V. HOXIE.

STAPLE FORMING AND DISCHARGING MECHANISM.

APPLICATION FILED FEB. 27, 1909.

942,904.

Patented Dec. 14, 1909

2 SHEETS—SHEET 1

Fig. 1.

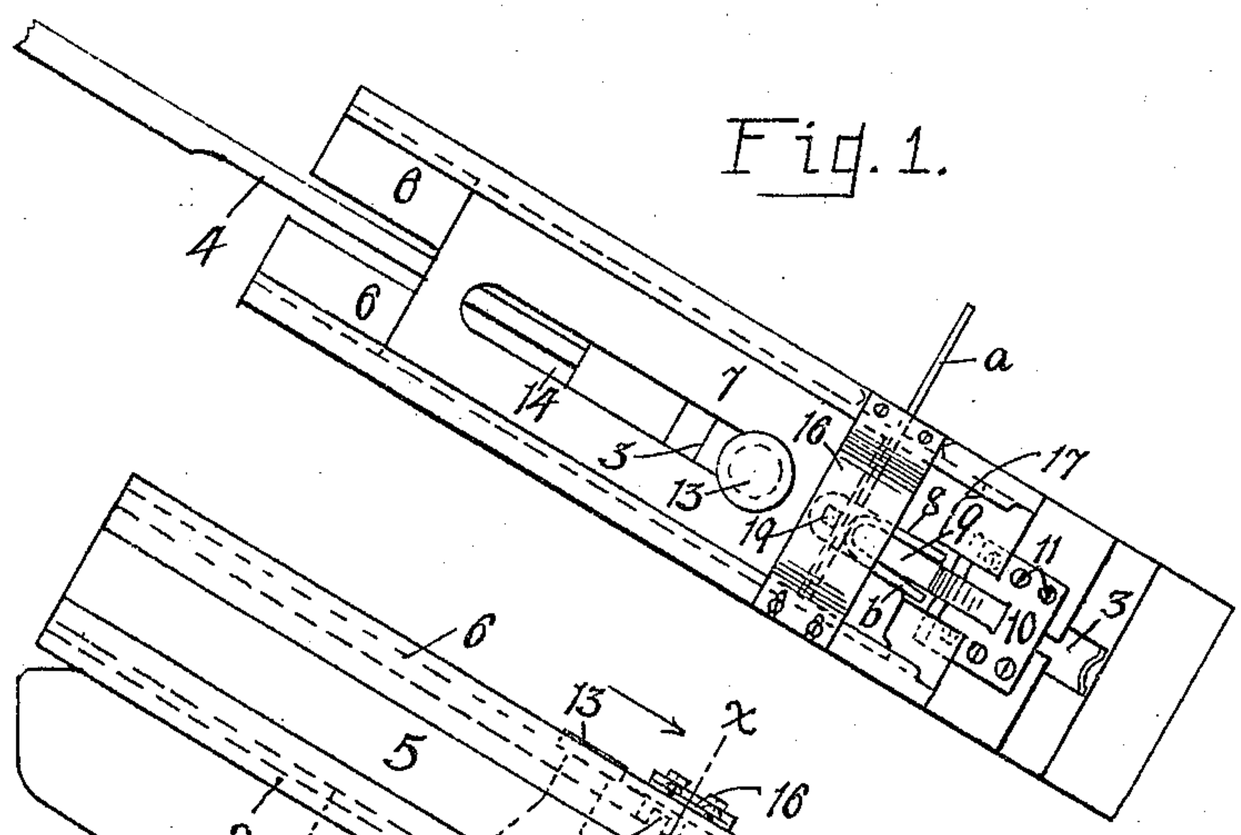


Fig. 2.

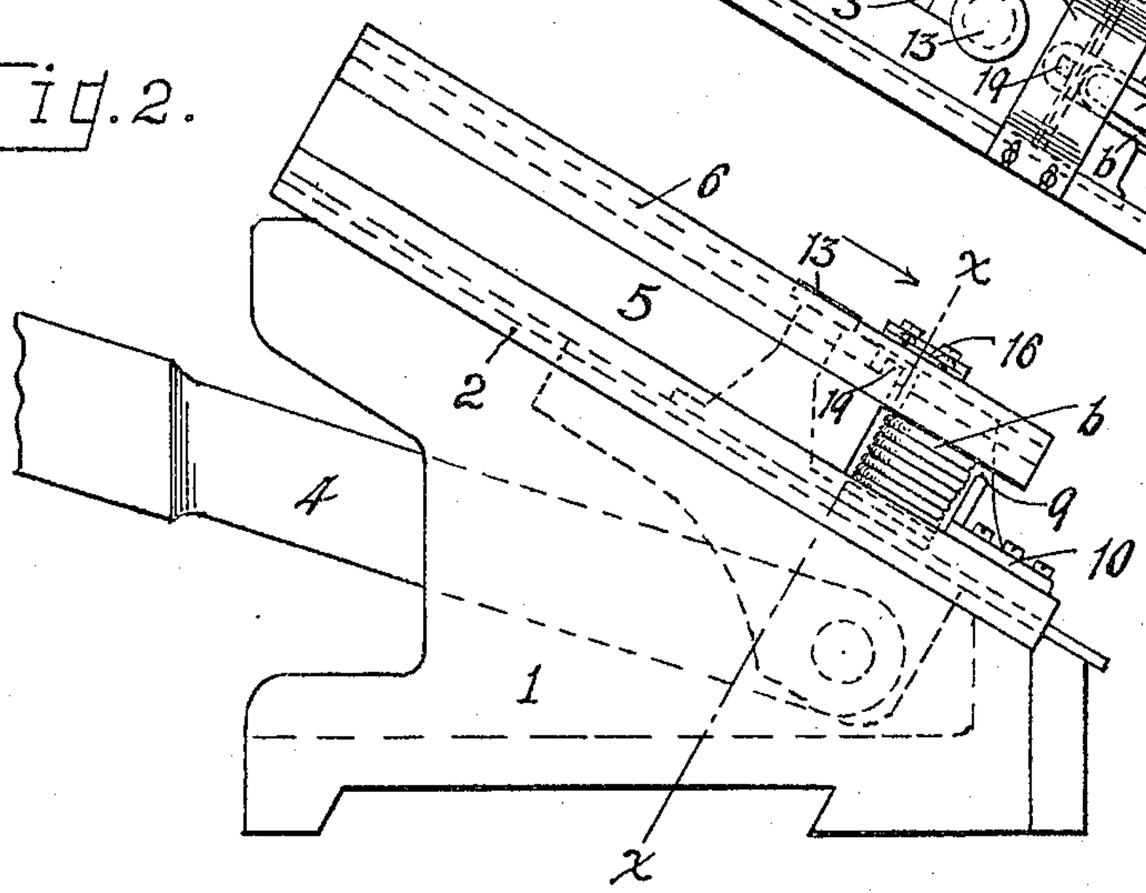


Fig. 3.

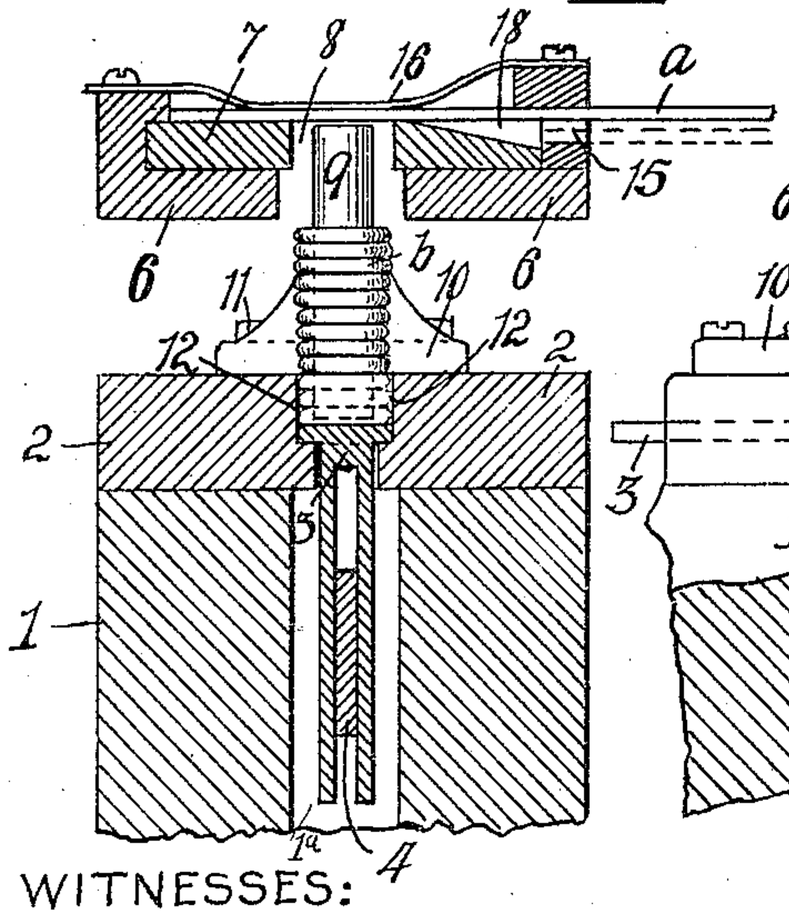
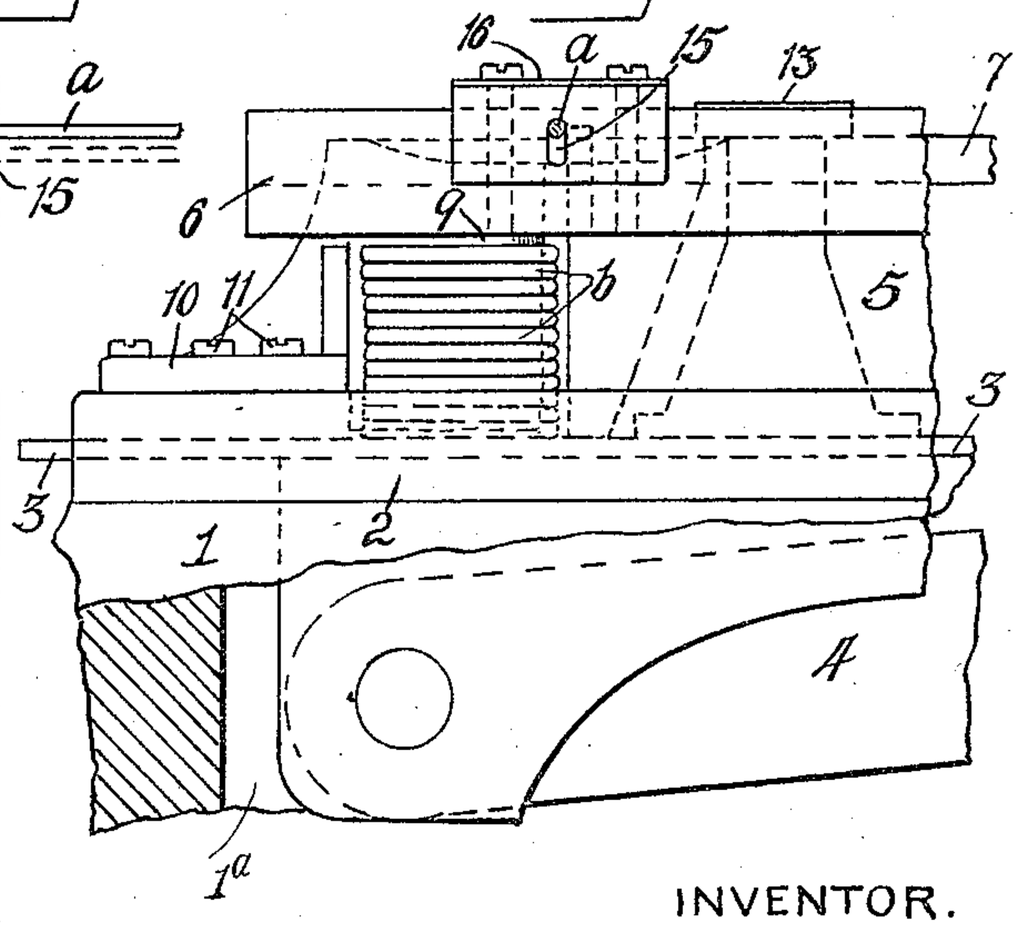


Fig. 4.



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2 SHEETS—SHEET 2.

Fig. 5.

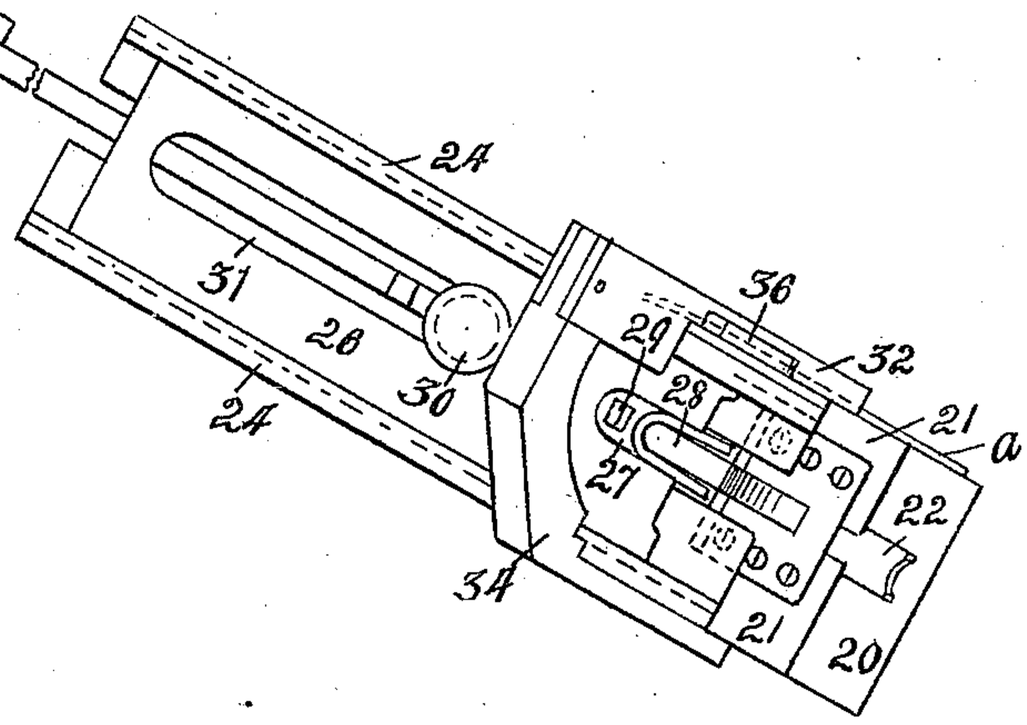


Fig. 6.

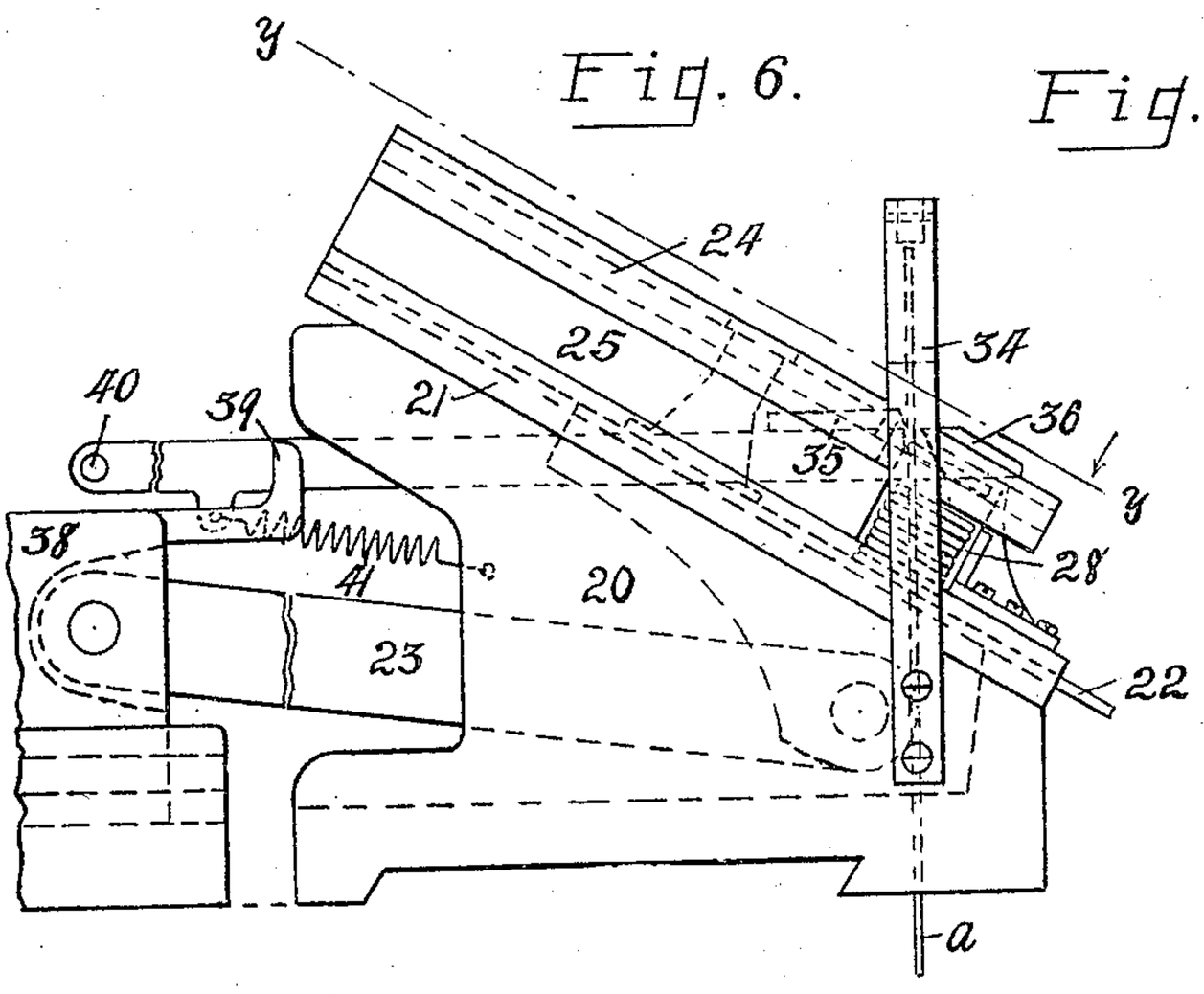


Fig. 7.

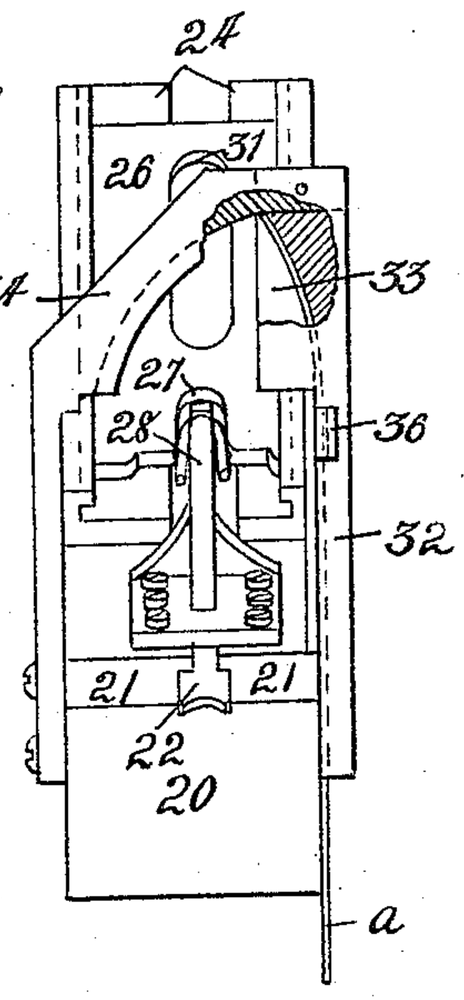
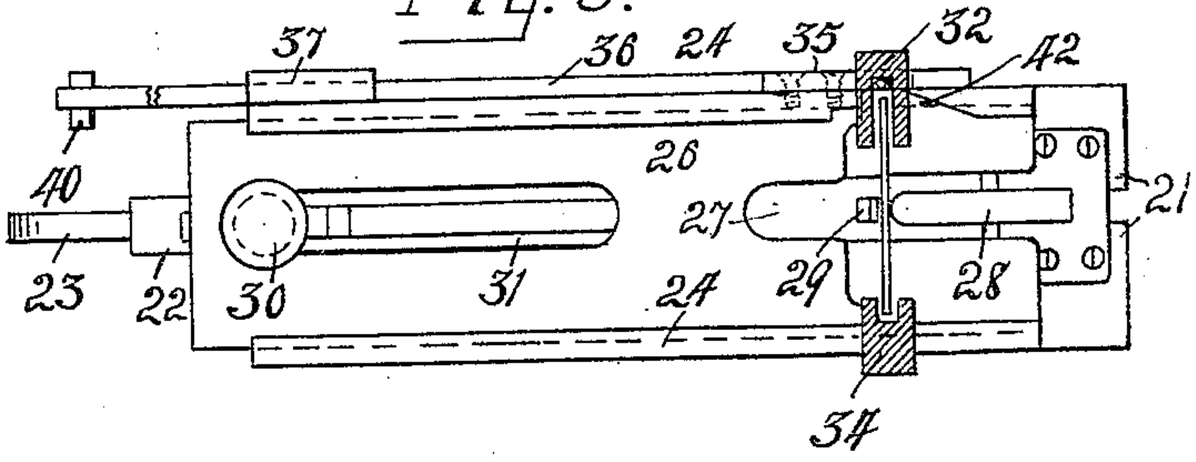


Fig. 8.



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UNITED STATES PATENT OFFICE.

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STAPLE FORMING AND DISCHARGING MECHANISM.

942,904. Specification of Letters Patent. Patented Dec. 14, 1909.

Application filed February 27, 1909. Serial No. 480,439.

To all whom it may concern:

Be it known that I, VERNON HOXIE, a citizen of the United States, and a resident of Adrian, in the county of Lenawee and State of Michigan, have invented a certain new and useful 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 characters of reference marked thereon, which form a part of this specification.

My invention relates to mechanism which is particularly intended for use in connection with machines for the weaving of wire fabric and adapted to intermittently sever lengths of wire fed thereto, form the same into staples, and then to discharge and clamp them about portions of the fabric being woven.

The object of my invention is the provision of an improved and highly efficient mechanism of this class, which is simple and cheap in its construction, positive in its operation and capable of holding a plurality of formed staples in readiness to be successively discharged therefrom, and clamped about the fabric being woven.

The operation, construction and arrangement of the parts of the invention are fully described in the following specification and two embodiments thereof illustrated in the accompanying drawings, in which,—

Figures 1 and 2 are top face and side elevations, respectively, of one form of my invention, with the plunger at its limit of forward movement. Fig. 3 is an enlarged cross-section on the line *x x* in Fig. 2. Fig. 4 is an enlarged side elevation of the upper forward portion of the same. Figs. 5, 6 and 7 are top face, side and front end elevations, respectively, of another form of my invention, with the movable parts at their limits of forward movements, and Fig. 8 is a section on the line *y y* in Fig. 6, with the movable parts at their limit of rearward movements.

My invention in its broader aspect may be embodied in different forms of apparatus, and in the present instance I have shown and described two forms, a preferred form, which is illustrated in Figs. 1 to 4 of the drawings, and a modified form, which is illustrated in Figs. 5 to 8.

Referring to the preferred form of the invention, 1 designates the holder, which has its top longitudinally inclined, as shown, to suit the angle at which it is desired to discharge a staple relative to a horizontal plane, and 2, 2 a pair of guide-bars or blocks which are mounted on the inclined top of the holder longitudinally thereof and in transversely spaced relation, and have their inner or contiguous faces longitudinally grooved to form guide-ways for complemental portions of a staple-discharging plunger 3 and a discharge-way for the staples delivered thereto as hereinafter described. The plunger 3 has a portion projecting down within a longitudinally grooved or cored portion 1^a of the holder, as shown in Figs. 3 and 4, and connected to the forward end of an operating-rod 4, which has reciprocatory movements imparted thereto by any suitable means, such for instance as that shown in my former United States Letters Patent No. 879,965, dated February 25, 1908.

5 designates a block, which is supported by the guide-bars 2, 2 being secured thereto in any suitable manner, and in turn supports a similar pair of transversely spaced bars 6, 6, which parallel the bars 2, 2 and are grooved to form guides for the reciprocatory staple-forming plate 7, as shown. The forward end of the plate 7 is provided with a groove 8, which when the plate is moved forward straddles and coöperates with a relatively fixed boss or anvil 9 to form a staple from a section of wire disposed intermediate such forming parts.

The boss 9 is disposed in advance of the block 5, which terminates short of the forward ends of the bars 2, 6 for such purpose, and rises from between the guide-bars 2, 2 immediately above the plunger 3, with its upper end projected between the upper guide-bars 6, 6 and into the plane of movement of the plate 7, thus providing both a male staple forming part and a slide for guiding the gravity movements of the staples from forming to discharging position. The boss 9 has its lower forward portion formed with a broadened foot 10, which is secured to the tops of the bars 2, 2 by screws 11 or in any other suitable manner. The

bars 2, 2 have the top walls of their plunger receiving grooves cut away at the sides of the boss 9, as at 12 Fig. 3, to permit the staples to enter the discharge-way as they slide down the boss.

Rising from the top of the plunger 3 is a boss 13, which works up through a registering longitudinal slot in the block 5, between the guide-bars 6, 6 and through a slot 14 in the plate 7. The slot 14 is shorter than the throw of the boss so that the plate 7 has short forward and rearward movements imparted thereto by said boss when the plunger is reciprocated.

The wire *a* from which the staple sections are severed is fed to the forming parts by any suitable intermittent wire feeding mechanism through the vertically elongated opening 15 in one of the guide-bars 6 and over the forward end portion of the forming plate 7, due to its feed being timed to take place during the first portion of the rearward movement of the plunger or while the plate 7 is at its limit of forward movement. As the plate 7, on its rearward movement, recedes from under the fed length of wire the bowed spring 16, which has its ends attached to the tops of the bars 6, 6, forces the wire in advance of such plate directly in rear of the boss 9. On the next forward movement of the plate the fed length of wire is first severed from its thread, due to the shearing action of the side edge 17 of the plate with the inner edge of the feed opening 15, and is then formed into a staple *b* by the coöperating action of the boss 9 and registering notch or groove of such plate.

As the end of the wire *a* is below the top surface of the plate 7 when a feeding movement is imparted thereto the upper edge of such plate which is contiguous to the feed opening 15 is chamfered or cut away, as at 18 Fig. 3, to guide the wire to the top of the plate as it feeds forward.

19, Figs. 1 and 2, designates a stud, which rises from the forward end portion of the block 5 in rear of the boss 9, and on each rearward movement of the plate 7 coacts with the loop end of the staple formed on the previous forward movement of such plate and effects its ejection from the notch 8. The staples on the boss or slide 9 are prevented from rearward displacement thereon by the front end of the block 5 and the stud 19.

In the operation of this form of my invention, it is apparent that on the first part of the rearward stroke of the plunger 3 a length of wire is fed over the top of the forward end of the plate 7, and that when the plunger has moved a distance equal to the length of the slot 14 in the plate 7 the boss 13 strikes the rear end of such slot and causes such plate to move with the plunger the remainder of its throw, which movement is sufficient to withdraw it from under the fed wire length to permit such length to drop between the forward end of said plate and the boss 9 under the influence of the spring 16. As the nose of the plunger 3 in its rearward movement recedes from under the boss or staple-slide 9, which carries a plurality of staples, the lower staple drops by gravity into the discharge-way in advance of the plunger. On the forward movement of the plunger this staple is discharged from the apparatus and clamped about an alining object, and when the boss 13 has moved forward the length of the slot 14 it acts on the plate 7 to move it forward to sever the fed length of wire and form a staple therefrom around the boss 9. On the next rearward movement of the plate 7 the staple just found is forced from the notch 8 therein, due to the contact of its rear or loop end with the stud 19, and drops down the boss 9 by gravity and rests on the top of one of the staples stored thereon, as shown.

In the modification shown in Figs. 5 to 8, which is substantially the same as the form above described, except that the direction of feed of the wire thereto and the wire severing means are different, 20 designates the holder; 21, 21 the lower guide-bars secured to the inclined face thereof; 22 the staple-discharging plunger working in said guide-bars; 23 the plunger actuating bar; 24, 24 the upper guide-bars, which are spaced from the lower guide-bars 21 by the block 25; 26 the staple-forming plate having the staple-forming notch 27 in its forward end; 28 the staple-forming boss and slide; 29 the stud for ejecting the staples from the notch 27 of the forming plate on the rearward movements of such plate, and 30 the boss on the plunger, which moves the plate 26 and works through a slot 31 therein. The wire *a* instead of feeding transversely of the apparatus, as in the case of the form first described, is shown as feeding thereto through a vertical feed-guide 32 the upper end of which projects above the contiguous guide-bar 24 a distance a little greater than the length of feed of the wire. The portion of the guide 32 projecting above the apparatus is transversely broadened to project inwardly a short distance and has its inner side grooved, as shown at 33 to permit the fed lengths of wire to fall inwardly in advance of the forming plate 26 when severed. The groove 33 is shown as being gradually shallowed toward its top, to effect an inward springing of the upper ends of the fed lengths of wire when severed. The section is guided in its falling movement by the inner channeled face of the member 34, which rises from the opposite side of the apparatus to the guide 32 and connects with

the upper end of such guide with its channel in register with the channel or groove 33 thereof. The fed wire lengths are severed from their thread by the coöperating shearing action of a fixed cutter-die 35, which is secured to the side of the upper guide-bar 24 contiguous to the feed-guide 32, and the reciprocatory cutter-bar 36. This cutter-bar is horizontally disposed and has its forward end projected through a guide opening in the guide 32, which opening intersects the wire feed passage in said guide, and has its rear end working through a guide 37 secured to the side of the holder 20, see Fig. 8. The wire *a* is intended to feed upwardly through a flaring groove (see dotted lines Fig. 6) provided in one side of the bar 36 in register with the feed passage through the guide 32, and the fed lengths are severed therefrom due to the upper contracted end of said groove working under the nose of the fixed cutter 35 when a slight rearward movement is imparted to the bar. 38 designates a reciprocatory table or sliding member to which the rear end of the plunger actuating bar 23 is attached, and which has a finger 39 projecting from its top in position to engage a pin 40 on the rear end of the cutter-bar 36 and impart a slight rearward or cutting movement to such bar when the table is near the limit of its rearward throw. On the forward stroke of the table 38 the cutter-bar is returned to its forward position by the action of a contraction-spring 41 thereon, which has its ends attached to the bar and holder as shown. The upper side edge of the guide-bar 24 contiguous to the cutter-bar is cut away, as at 42 Fig. 8, to receive the severed end of the wire section as it falls over in advance of the forming plate 26, and to permit such end to swing forward when being formed into a staple.

I wish it understood that my invention is not limited to any specific arrangement and construction of the parts except in so far as such limitations are specified in the claims.

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

1. In an apparatus of the class described, the combination of a holder having a staple-discharge way therein, a member movable to discharge a staple from said way, a reciprocatory female staple-forming member guided by said holder for movements in a plane which is spaced from said discharge-way and having its movements actuated by the movements of said discharging-member, an anvil carried by the holder and coöperating with the female forming-member to form a staple, said anvil serving as a magazine for holding a plurality of formed staples and having its lower end extended to a point immediately above the discharge-way whereby at each movement of the plunger in one direction the lower staple drops by gravity into said discharge-way in advance of the staple-discharging plunger.

2. In an apparatus of the class described, the combination of a holder, guide-bars secured to the top of said holder and forming a staple discharge-way, a plunger operative to intermittently discharge staples from said way, a second set of guide-bars spaced from said first set, a staple-forming member guided for reciprocatory movements by said second set of guide-bars, means connecting the plunger and said member whereby intermittent reciprocatory movements are imparted to said member, means coöperating with said member to form a staple from a section of wire fed therebetween, said means serving as a holder for a plurality of staples and as a means for guiding the formed staples from forming to discharging position, and means for preventing rearward movements of the staples when formed relative to said forming means.

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

VERNON HOXIE.

Witnesses:
E. A. Ballenberger,
C. E. Clement.