figs. 2, 3, 9, and 10, is stationary, being fixed to the front plate by screws 58<sup>x</sup>. It has a passage in it for the wire 63 to pass through into the rotary oscillating cutter 59, which revolves to break off the wire to form a slug. The wire is drawn off a large coil supported in any suitable position on the machine. The passage in the said block 58 is furnished with a removable hardened-steel lining or bush 64, placed endwise therein and maintained in position by a set-screw 65, passing upward through the body of the block, as shown most clearly in Figs. 9 and 10. This lining or bush 64 can be removed and another with a larger or smaller passage therein substituted for it for a different gage of wire. The wire when fed through the block 58 has a short length sufficient to form the nail or slug projected forward into a passage or throat in an oscillating cutter 59 in register therewith. The latter consists of a circular steel block, which has let into its circumference a removable hardened-steel bush or lining 66 for the reception of the end of the wire to be cut off, as shown in Figs. 9 and 10, the said bush or lining being kept in position by a set-screw 66<sup>x</sup>. This block is oscillated as hereinafter described, and each movement of the same in the direction of the arrow, Fig. 9, breaks off the short length of wire held thereby to form the slug. The severance of the wire or slug is effected by the circular block 59, into which the latter is projected, moving against the fixed surface of the fixed block 58.

The block 59 is formed integrally with and on the end of a sleeve 67, which passes through the stationary head 4 to the rear of same and carries also a small toothed wheel 68, Figs. 4 and 5, gearing with a reciprocating horizontal rack-bar 69, having on its upper surface a bracket 70, fitted with an antifriction-roller 71, located in a groove 72 in the face of a cam 72<sup>x</sup> on the driving-shaft, which said cam oscillates the rack 69, pinion 68, and cutter 59, moving the latter first into the



position indicated in Fig. 9 to receive the end of the wire as it is fed forward between the rollers 55 56, as hereinbefore described, and second into the position shown in Fig. 10, by which the end of the wire 63 to form a slug or nail is broken off and carried opposite to a slot 79 in a plate 80, which is also in register with the hole last formed in the work and just vacated by the awl 25 and immediately under the driver. The work having been moved forward by the awl and vacated by the latter, leaving the hole last formed in a vertical line with driver 73, and the oscillating cutter 59, having cut off the nail or slug and carried it to the position shown in Fig. 10 in register with the hole in the work, the cam 35, which elevates the driver 73, passes out of contact with the pin 37 thereon, whereupon the lever 74, Fig. 1, suddenly depresses the driver 73, which passes into the cutter-passage 66 and drives the nail 75 therein into the work. Upon the descent of the driver the spring 76, Figs. 2 and 3, returns the lever 39 and clawker 52 to their original positions. (Shown in Fig. 3.)

It will be observed that the larger portion of the front of the cutter is cut away for a part of its thickness, so as to enable the driver 73 to enter sufficiently deep into the throat 66 to drive home the nail, as shown in Fig. 3, and also to enable the awl to carry the work forward, so that the last hole formed is both in line with the driver and in register with the cutter-throat, as shown in Fig. 2.

A rod 77, fixed to a bracket 78 on the bed 2, passes through the sleeve 67 to the front of and flush with the face of the cutter-block 59, and part of its end is cut away, as shown in Figs. 9 and 10, so that the remaining portion forms a shutter at the end of the throat in the cutter and prevents the slug or nail flying out of the other end as the result of the impetus received at the moment of being cut off.

Means are provided, first, for locking the horn at the time the awl is perforating the work and also when the driver drives the slug into the work, and, second, to drop or lower the horn when the feed of the work takes place.

The horn for supporting the sole or heel to be nailed may be of any suitable construction and supported on the upper end of a vertical rod 81, movable in guides 82 83, connected to the standard 1 and encircled by a spring 84, compressible between the guide 83 and a collar 85 thereon to assist in raising the rod after it has been depressed to permit the work to feed.

The vertical rod 81 has attached thereto by pin-and-slot connection 86 the end of a lever 87, fulcrumed at 88 to a bracket 89, fastened to the standard. The said lever is formed with a curved or segmental face 90, adapted to bear against the curved face of a depend-

ing block 91, grooved on its opposite side to receive the edge of a vertically-movable wedge 92, the opposite edge of which is in contact with a roller 93, fitted in a groove in the edge of a block 94, fixed by screws to the inner face of the standard. The said wedge 92 is attached to a rod 95, fitted to the strap 96 of an eccentric 97 on the driving-shaft 5, and when moved into the position indicated in Fig. 1 the roller 93 forces it against the depending block 91 and the latter against the segmental face 90 of the lever 87, which becomes locked thereby, so that the rod 81 and the horn on the upper end thereof become also locked at the time when the driver descends to drive the slug into the work and also at the time when the awl enters the work to make a hole therein for the reception of the slug.

For the purpose of automatically dropping or lowering the horn to permit the feed of the work to take place a lever 98, provided with a curved edge adapted to bear against the segmental lever 90, is connected by an eye and spring-controlled rod 99 pivotally to the block 92. The opposite end of the lever 98 is pivoted to a vertical arm 100, fulcrumed also to the bracket 89 and pressed forward by a spring 101, having one end fastened thereto and the other end to the side of the guide 82. When the rod 95 and block 92 commence to rise on the return movement after being lowered to their lowest position, Fig. 8, they first lock the horn in position, as hereinbefore described. Then as the block 92 continues to rise and frees the block 91, so as to unlock the horn, the end of the lever 98 comes into contact with the segmental face 90 of the lever 87, and being pivoted at 102, as well as fulcrumed at 88, it moves in an arc of a circle which is not coincident with that of the segment 90, so that the latter is raised and the rod and horn lowered or dropped at the moment the feed of the work takes place.

It will be observed that the horn is locked twice and dropped once at each revolution of the eccentric for the purposes hereinbefore described.

I claim—

1. In a nailing-machine of the character described the combination of the awl 25 and its carrier 26, vertically-moving slide 27, and an adjustable plate 45 with an inclined slot 44, which guides the awl-carrier in a lateral direction at the same time that it rises with the slides 27, substantially as and for the purpose described.

2. In a nailing-machine of the character described the combination with the awl 25, its sliding carrier 26, the driver-bar 36 and vertically-moving slide 27, of a lever 42 actuated by the driver-bar 36 to move the awl-carrier 26 independently of the slide 27 to feed the work under the driver, substantially as described.



3. In a nailing-machine of the character described, the combination with a reciprocable driver-bar, a pin carried thereby and means for reciprocating the said driver-bar, of a piv-  
5 oted angle-lever, one arm of which is adapted to be engaged and actuated by the pin on the driver-bar, as described, the awl-plate, the vertically-movable slide carrying the awl-plate, a roller on the awl-plate adapted to  
10 be engaged and actuated by the other arm of the angle-lever, and an adjustable plate 45, having a slot in which the roller on the awl-plate is adapted to move, for the purpose set forth.

15 4. In a nailing-machine of the character described, the combination with a reciprocable driver-bar, a pin carried thereby and means for reciprocating the said driver-bar, of a piv-  
20 oted angle-lever, one arm of which is adapted to be engaged and actuated by the pin on the driver-bar, as described, the awl-plate, the vertically-movable slide carrying the awl-plate, a roller on the awl-plate adapted to be engaged and actuated by the other arm of the angle-  
25 lever, an adjustable plate 45 having a slot in which the roller on the awl-plate is adapted to move, a link 47 carried by one arm of the angle-lever, an arm 48 to which one end of the link is pivoted, said arm being loose on a

spindle, a pinion and a ratchet-wheel fast on 30  
said spindle, a pawl on the arm 48 engaging the ratchet-wheel, a second pinion with which the first pinion engages, a feed-roller fast on the spindle which carries the said second pin-  
35 ion, and a second feed-roller adapted to cooperate with the first feed-roller for the purpose set forth.

5. In a nailing-machine of the character described, the combination with the driver and means for feeding the wire, of a fixed block 58 40  
having a passage for the wire, a cutter comprising a circular block adapted to be oscillated, a bush arranged within the said circular block and having a passage for the reception of the  
45 end of the wire, a sleeve at one end of which the circular block is integrally formed, a rod passing through the sleeve with one end flush with the face of the said block and having  
said end partially cut away and forming a shutter at the end of the passage for the wire 50  
in the block, and means for imparting an oscillating movement to the circular block.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM HEATON.

Witnesses:

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GEO. H. BLAKESLEY.