

No. 804,311.

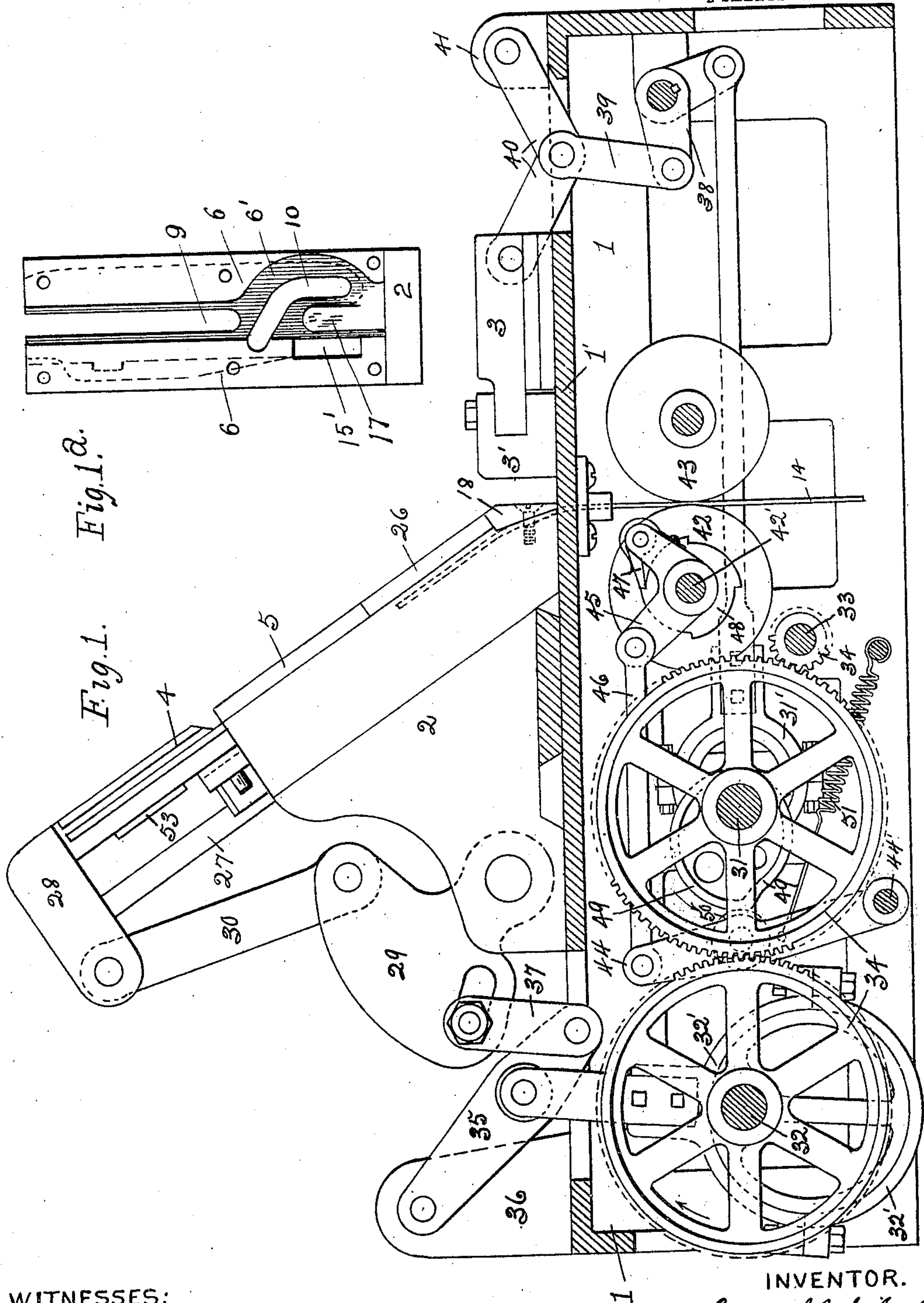
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WIRE STAPLE FORMING AND DISCHARGING MECHANISM.

APPLICATION FILED JUNE 24, 1904.

2 SHEETS—SHEET 1.



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2 SHEETS—SHEET 2.

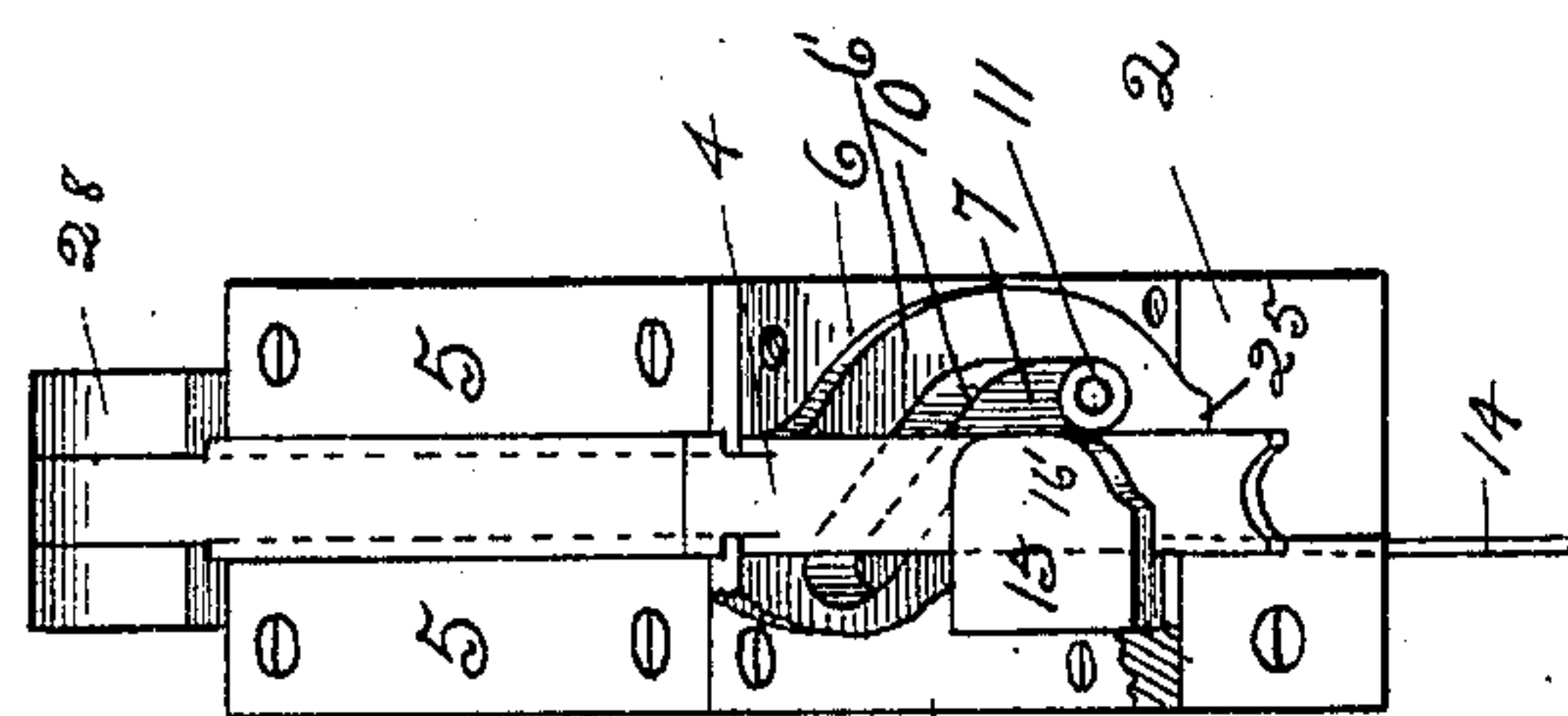


Fig. 4.

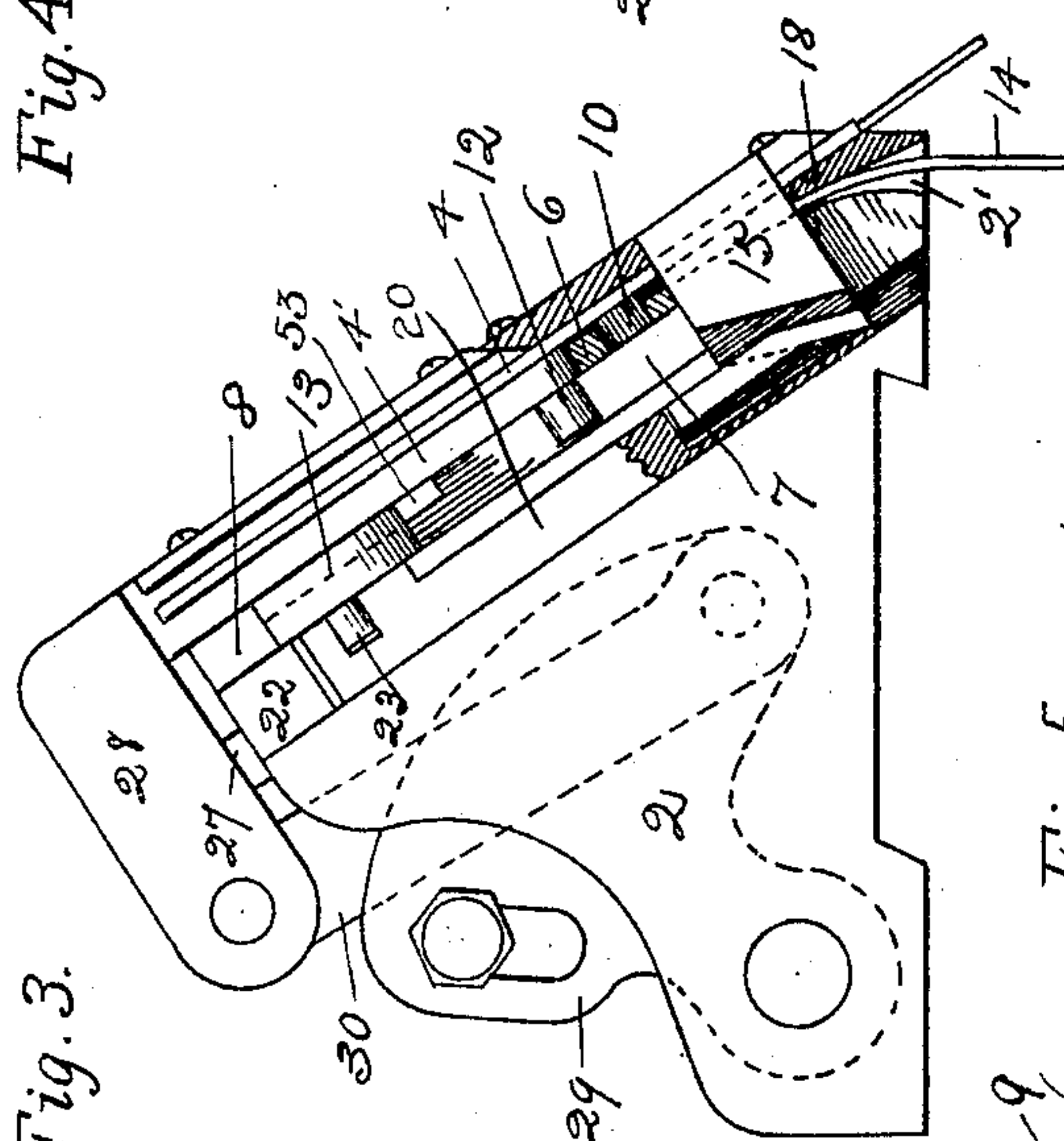


Fig. 3.

Fig. 2.

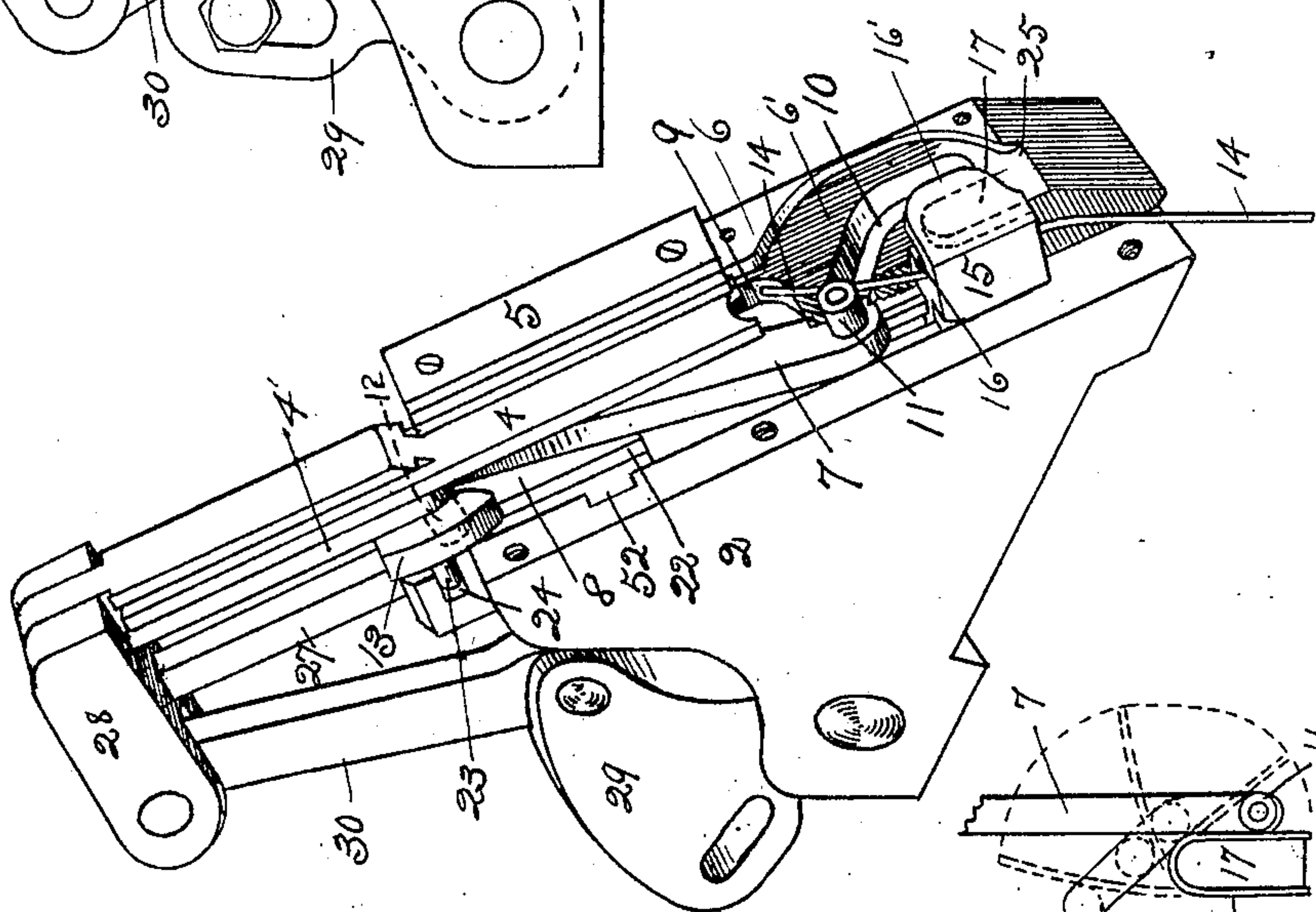


Fig. 5.

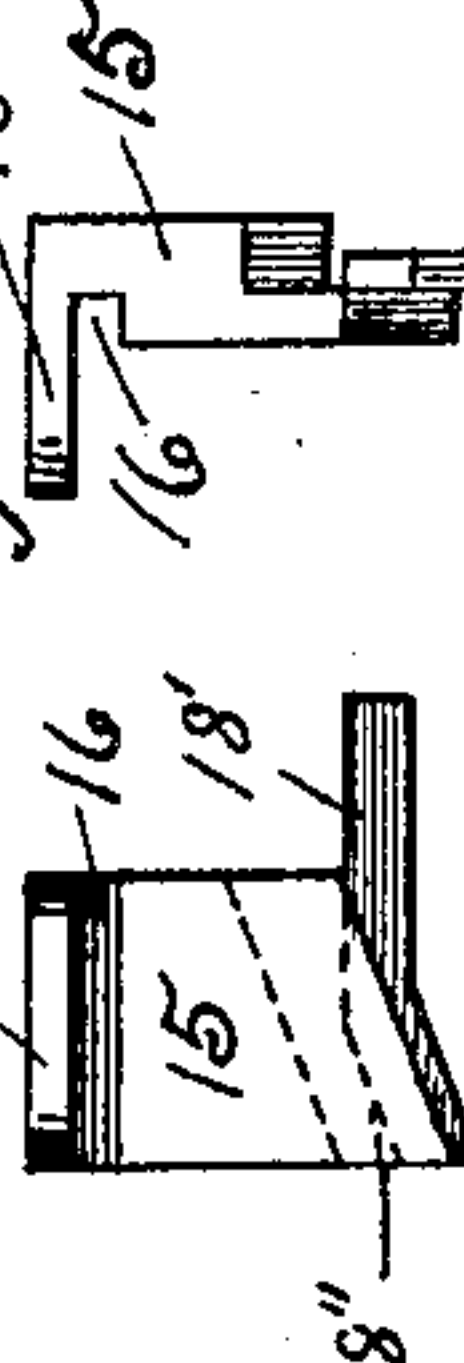


Fig. 6.

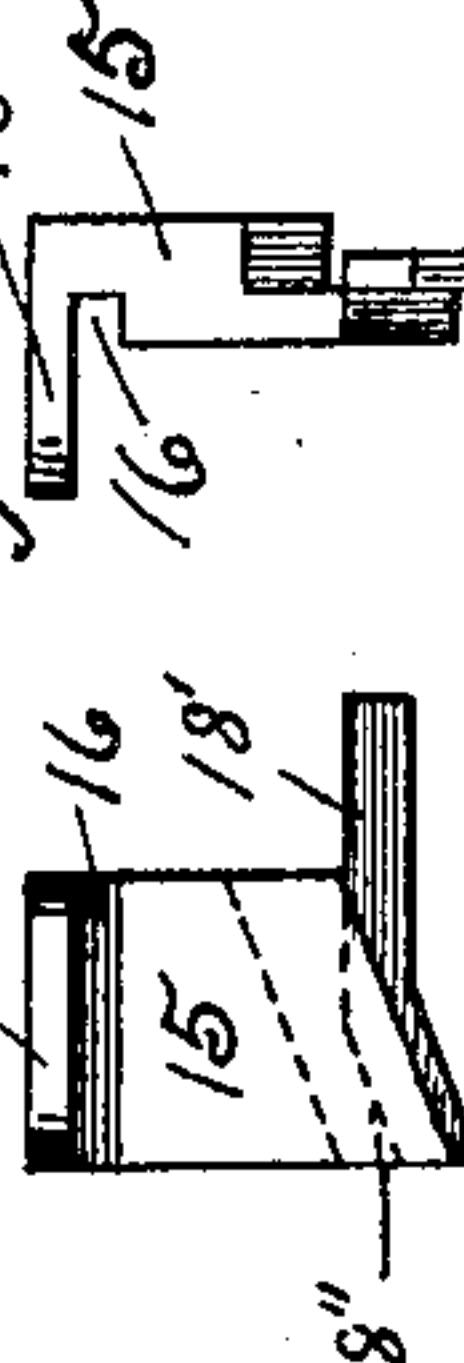


Fig. 7.

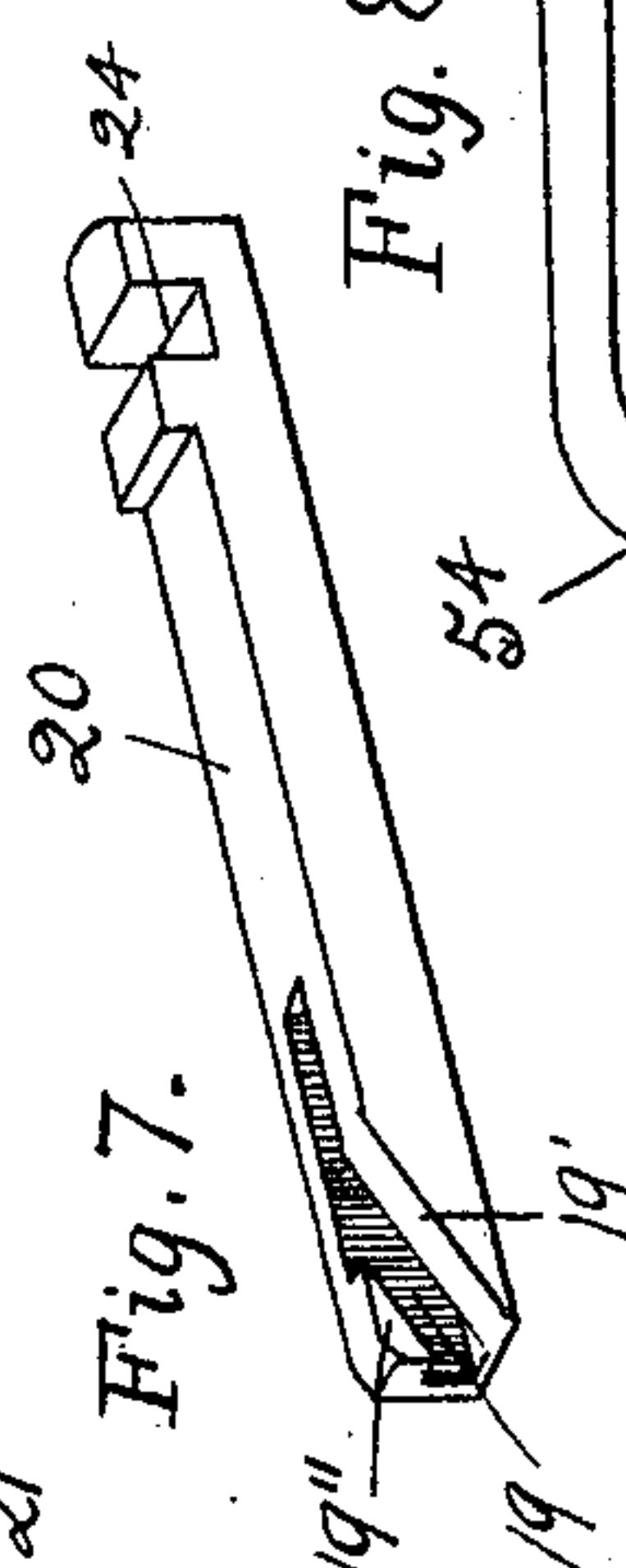


Fig. 8.

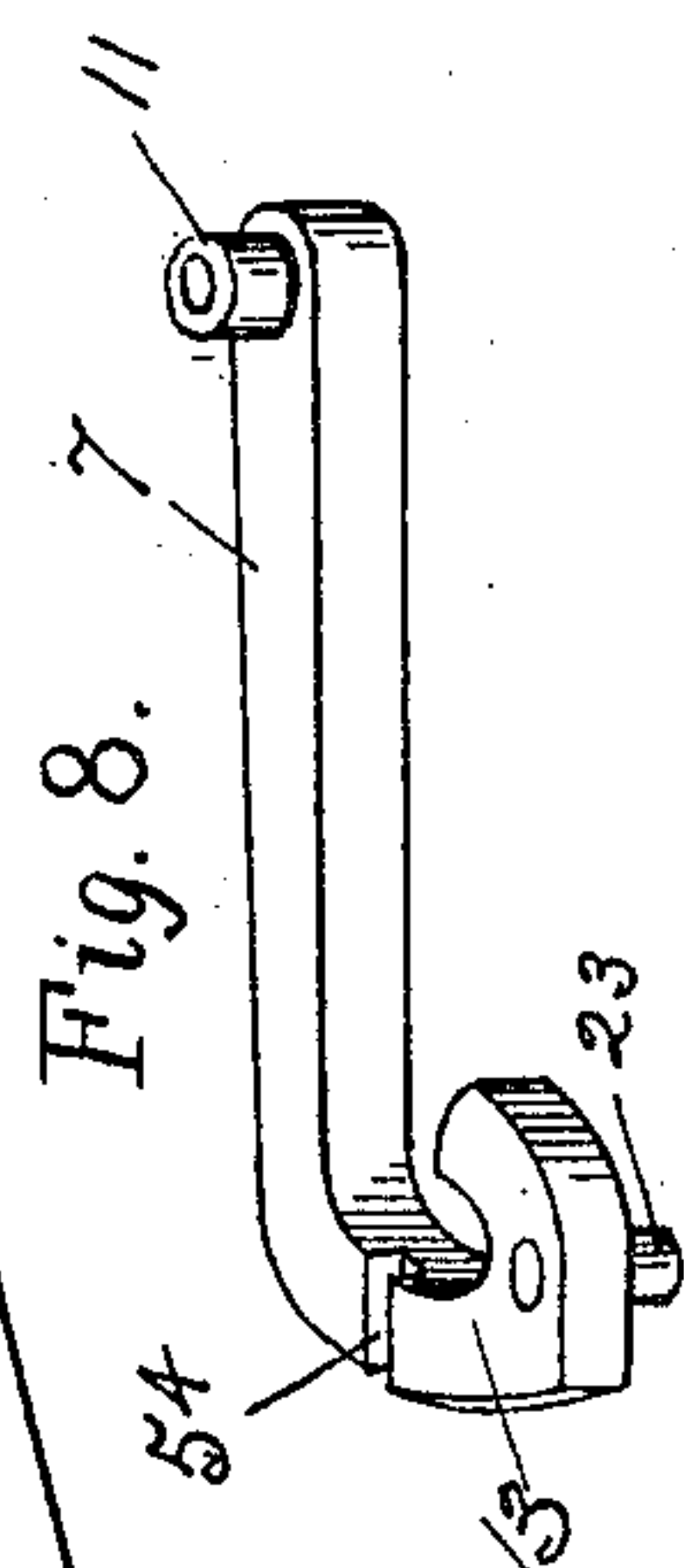
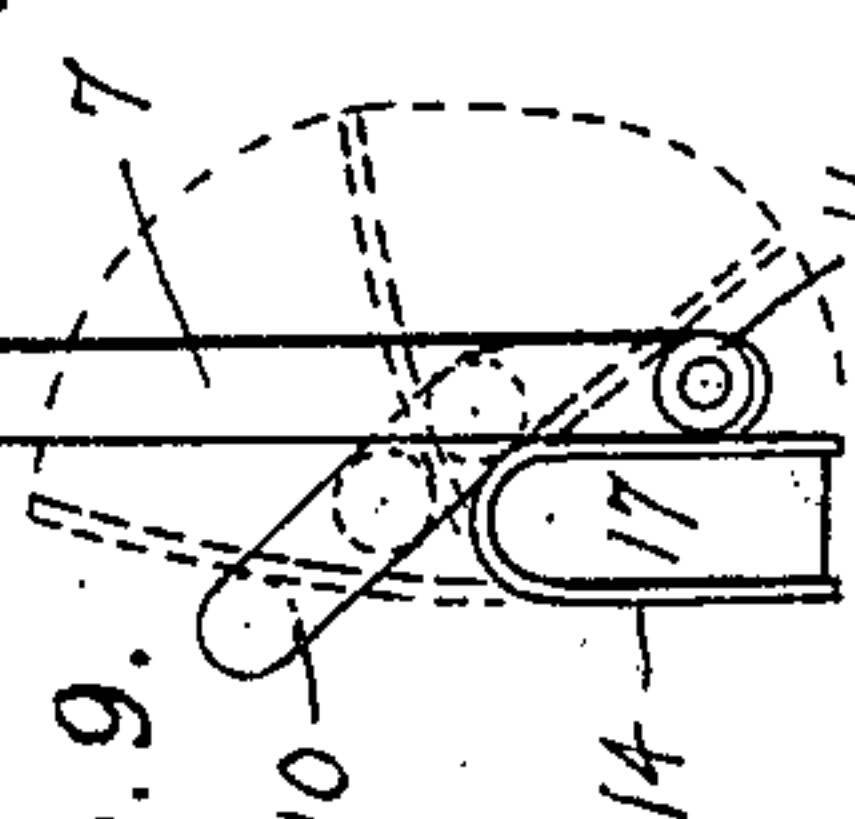


Fig. 9.



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WIRE-STAPLE FORMING AND DISCHARGING MECHANISM.

No. 804,311.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed June 24, 1904. Serial No. 213,926.

To all whom it may concern:

Be it known that I, EDWARD J. GIBSON, a citizen of the United States, and a resident of Adrian, in the county of Lenawee and State of Michigan, have invented certain new and useful Improvements in Wire-Staple Forming and Discharging Mechanism; 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates more especially to improvements in mechanism for use in conjunction with wire-fabric machines for forming a staple from a section of wire intermittently fed to such mechanism and discharging and clamping the same about portions of a fabric being formed and intermittently moved by suitable mechanism in a plane intersecting the plane of discharge of said staples.

The object of my invention is to provide an improved form of mechanism of this class that is adapted by a single continuous operation to form and sever a staple from a section of wire intermittently fed thereto, discharge the same from the forming mechanism and either clamp it about an alining object or deposit it without said mechanism for any desired purpose.

The invention is fully described in the following specification and shown in the accompanying drawings, in which—

Figure 1 is a side elevation of my improved staple-forming mechanism and associated operating means, showing the supporting-frame in vertical section. Fig. 1^a is a plan view of the tool-holding block with the upper part removed and showing the slots and openings in which the movable parts operate. Fig. 2 is a perspective view of said mechanism, showing portions thereof broken away and removed. Figs. 3 and 4 are side and end elevations, respectively, showing portions broken away and removed. Figs. 5 and 6 are side and end views, respectively, of the movable wire-cutting and staple-controlling block. Fig. 7 is a perspective view of the controlling member for said block. Fig. 8 is a side elevation of the staple-forming member, and Fig. 9 a detail of the staple-forming parts.

Referring to the drawings, 1 represents a portion of the frame of a loom or other machine with which my invention may be associated, on the upper portion 1' of which are mounted the stationary block 2, in which the staple forming and discharging parts are located, and the longitudinally-movable table 3, which carries the die 3' for intermittently co-acting with the discharge end of said block for the purpose hereinafter described.

The block 2 is shown as being substantially triangular in shape and has the main plunger 4 reciprocatorily mounted in its forward diagonally-disposed face, the said plunger operating in and being guided by the grooved leader-blocks 5 5, which are secured to the block 2 on either side of said plunger. Immediately below the plane of operation of the plunger 4 is provided an abutting partition 6, which separates said plunger from the plane of movement of the curved staple-forming finger 7, which latter is adapted to operate within an oblong opening 8, provided below said partition and opening without the upper part of the block 2, as shown by dotted lines in Fig. 1^a.

The partition 6 is provided longitudinally thereof with the centrally-disposed elongated slot 9, in which the enlarged portion 4' of the plunger 4 operates, and in advance of said slot with the curved slot 10, in which the anti-friction-roller 11, mounted on a stud at the forward end of the finger 7, is adapted to operate.

Projecting from the under side of the enlarged portion 4' of the plunger 4 is a stud 12, which is adapted to operate loosely within the hooked end 13 of the finger 7 and along the side of the shank of said finger when said plunger is reciprocated, thereby imparting a requisite movement to said finger for the purpose of forming a staple from a section of wire 14, which is fed to the block 2 through a suitable feed-opening 2', provided in its lower forward portion, as shown in Fig. 3.

The block 15, which is mounted in the opening 15' provided in the forward portion of the block 2, is provided at its upper end with a groove 16, through which the wire 14 is adapted to pass as it is fed to the staple-forming parts, and also with the overlapping lip 16', which is adapted when the block is in low-

ered position to coact with the upper side of the rib or shoulder 17, formed on the forward end of the partition 6, and hold the wire in position around said shoulder during the forming operation. As soon as a staple has been formed about the shoulder 17 the block 15 is automatically forced upwardly for the purpose of severing the staple from the length of wire 14 and causing the severed staple to be moved in alining position with the discharge end of the plunger 4. The severing operation is accomplished by reason of the sharp forward edge of the groove 16 shearing against the contiguous cutting edge of the partition 18, which is disposed between the wire-feed opening 2' and the path of discharge of the severed staple, as shown in Fig. 3.

For the purpose of imparting a properly-timed reciprocatory movement to the block 15 its lower end is notched and provided with a tongue 18', shaped substantially as shown in Fig. 5, which tongue is adapted to operate within the elongated slot 19, provided in the end of the controlling-rod 20. One shoulder of the slot 19 is longitudinally beveled, as shown at 19', for coacting with the lower beveled edge 21 of the block 15 and causing said block to be raised on the forward movement of the rod 20, and the other shoulder of said slot is formed at the outer end thereof with the lip 19'' for coacting with the beveled portion 18'' of the tongue 18' and causing the block 15 to be lowered on the rearward movement of said rod. The rod 20 is reciprocatorily mounted in a longitudinal groove 22, which is provided in a plane parallel with and below that of the opening 8 and is in communication at its forward end with the opening 15'. Said rod is adapted to receive its movement from the movement imparted to the finger 7 by reason of the pin 23 on the hook 13 of said finger projecting loosely within the transverse notch or recess 24, provided in the rear end of said rod.

A bored or cut-away portion 6' is provided in the partition 6, within which the plunger 4 operates, and the end of the wire is looped to form a staple. The shoulder 17, about which the wire is bent, has its upper surface on a plane with the outer surrounding surface of said bored portion 6' and is formed, by reason of the portion 6' being cut away, at a gradually-increasing depth toward said shoulder. To facilitate the discharge of a staple, the side of the shoulder 17 opposite the block 15 merges at its forward end into a plane with that of the bored portion 6', thereby drawing one leg of a staple in alinement with the staple-discharge opening 25 as it is being formed and the other leg being forced in alining position therewith by the upward movement of the block 15.

When in operation, the bored portion 6' of the partition 6 is covered by a plate 26, which is bolted or otherwise secured to the raised

sides thereof and which is provided with a suitable opening in which the block 15 operates.

Operating in a suitable opening (not shown) provided in the block 2 below the plane of movement of the plunger 4 and parallel therewith is a rod 27, which acts solely as a lateral strengthening member for said plunger. The plunger 4 and rod 27 are rigidly connected at their outer ends by means of a casting 28, which latter has its lower portion forked and is connected to the oscillatory member 29 through the medium of the pivotal link 30. The member 29 is pivoted within a slot provided in the rear of the block 2 and is adapted when oscillated to impart the requisite movement to the plunger 4 and connected parts for forming, severing, and discharging a staple.

A simple mechanism is shown in Fig. 1 of the drawings for intermittently feeding the wire 14 to the block 2 and operating the staple forming and discharging parts thereof.

A properly-timed rotation is imparted to the counter-shafts 31 and 32 from the driven shaft 33 through the medium of the meshing-gears 34 mounted thereon. An eccentric 32', which is mounted on the shaft 32, is pivotally connected to the lever 35, which lever has one end pivoted to the boss 36 on the frame 1 and its other end connected to the oscillating member 29 by the link 37, said lever 35 being adapted when operated to impart an oscillatory movement to said member 29 for the purpose of operating the plunger 4.

A second eccentric 31', of smaller swing than the eccentric 32', is mounted on the shaft 31 and communicates a reciprocatory movement to the die-carrying table 3 through the medium of the bell-crank lever 38 and connected links 39 and 40, the links 40 being pivoted at one free end to the boss 41 on the frame 1 and at their other free end to the table 3, as shown.

The wire 14 is fed to the block 2 by the co-acting feed-wheels 42 and 43, which are caused to be intermittently rotated a predetermined distance by an oscillation of the arm 44, which is mounted on the stud 44' and connected with the bell-crank lever 45 by the rod 46, the said lever 45 being loosely mounted on the stud or shaft 42' and communicating motion to the feed-wheel 42 in one direction of its movement by reason of the pawl 47 engaging and rotating the ratchet 48, which is secured to said feed-wheel 42.

An eccentric cam 49 is keyed to the shaft 31 in coacting position with the roller 50, carried by the arm 44, and is provided with an irregular surface for the purpose of imparting a quick oscillatory movement to the arm 44 and simultaneous feed of the wire 14 at each revolution of said shaft. A contraction-spring 51 is employed to cause a return of the arm 44 to its normal position after being moved in the opposite direction by the cam 49.

In the operation the wire-feed mechanism is so timed that the end of the wire 14 is fed past the side of the roller 11 on the finger 7 as soon as said finger has reached its limit of rearward movement, the block 15 being at this time in lowered position by reason of the position of the controlling-rod 20, so that the feed-opening 16 therein will be in alinement with the feed-opening 2' in the block 2, as shown in Fig. 2. As soon as a proper length of wire 14 has been fed to the block 2 the eccentrics 31' and 32' have started a converging movement of the table 3 and plunger 4, the former moving to clamp an interposed object between the die 3' and the block 2 and the latter moving to form and discharge a staple. When the plunger 4 and finger 7 are at their limit of rearward movement, the stud 12 on said plunger is within the hooked end 13 of said finger and is caused on the forward movement of the plunger to coact with the point or forward portion of said hook 13 and force the finger forward therewith for the purpose of forming a staple and also moving the controlling-rod 20. The said finger and rod are permitted to move forward until the pin 23 on said finger moves into transverse alinement with and is forced laterally within the recess 52, provided in the side of the groove 22, by reason of the stud 12 acting against the inclined or slanting face of the hook-point 13, thereby releasing the hook from engagement with the stud 12 and enabling the plunger 4 to continue its forward movement alone for the purpose of discharging the formed staple through the opening 25. The rear end of the finger 7 when in this position is prevented from lateral movement within the opening 8 by reason of the rib or feather 53, which is formed on the under side of the enlarged portion 4' of the plunger 4, as shown in Figs. 1 and 3, passing within the groove 54, provided in the hooked end of said finger, as shown in Fig. 8. The rib 53 is so positioned on the plunger that it does not enter the groove 54 until after the rear end of the finger 7 has been forced over and the stud 12 passed free thereof. As soon as the end of the wire 14 has been bent around the shoulder 17 the controlling-rod 20, which connects with the finger 7, moves forward and causes the block 15 to be raised, thus severing the formed staple from the wire 14 by shearing contact of said shoulder with the contiguous edge of the cutter-plate or partition 18 and at the same time moving the staple in position to be engaged by the advancing concaved end of the plunger 4, by which it is discharged from the block 2 through the opening 25 about an alining object.

The coöperative movement of the parts is so timed that as soon as the end of the plunger 4 on its receding movement has passed the rear edge of the block 15 the stud 12 engages the hooked end of the finger 7, thereby caus-

ing it to move out of engagement with the recess 52 and have a corresponding receding movement, together with the connected rod 20, which latter is moved to cause a simultaneous lowering of the block 15, so as to bring the groove 16 therein in alinement with the wire-feed opening 2', and thus enable another section of wire to be fed within the bored portion 6', as shown in Fig. 2.

While it has been necessary in the description and drawings illustrating my invention to show and describe some means for operating the staple forming and discharging mechanism, feeding the wire thereto, and operating the clenching-die, it will be obvious that numerous methods for performing these several functions might be devised without detracting from the merits of my invention, which consists, broadly, in the provision of mechanism for forming a staple into U shape from a section of wire fed thereto previous to the severing of the staple from said wire and then discharging the staple from said mechanism. It is also apparent that such changes in the form, proportion, and minor details of construction of the parts as fairly fall within the scope of my invention may be made without departing from the spirit or sacrificing any of the advantages thereof.

I also wish it understood that while I have particularly described my invention as being for use in conjunction with wire-fabric machines the same might be used separately or in connection with other machines for similar or analogous purposes without departing from the spirit of my claims.

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

1. In a staple-machine, a member, a tool operative in said member to bend a length of wire previously fed thereto about a portion thereof, the said bent section lying at one side of and in substantial parallelism with the feed of the wire mechanism for severing the wire after the forming of a staple, and means for discharging the staple after the severing of the wire.

2. In a staple-machine, a stationary member, mechanism comprising a plunger and associated finger operative in said member to form a staple into U shape from a section of wire fed thereto and discharge the same from said member, and mechanism for severing the wire after a staple is entirely formed and prior to the discharge thereof.

3. In a staple-machine, a stationary member, mechanism comprising a plunger and connected finger operative in said member to form a staple from a section of wire fed thereto and discharge the same from said member, and mechanism operated by a movement of said plunger to sever the fed section of wire after a staple has been entirely formed therefrom and prior to its discharge.

4. In a staple-machine, a fixed member, and mechanism in said member comprising a plunger and dependently-movable staple-forming and wire-cutting parts for successively bending upon itself a section of wire fed to said member to form a staple, severing the staple from the connected wire, and discharging it from said member.

5. In a staple-machine, a fixed member, a staple-discharging plunger, a staple-forming finger and a wire-cutting mechanism all mounted in said member and movable in unison to successively bend a section of wire fed thereto upon itself to form a staple the legs of which lie in the general direction of the feed of the wire, sever the wire and discharge the staple, means for imparting movement to said finger and cutting mechanism from said plunger, and means for operating said plunger.

6. In a staple-machine, a fixed member having a shoulder about which a staple is formed, a block having a wire-feed opening therein, a plunger operative in said member to discharge a staple therefrom, a dependent element for forming a staple from a section of wire fed to said member, means movable by said plunger for moving said block to sever the fed wire after a staple has been formed and raising the staple in position to be discharged by the advancing plunger, and mechanism for operating said plunger.

7. In a staple-machine, a fixed member having a series of parallel openings therein, a shoulder in the plane of one of said openings, a plunger operating over said shoulder in the opening therewith, an element movable by said plunger operating in one of the other of said openings and having a portion movable in a plane with and adapted to bend a section of wire previously fed to said member around said shoulder, a member operated by a movement of said plunger to sever the wire after a staple is formed and move the same in position to be discharged by the advancing plunger, and means for imparting the requisite movement to said plunger.

8. In a staple-machine, a fixed member having a series of parallel openings therein, a shoulder in one of said openings, a slot formed in the partition separating said openings and extending partially around said shoulder, a plunger operative over said shoulder in the opening therewith, a finger operative by said plunger in the other of said openings and having a portion movable in said slot for forming a staple about said shoulder from a wire fed to said member, an element movable by

said finger to cut the wire after a staple has been formed and move the same in position to be discharged by said plunger, means for intermittently feeding a wire to said member, and means for operating said plunger.

9. The combination in a staple-machine, of a fixed member, mechanism operative in said member to successively form a staple into U-shape from a section of wire fed thereto, sever the staple from the wire after being entirely formed, and discharge the severed staple, a movable die coacting with the discharge end of said member to clench the discharged staple about an interposed object, and means for operating said mechanism and die.

10. The combination in a staple-machine of a fixed member, a shoulder in said member, a die adapted to be moved to intermittently coact with the face of said member, an element operative in said member to form a staple around said shoulder from a section of wire fed thereto, an element operative to sever the staple from the wire when formed and raise the same above said shoulder, a plunger for discharging and clamping the staple about an object held between said member and die and adapted when moved to actuate said two elements, and means for operating said plunger and die.

11. In a wire-working machine, a fixed member, mechanism for intermittently feeding a section of wire to said member, a staple-forming element and a staple-discharging element operative in said member and movable in a line parallel with the line of feed of the wire, the former element being adapted to bend a portion of the fed wire upon itself to form a U-shaped staple, and the latter element to discharge the formed staple, and means for severing the staple when entirely formed from its thread.

12. In a staple-machine, a fixed member, mechanism for intermittently feeding a section of wire to said member, a shoulder in said member about which the wire is bent, means movable parallel with the line of feed of the wire for engaging the end thereof and bending it about said shoulder to form a U-shaped staple, mechanism for severing the staple when entirely formed, and means for discharging the severed staple.

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

EDWARD J. GIBSON.

Witnesses:

M. H. VOWLES,
EMMA WHITE.