(No Model.) 3 Sheets—Sheet 1.

E. R. JOHNSON.

WIRE STITCHING MACHINE.

No. 496,314. Patented Apr. 25, 1893.

Fig. 2.

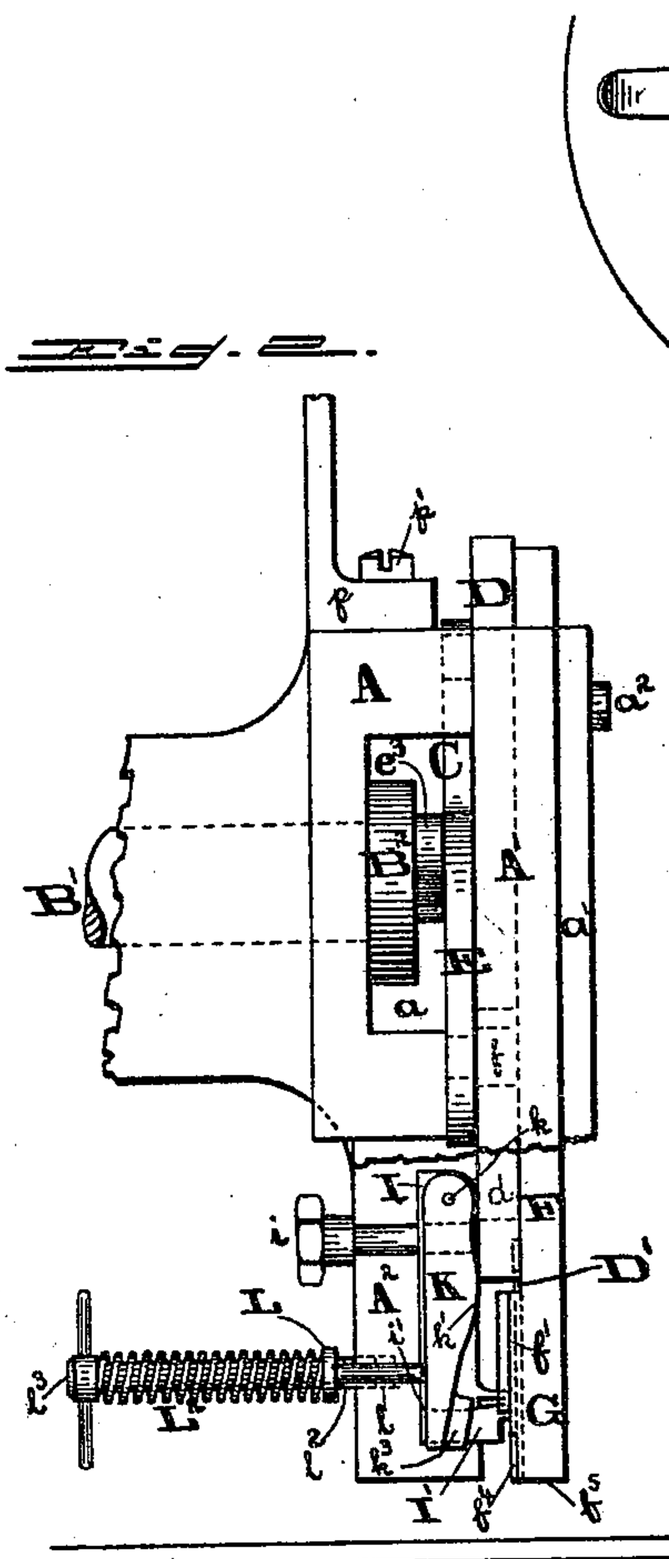


Fig. 1.

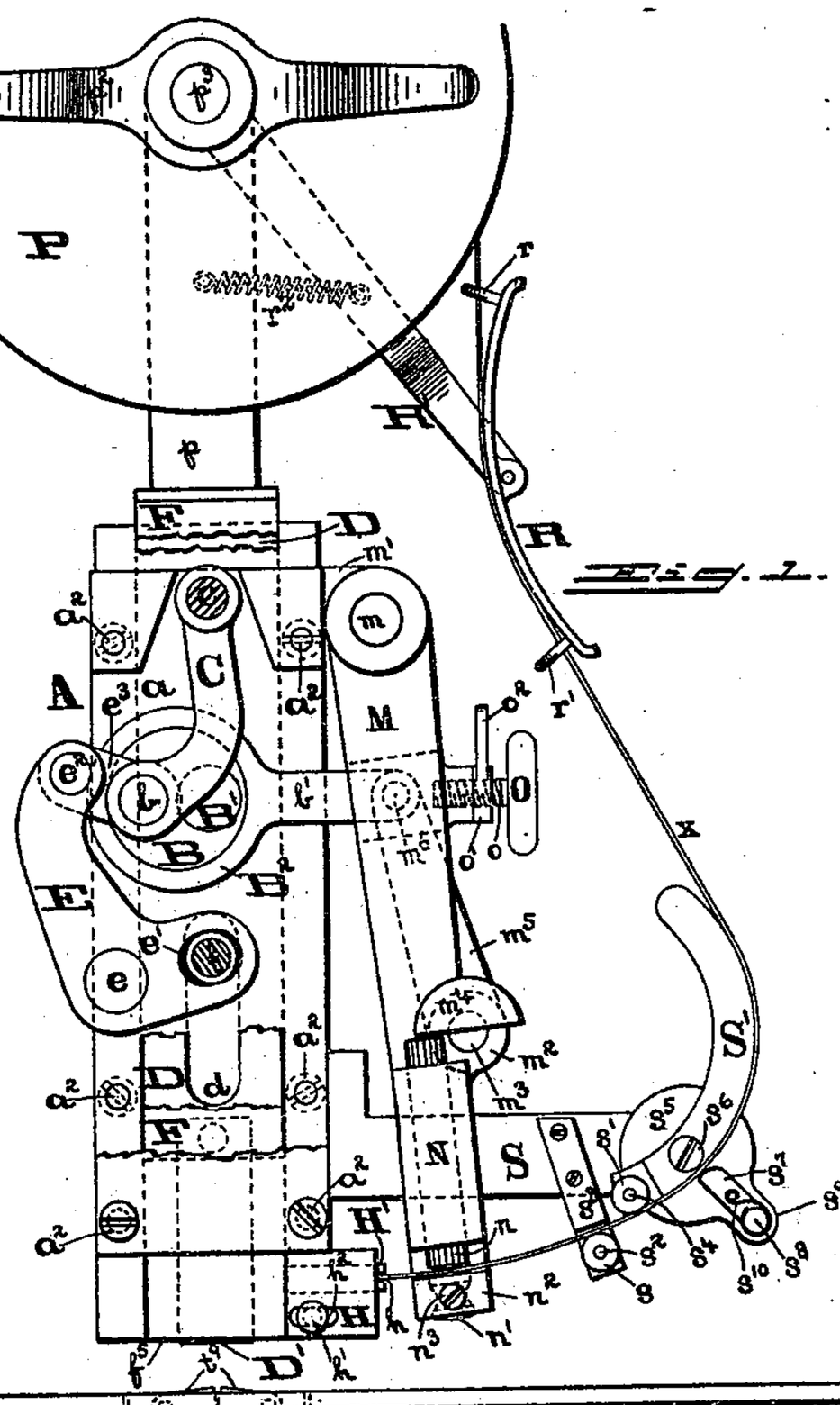
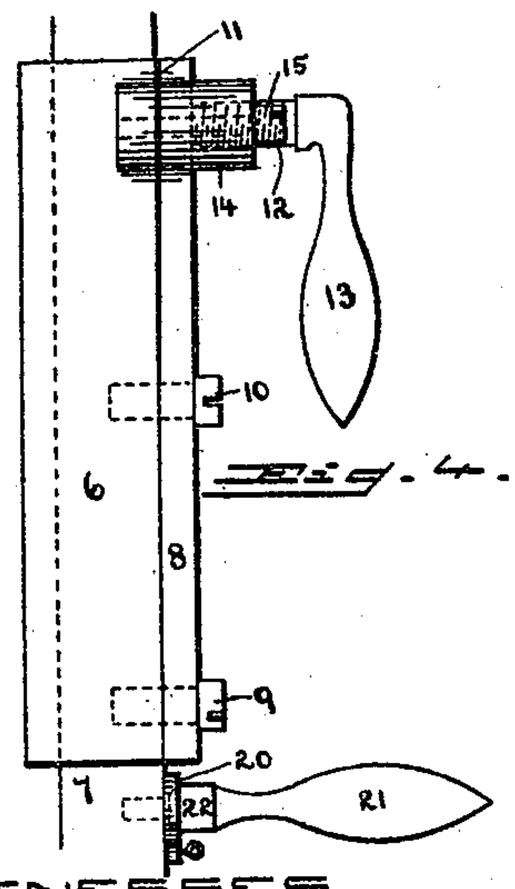


Fig. 4.



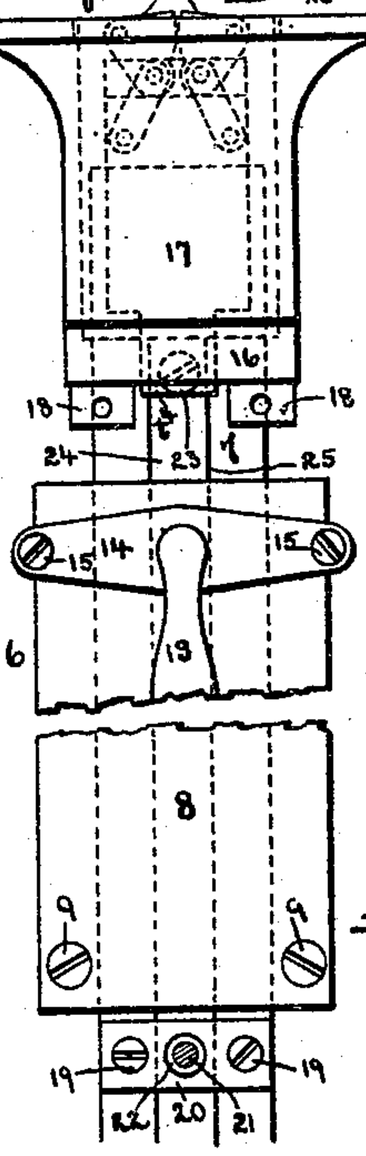


Fig. 5.

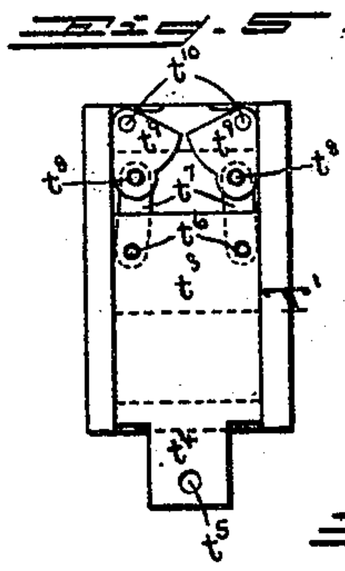


Fig. 3.

WITNESSES

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(No Model.) 3 Sheets—Sheet 2.

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WIRE STITCHING MACHINE.

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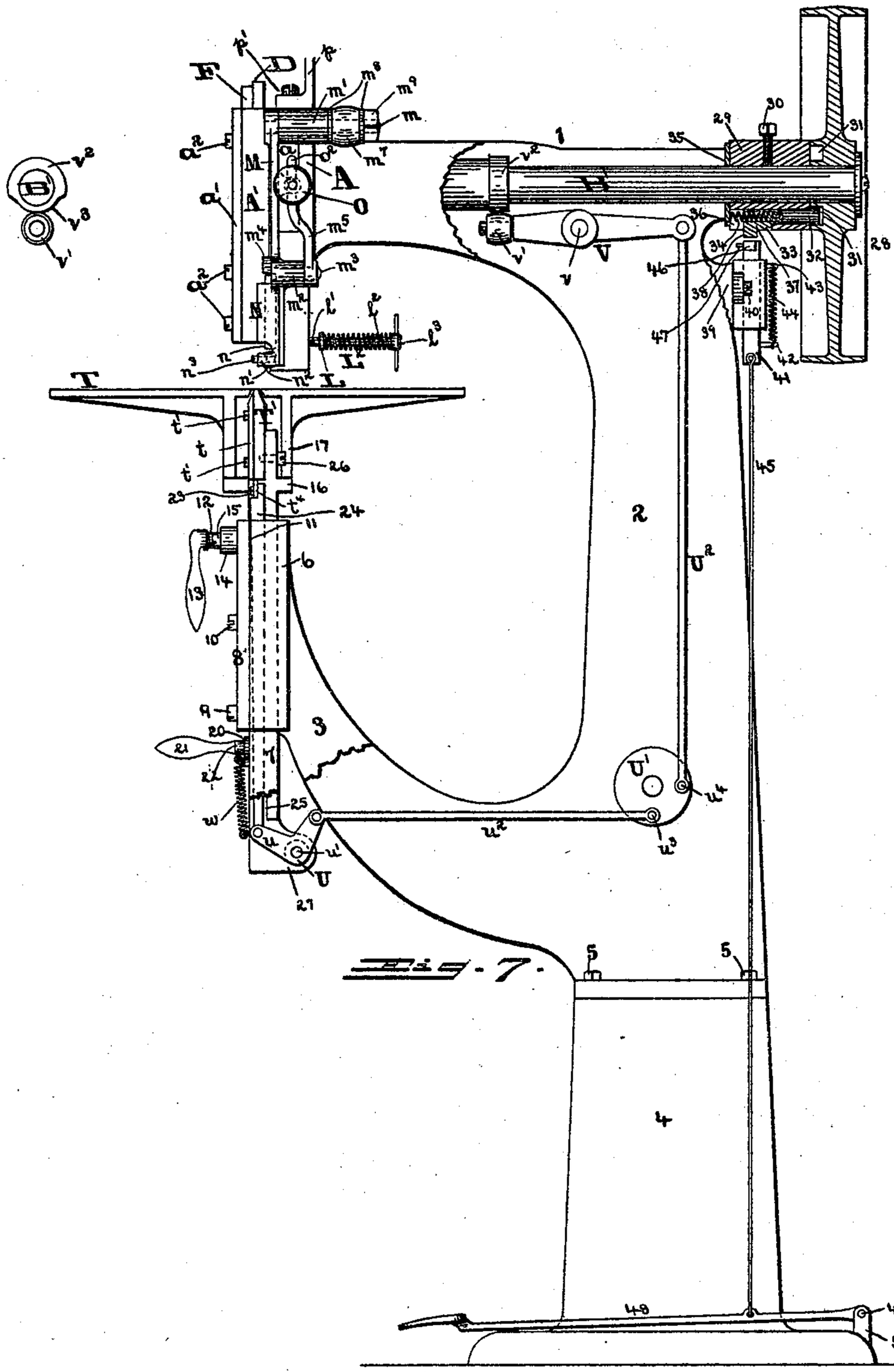

Fig. 7.

WITNESSES

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WIRE STITCHING MACHINE.

No. 496,314. Patented Apr. 25, 1893.

Fig. 8.

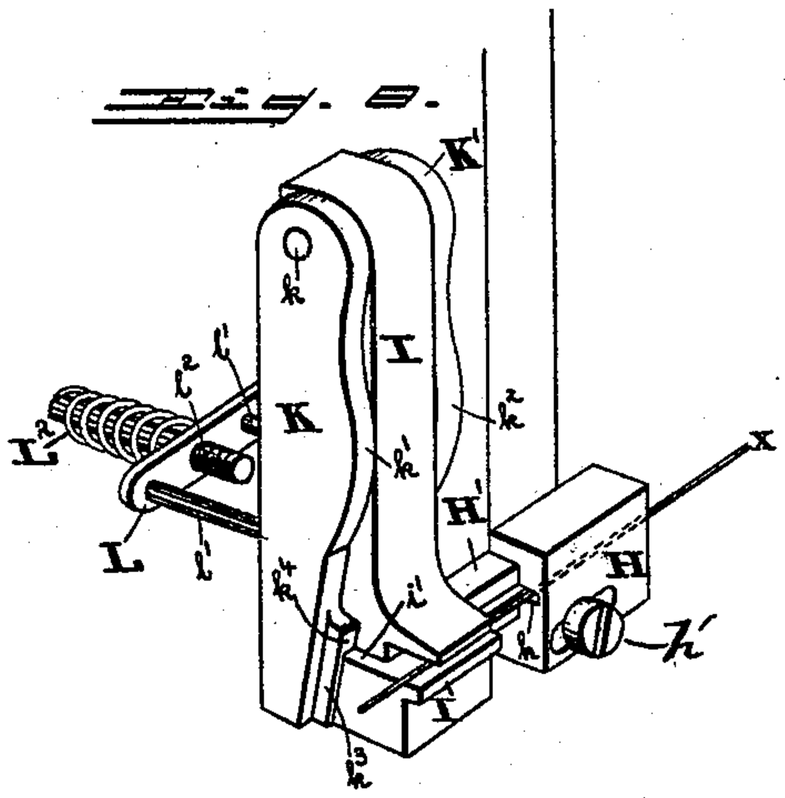


Fig. 9.

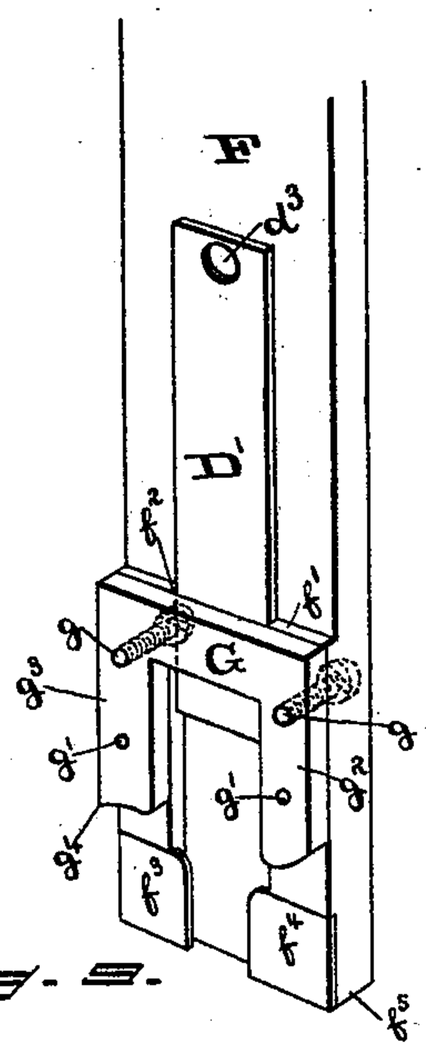


Fig. 10.

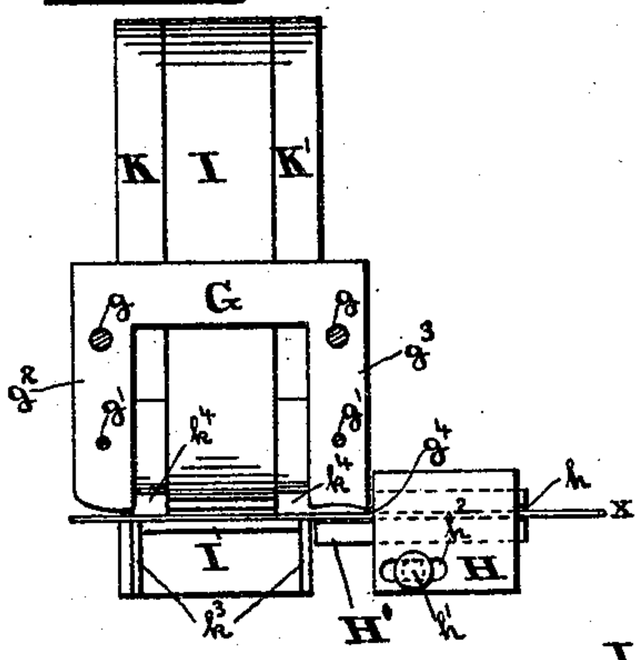


Fig. 11.

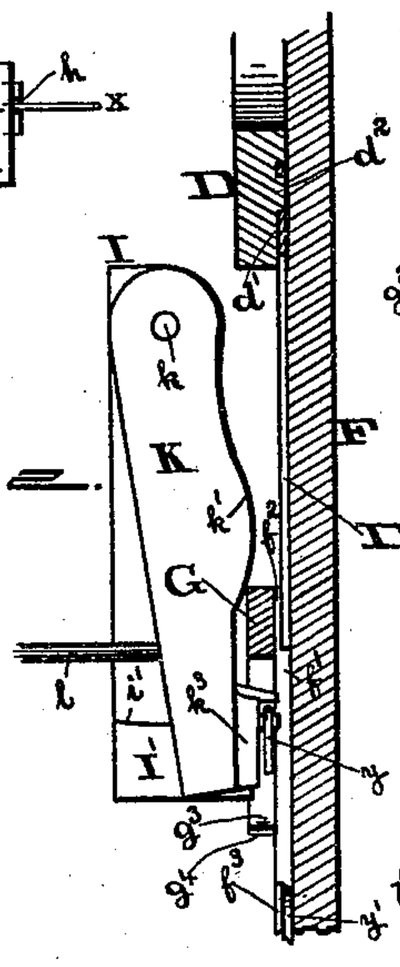
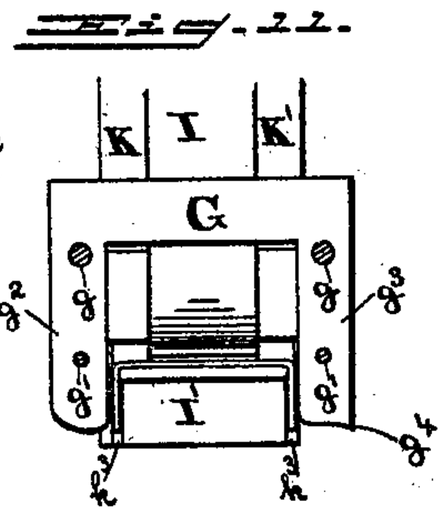


Fig. 12.



WITNESSES

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By Wm. E. Bowell, Atty.

UNITED STATES PATENT OFFICE.

ELDRIDGE R. JOHNSON, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE NEW JERSEY WIRE STITCHING MACHINE COMPANY, OF NEW JERSEY.

WIRE-STITCHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 496,314, dated April 25, 1893.

Application filed August 23, 1892. Serial No. 443,852. (No model.)

To all whom it may concern:

Be it known that I, ELDRIDGE R. JOHNSON, a citizen of the United States, residing at Camden, in the county of Camden and State of New Jersey, have invented certain new and useful Improvements in Wire-Stapling Machines, of which the following is a specification.

My invention has relation to wire-stapling machines having for its object to improve and simplify the construction and increase the efficiency thereof, and consists in the provision of a novel form for each of the wire feeding, wire-cutting, staple-forming and staple-driving mechanism and the means whereby the same may be in continuous, as distinguished from intermittent, operation; the length of wire fed and the pressure exerted thereon, by the feeding device, varied for the reception of wire of different gage; and the length of stitch regulated.

My invention also consists in novel means whereby the position of the table, relatively to the presser-bar of the machine, is governed by the thickness of the pamphlet, &c., to be stapled, and in the provision of a novel form of clincher and means for its operation.

My invention, further, consists in the details of construction and the combinations of parts as hereinafter fully described and claimed and as illustrated in the accompanying drawings, to the end that the various and necessary operations of the machine, for the production of work of the most approved character, may be accomplished through the employment of the fewest possible parts and the least complex motions, conducing to durability, lightness and freedom from noise, together with smoothness and rapidity of running and easiness of operation.

In the drawings: Figure 1 is a front elevation, partly broken away, of the head of the machine and its appurtenances, and Fig. 2 is a side view of the same. Fig. 3 is a front elevation of the table and its support and Fig. 4 a side view of the latter. Figs. 5 and 6 are a front elevation with the front or plate removed and a vertical transverse section, respectively, of the clincher detached. Fig. 7 is a side elevation, on a reduced scale and partly broken away, of the improved machine. Fig. 8 is a perspective view of the anvil and support, the pushers, the guide and cutting blocks, in operative relation. Fig. 9 is a perspective view of the presser-bar, with the cutter and former secured thereto, and the staple-driver in its proper position relatively thereto. Fig. 10 is a front elevation of the anvil and support, the pushers, and the guide and cutting blocks, in the relation shown in Fig. 8, showing the position of the cutter and former when about to cut off a length of wire, when the latter has been shoved by said pushers to the point illustrated by the dotted lines in said figure, and Fig. 11 is a similar view of so much of said parts as is necessary to illustrate the staple-forming operation. Fig. 12 is a side elevation of the anvil and support, with the driving-bar, presser-bar, and cutter and former in section, showing the position of the latter after the forming operation and the pushers in the act of shoving the completed staple off the anvil into the path of the driver.

In the drawings, A represents the head of the machine, having therein a recess *a* for the eccentric B, the latter being secured on the forward end of the main shaft B′ and sustaining the pin *b*, said pin affording a bearing for the lower end of the pitman C, the upper end of said pitman having its bearing on the pin *c* secured in the driving-bar D near its upper end.

E is a bell-crank lever pivoted on the pin *e*, sustained by the head A, at one side thereof, said lever having a slot *e′* in its shorter end and supporting the pin e^2 in its longer end, said pin e^2 affording a bearing for one end of the link e^3, the latter forming the actuating medium for the lever E, through having its other end journaled on the eccentric-pin *b*. As will be observed, the driving-bar D has therein, about midway of its length, a longitudinal slot *d*, the same affording a clearance for the pin *f*, of the presser-bar F, said pin passing through said slot and into the slot *e′* in the lever E, the slot last mentioned permitting of freedom of movement therein of the pin *f*, upon the reciprocation of the presser-bar by said lever.

The lower end of the driving-bar D has therein a short recess *d′*, of a depth equal to

the thickness of the driver D′, having therein a round boss or projection d^2, said boss being provided for engagement with the opening d^3 in the upper end of the driver and said recess permitting of such upper end resting within the plane of the surface of the bar D, so as to not interfere with the sliding freely of the presser and driving-bars upon each other and within the box A′ of the head A, said bars being retained in operative relation with each other, and with their connections, through the medium of the lid or plate a', the latter being secured in position by the screws a^2.

The lower end of the presser-bar F is thickened or enlarged, as at f', such enlargement having a vertical groove f^2 therein, the same forming a slide-way for the driver D′ and the latter being secured against dislodgment therefrom by the combined cutter and former G, which is secured to the face of the enlargement by the screws g g and extends over said groove, which screws pass thereinto from the rear, and by the pins g' g'. The driver D′ being further retained in the groove f^2 by the guides f^3 f^4, which latter are secured in recesses at opposite sides of and project, for a short distance over the edges of said groove, forming a tube for reception of the staple and serving to poise or hold such staple in position for driving, the lower end f^5 of the presser-bar operating as a presser-foot, while the space between the guides prevents the lodgment of any improperly formed staples at the entrance to the tube and the consequent clogging up thereof.

The cutter and former G is, as shown, of angular shape, having two depending legs g^2 g^3, the leg g^3 having its lower end sharpened at its outer edge, as at g^4, while the end of the leg g^3 is rounded. This cutting edge, in conjunction with the block H, with which it is in close relation, operates to exert a shearing action on the wire at the point where it passes from that portion of the slot h which is in said block, thus separating it into the proper lengths.

I represents the anvil support, the same being secured to the leg A^2 of the head of the machine by means of the screw i, which screw passes through said leg and into the support, the latter having its lower end forwardly extended, foot-like, into a forming-anvil I′, said anvil being of such width as to permit of its projecting between the legs of the cutter and former to such extent as that its forward edge will barely clear the path of the driver, there being left a space between the sides of the anvil and the adjacent sides of said cutter and former of a width equal to the thickness of the wire employed. Accordingly, as such wire is cut off, in the manner hereinbefore explained, the former will continue downwardly from the cutting position, causing the bending of the free ends of the wire down against the sides of the anvil and the formation of the staple. The upper end of the anvil-support sustains a transverse pin k, upon the projecting ends of which are pivoted the pushers K K′, the latter having their lower ends forwardly extended and provided with the offsets k^4, the same permitting such ends to overlap the ledges of said anvil-support and project slightly over the top of the anvil. These extensions k^3 are diminished in thickness, so as to permit of their interposition between the sides of said anvil and the adjacent edges of the cutter and former, and have their front edges so inclined that they will stand vertically, when the pushers are swung forwardly their full extent, permitting of the pushing of the staple squarely off the anvil.

The cross-bar L has secured thereto the pins l l', which bear against the rear edges of the pushers, and the rod l^2 passes through a central opening in said cross-bar, said rod having its inner end threaded and in engagement with a correspondingly threaded socket in the leg A^2, and is provided at its outer end with a thumb-piece l^3, between which and said cross-bar is interposed the spring L′, said thumb-piece affording means for screwing, in or out, the rod l^2 and varying the pressure of the encircling spring on the cross-bar and, consequently, the pressure of said pins on the pushers.

M is the feed-bar of the machine, which is supported on one end of the shaft m, such shaft being journaled in the boss m' on the head A of the machine, and having on one edge the boss m^2, the latter affording a bearing for the rock-shaft m^3, the forward end of which shaft has secured thereon an inverted semi-circular disk m^4, while the rear end thereof has secured thereon the lower end of the curved lever m^5, such lever being jointed, hinge-like, to the arm b' of the eccentric-strap B^2, through the medium of the pin m^6.

n represents one of the feed-jaws, the same being a circular rod sustained in a box or bearing N near the lower end of the bar M, having its ends rounded and smooth, at its upper end abutting against the flat part of the disk m^4 and at its lower end being opposed to the stationary jaw n', said jaw being also circular and is secured in the lug n^2, at the lower extremity of said bar M, by the screw n^3 which projects into a groove therein. It will be seen that the shaft m has thereon, at the end opposite to that on which the bar M is secured, a rubber cushion m^7, the same being interposed between two washers m^8, which prevent access of oil thereto, and being subject to the impact of the nut m^9, which latter, also, serves to secure the shaft m in the boss m'. Now, owing to the fact that the connection between the lever m^5 and the feed-bar M is loose, the shaft m^3 being loosely journaled in the latter while the lever is secured rigidly to such shaft, when the arm b' is drawn by the eccentric toward the left of the drawing the shaft m^3 will simply turn in its bearings, without the feed-bar moving, until it meets with a resistance

sufficient to prevent its rotation. This resistance is found in the feed-jaw n, the disk m^4 on said shaft coming into contact with said jaw and the wire being interposed between it and the lower jaw. When this occurs, which, as before suggested, involves the gripping of the wire by said jaws, the feed-bar M will move toward the left of the drawing, under the draft exerted thereon by the eccentric-arm b', and accomplish the feeding of the wire to the staple-forming devices. Obviously, the less easily the feed-bar moves on its bearings, or the more friction therein to overcome, the more tightly must the wire be grasped in order to produce a resistance in the shaft m^3 which is greater than that of the shaft m. Therefore, as the amount of friction in the shaft last mentioned is varied so will the pressure of the feed-jaws on the wire vary, thus said jaws are readily adjusted to suit wire of different sizes.

The amount or length of wire to be fed to the staple-forming mechanism is regulated by simply turning the thumb-screw o, by means of the wheel O, and then locking it in position by the check-nut o', the latter having an arm o^2 for facilitating its operation. As the distance is between the opposing ends of the screw o and the eccentric arm b', so will the eccentric move free without actuating the feed-bar, owing to the loose joint, aforesaid, between said bar and the lever m^5. When, however, the screw o and arm b' come together the feed-bar will be actuated, consequently the more the motion of the eccentric, before the movement of said feed-bar, the shorter will be the length of wire fed, while, on the other hand, the less of such motion the greater the length of wire. Obviously, the feed-bar M may be actuated to equal effect by lengthening the pin b sufficiently to permit of pivoting one end of a pitman thereon, the other end of which latter being jointed to the lever m^5, through the pin m^6, the same as is the eccentric arm. The pin b, in this event, is a crank-pin; which, through the intermediate connections, operates the feed-staple-forming and driving mechanism; and the eccentric B a crank-disk. The advantage in the employment of the strap B', however, is that of greater compactness.

The reel P, which is supported by the arm p, secured to the head A of the machine by the screw p', is of ordinary form and provided with the usual spring p^2, secured to the spindle p^3 upon which the reel rotates, which spring retards the movement of such reel and prevents the unnecessary unwinding of the wire x therefrom. After leaving the reel the wire is as usual subjected to tension, for which purpose any suitable device may be employed, such, for example, as that lettered R, the same being in the form of a guide and having at its ends the loops or eyes r r' for the passage of said wire, the eye r being of about the width of the coil of wire, while the eye r' is considerably narrower and operates to center the wire preparatory to its going through the straightening devices. Said guide or tension, also, being pivotally supported on the outer end of the arm R', which arm is secured on the rear end of the spindle p^3 and has interposed between and secured to it and the arm p, the spring r^2.

The wire-straighteners are shown at s s' in the shape of small rollers, one of which, s, is journaled on the pin s^2 in the end of the fixed arm s^3, the latter being secured to the arm S projecting laterally from the head A, and the other roller, s', having its bearing on the pin s^4 in one end of the pivoted curved plate S', the latter being provided with a circular base s^5 and is adjustably secured to the arm S by the screw s^6. The wire, after leaving the tension device, passes around the plate S'; under the draft of the feed-bar; and between the rollers, which latter operate to bend such wire in opposite directions and straighten it. The plate S' is swung on the screw s^6 so as to bring the axis of the roller s' nearer to or farther from the axis of the roller s, according as the stiffness of said wire requires. After the wire is straightened and grasped by the feed jaws n n' it is passed into the slot h formed by the block H and the guide H', said block and guide each having half of said slot therein, while the guide H' is of such length and is so disposed as to have its inner end in close relation with the rear of the anvil, back of the path of the cutter and former, thus insuring the invariable introduction of the wire to said anvil and avoiding the bending of the same theretofore, by striking the side of the anvil, or otherwise. The detent or dog s^7, pivoted on the pin s^8 in the extension s^9 of the base s^5 and maintained, by the spring s^{10}, in contact with the wire x, is of such shape at its free end as to permit of the wire passing forwardly between it and the plate S' and operating to wedge or jamb said wire, when a staple length has been cut and the draft of the feed-bar is released, preventing the tension device from drawing the end of the wire from said slot h. In this connection it may be stated that for the formation of a deeper staple, that is, one having longer ends, the block H is simply moved outwardly on the guide H' which it incloses, through loosening the screw h' in the slot h^2, and substituting a cutter and former whose cutting edge is farther from the center than the one shown, which latter is detachably secured by the screws g g, and again fixing said block in such position as to be in operative relation with the cutter.

The table T is supported by the lower arm 3 of the frame 2; said frame being secured to the base 4 of the machine by the bolts 5; through the medium of the box 6 which incloses the standard 7, said box having its lid 8 secured thereto by the screws 9 and 10, which lid, by reason of their being a little clearance between its upper rear side and the upper edges of the sides of said box, as shown at 11,

operates as a clamp-plate to retain said standard in any adjusted position, when pressure is exerted thereon by the screw 12. Said screw 12 having thereon the handle 13, to facilitate its operation, and passes through the center of the cross-bar 14, said bar being secured to a boss on each side of the box 6 by the screws 15 and the screw 12 passing through a central threaded opening in the cross-bar and bearing against the lid 8. The standard 7, at its upper end, is provided with a head 16 to which the pedestal 17 of the table is fastened, by the bolts 18.

As will be observed, the standard 7 has secured thereto by the screws 19, at a point below the lower edge of the box, the plate 20, the same having secured thereto the handle 21, the shank 22 of which handle serving as a gage for regulating the height of the table. Thus, when a book, for example, of a certain thickness is to be stapled and the table is not at its proper height relatively to the presser-bar of the machine, such book is inserted between the shank 22, of handle 21, and the lower edge of the box 6. Then the screw 12 is loosened and the standard 7 and, consequently, the table, raised by means of the handle 21 until the shank 22 of the latter bears against the book aforesaid. Then the screw 12 is again tightened. The effect is to bring the table into such relation with the presser-bar of the machine as that the distance between its lowest point of travel and said bar will be equal to the thickness of the book to be stapled, avoiding any injury to either the book or the machine. The distance between the shank of the handle 21 and the lower edge of the box 6 is at all times equal to the distance between the table and the lowest point reached by the presser bar, or the foot thereof.

The clinching mechanism consists of the casing T′ projecting through an opening in the center of the table T and provided with a cap-plate t, secured thereto by the screws t', said casing having therein a broad transverse rib t^2 upon which and between it and said plate moves the slide t^3, the lower end of said slide having a lug t^4 provided with an opening t^5, through which opening passes the screw 23 which connects the slide to the clincher operating rod 24, said rod sliding within a longitudinal groove 25 in the face of the standard 7 and being connected at its lower end to the arm u of the bell-crank lever U. The upper end of the slide t^3 is provided with pins t^6, upon which are pivoted the lower ends of the links t^7, while the upper ends of said links are pivoted, in turn, on the pins t^8 of the clinchers t^9, the latter being pivoted on the pins t^{10} in the upper end of the casing. The upper ends of the links t^7 are, as shown, inclined inwardly, so as to avoid the crossing of centers by said ends and the consequent jamming of the clinchers against the sides of the casing, which latter is secured to the standard by the screw 26.

The bell-crank lever U is pivoted on the pin u' sustained in lugs formed on the lower end of the standard 7, as at 27, the other end of said lever being connected to the pitman u^2, which latter is pivoted on the pin u^3 in the rotary disk U′, said disk, also, having a pin u^4 upon which is pivoted one end of the connecting rod U^2, the upper end of such rod being pivotally connected to the lever V, which lever is fulcrumed on the pin v in the arm 1 of the machine and has upon its free end a friction-roller v', said roller being maintained, by the pressure exerted on the lever U by the spring w, in contact with the cam v^2 on the main-shaft B′, thus the desired reciprocation of the slide t^3 and the consequent operation of the clinchers t^{10} is secured.

In order to have perfect control of the machine it is necessary to provide means for applying power to and releasing the same from the shaft B′ therefore the collar 29 is secured rigidly on said shaft by the bolt 30, the hub of the pulley 28, which latter is loosely journaled on said shaft, having sockets 31 therein for reception of the rounded end 32 of the bolt 33, which bolt is hollow for reception of the spring 34 and is retained within a recess in the collar by the disk or washer 35 secured to the end of said collar, which recess is round at the part through which the end 32 of the bolt projects and is square at the point 36 where the correspondingly shaped rear portion 37 of said bolt lies, said collar, also, serving to keep the spring 34 in the position shown, said square portion 37 of the bolt 33 being provided with a projection 38.

Secured to the shoulder 39, on the frame of the machine, by screws, as at 40, is a vertical box or casing having therein a latch 41, which latch and box have each a pin 42 43 to which are secured the ends of a spring 44, the lower end of said latch being connected to the rod 45 and the upper end of the same having thereon an inclined shoulder 46, which is in radial alignment with the path of the projection 37, and a limiting stop 47. The rod 45 is connected at its lower end to the treadle 48 and the treadle is pivoted on the pin 49, in lugs on the foot of the base 4 of the machine, as at 50.

The operation of this machine is as follows: The wire x is first drawn from the reel P and the end thereof passed through the eyes r r' of the tension-device; around the plate S′ and between the straightening rolls s s'; into the feed-jaws n n'; through that portion of the slot h which is in the guide H′; and into the position shown in full lines in Fig. 8 of the drawings. Starting with the parts of the machine in the relation shown in Figs. 1 and 2, which is that assumed by such parts after the driving of a staple and immediately preceding the feeding operation, the staple-former and driver is on the rise, said former being about to clear the anvil and the lower end of the driving-bar, to which latter said driver is attached, about to clear the cam-shoulders

k' k^2 of the pushers. Power is applied to the shaft B', through pulley 28, causing the rotation of the eccentric B and the farther rise of the driving-bar, through the medium of the pitman C, and a like direction of movement to be imparted to the presser-bar, to which latter the former is secured, through the swinging outwardly of the upper end of the lever E under the impulse exerted thereon by the link e^3. Said forming-bar then rests, momentarily while the center of the eccentric pin b is crossing the horizontal axis of the lever-pin e^2, the former G having, by this time, cleared the anvil and the lower end of the driving-bar cleared said cam-shoulders, the driver, at the same time, being above the plane of said anvil. The wire, meanwhile, has been fed onto the rear part of the latter by the feed-mechanism, whereupon the pushers K K' are free to swing forwardly, under the impulse of the spring L, pushing said wire forwardly on the anvil until their shoulders abut against the former G, such wire being thus brought into the position shown in dotted lines in Fig. 8, where it is in the path of said former. Now the forming-bar descends, causing the cutting off of the proper length of wire and the bending of the ends of the same over the anvil, by the former, producing the desired staple, such descent continuing until the upper part of the former clears the shoulders k' k^2, when the pushers swing still farther forwardly and sweep the completed staple squarely off the anvil into the position shown, Fig. 2, where it is in the path of the driver. By this time the lower end of the driving-bar, which latter has been steadily descending, comes into collision with said shoulders, causing the return of the pushers to their initial positions which motion, being continued, results in the driving of the staple through the article to be stapled, by the driver D', the presser-bar having, in the interim, come into contact with and exerting the proper degree of pressure on the same. Such pressure is continued during the clinching operation, because of the resting, for the time being, of said presser-bar in this position, by reason of the fact that the upper end of the lever C, which operates said bar through the line e^3, has reached the limit of its inward swing, clearance for which is afforded by the curve in the pitman C, and said link simply turning on the pin e^2 without actuating said lever. As will be readily understood, the clinchers remain inactive while the operations above described are taking place, the roller v' being in contact with the lower part v^3 of the cam v^2 and, upon the completion thereof, said roller strikes the higher portion of said cam and causes said clinchers, through the intermediate connections, to swing upwardly and bend the ends of the staple close to the article stapled, effecting the desired stapling. At this stage the eccentric has carried the pin b a portion of its up-stroke, carrying with it the driving-bar, whereupon the presser-bar and former rise until the upper part of said former is opposite the cam-shoulders of the pushers and the lower part or cutting edge clears the top of the anvil, the lower end of said driving-bar having, meantime, cleared said shoulders, permitting said pushers to shove the wire, which has been fed in by the feed-bar, from the slot in the guide H' and the back of the anvil, to the front of the latter and into the slot in the cutting-block H, where such wire is in the path of the cutter and former and the parts in position for a repetition of the operations just described, and so on. Upon the cutting off of a length of wire, which occurs when the eccentric has accomplished about half of its up-stroke, the feed-bar M, under the impulse of the eccentric-arm, swings back until the completion of half of the down-stroke of said eccentric, when the wire is gripped by the jaws n n', in the manner hereinbefore described, and said bar swings inwardly again and feeds another length of wire into the guide H' and the rear portion of the anvil, from whence it is pushed forwardly by the pushers.

The employment of spring-pressure for impelling the pushers forwardly, permits of the bringing of a single length of wire, of any thickness, directly under the former and the same, when formed into a staple, being placed in the path of the driver, before the admission of another length of wire to the front part of the anvil. Said pushers accommodate themselves to various thicknesses of wire, insuring the invariable placing of but one length of the same, be it ever so fine, under the cutter and former and avoiding the accidental driving of two or more staples at one point, obviating the necessity for the removal and substitution of parts, or other means, for adapting the machine for reception of wire of different thickness.

What I claim as my invention is as follows:

1. In a wire-stapling machine, the combination of a driving-shaft, a reciprocating arm actuated thereby, the feed-bar, a lever hinged to said arm and pivotally connected to said bar, and the feed-jaws, and means whereby said lever is limited in its pivotal movement by one of said jaws, substantially as and for the purpose specified.

2. In a wire-stapling machine, the combination of a driving-shaft, a reciprocating arm actuated thereby, the feed-bar, a lever hinged to said arm and pivotally connected to said bar, the feed-jaws, and a projection carried by said lever and limiting its pivotal movement by contact with one of said jaws, substantially as specified.

3. In a wire-stapling machine, the combination of a driving-shaft, a reciprocating arm actuated thereby, the feed-bar secured to a rock-shaft, a bearing for the latter, a nut on said shaft, a cushion between said nut and bearing, a lever hinged to said arm and pivotally connected to said bar, the feed-jaws,

and a projection carried by said lever and limiting its pivotal movement by contact with one of said jaws, substantially as specified.

4. In a wire-stapling machine, the combination of a driving-shaft, a reciprocating arm actuated thereby, the feed-bar provided with a wire gripping device, a lever hinged to said arm and pivotally connected to said bar and having a limited pivotal movement in both directions, substantially as specified.

5. In a wire-stapling machine, the combination of a driving shaft, a reciprocating arm actuated thereby, the feed-bar secured to a rock-shaft, a bearing for the latter, a nut on said shaft, a cushion between said nut and bearing, a lever hinged to said arm and pivotally connected to said bar and having a limited pivotal movement in both directions, substantially as and for the purpose specified.

6. In a wire-stapling machine, the combination of a driving shaft, a reciprocating arm actuated thereby, the feed-bar, the feed-jaws, a lever hinged to said arm and pivotally connected to said bar, a stop for limiting the pivotal movement of the lever in one direction, and means whereby said lever is limited in its other direction of movement by one of said jaws, substantially as and for the purpose specified.

7. In a wire-stapling machine, the combination of a driving-shaft, a reciprocating arm actuated thereby, the feed-bar, the feed-jaws, a lever hinged to said arm and pivotally connected to said bar, a stop for limiting the pivotal movement of the lever in one direction, and a projection carried by said lever and limiting its movement in the other direction by contact with one of said jaws, substantially as and for the purpose specified.

8. In a wire-stapling machine, the combination of a driving-shaft a reciprocating arm actuated thereby a swinging feed-bar, a lever hinged to said arm and secured to a rock-shaft in said bar, a stop for limiting the pivotal movement of the lever in one direction, the feed-jaws, and a projection on said rock-shaft adapted to strike one of said jaws and limit the movement of said lever in the other direction, substantially as and for the purpose specified.

9. In a wire-stapling machine, the combination of a driving shaft, a reciprocating arm actuated thereby, the feed-bar, the feed-jaws, a lever hinged to said arm and pivotally connected to said bar, an adjustable stop carried by the latter and limiting the pivotal movement of the lever in one direction, and means whereby said lever is limited in its other direction of movement by one of said jaws, substantially as and for the purpose specified.

10. In a wire-stapling machine, the combination of a driving shaft having thereon an eccentric, the eccentric-strap provided with an arm, a feed-bar secured on a suitable shaft, a bearing for the latter, a nut on said shaft, a cushion between said nut and bearing, a lever hinged to said arm and secured to a rock-shaft in said bar, an adjustable stop carried by the latter and limiting the pivotal movement of the lever in one direction, the feed-jaws, and a projection on said rock-shaft and limiting the movement of said lever, in the other direction, by contact with one of said jaws, substantially as and for the purpose specified.

11. In a wire-stapling-machine, the combination of a driving-shaft having thereon an eccentric, a swinging feed-bar, the forming bar, and the driving-bar, said bars being connected with and actuated by said eccentric through the eccentric-arm, a pitman, and a bell-crank lever, respectively, substantially as and for the purpose specified.

12. In a wire-stapling machine, the combination of a driving shaft, the feed-mechanism, the forming-bar, a revoluble pin actuated by said shaft, a pitman pivoted at one end on the pin and, at its other end, similarly connected with said forming-bar, the driving-bar, a bell-crank lever pivotally connected at one end with said driving-bar, and a link connecting the other end of the bell-crank lever with said pin, substantially as and for the purpose specified.

13. In a wire-stapling machine, the combination of the driving shaft having thereon an eccentric, a swinging feed-bar, the eccentric arm actuating the latter, the forming-bar, a pin carried by the eccentric, a pitman pivoted at one end on the pin and at its other end similarly connected with said forming-bar, the driving-bar, a bell-crank lever pivotally connected at one end with said driving-bar, and a link connecting the other end of the bell-crank lever and said pin, substantially as and for the purpose specified.

14. In a wire-stapling machine, the combination of an anvil, a former, and a guide-block located back of the path of said former in close relation with and leading the wire to the back part of said anvil, and means for bringing it from such position into the path of the former, substantially as specified.

15. In a wire-stapling machine, the combination of an anvil, a cutting-block, a cutter and former, and a guide located back of the path of said cutter and former, in close relation with and leading the wire to the back part of said anvil, and means for bringing said wire from such position forwardly into the path of the cutter and former, substantially as specified.

16. In a wire-stapling machine, the combination of an anvil, a cutter and former, a cutting-block having a longitudinal groove in its rear side, mechanism for feeding wire to the back part of the anvil, and means for bringing the wire from such position into said groove and the path of the cutter and former, substantially as specified.

17. In a wire-stapling machine, the combination of an anvil, a cutter and former, the feed-mechanism, a guide-block back of the path of the cutter and former, the cutting-

block, said blocks having registering parallel grooves, the groove in the guide-block ending at and leading wire to the back part of the anvil, and the groove in the cutting-block permitting said wire to be brought from such position into said path, substantially as specified.

18. In a wire-stapling machine, the combination of an anvil, an adjustable cutting-block, a detachable cutter and former, and a guide located back of the path of said cutter and former, in close relation with and leading the wire to the back part of said anvil, and means for bringing said wire from such position into the path of the cutter and former substantially as specified.

19. In a wire-stapling machine, the combination of an anvil, an adjustable cutting-block, a detachable cutter and former, and a guide-block located back of the path of said cutter and former and having one end in close relation with the anvil, said blocks having registering parallel grooves in their meeting surfaces, forming a slot for the passage of the wire, the groove in the guide-block ending at and serving to lead such wire to the back part of the anvil and the groove in the cutting-block permitting of the wire being brought from such position into the path of the cutter and former, substantially as specified.

20. In a wire-stapling machine, the combination of an anvil, an adjustable cutter-block, and a presser-bar, the latter having detachably secured thereto a former provided with depending legs adapted to embrace said anvil, one of such legs having a cutting-edge adapted to be brought into cutting relation with said block, substantially as specified.

21. In a wire-stapling machine, the combination of a stationary anvil, the staple-forming and driving mechanism, a pusher at each side of said anvil, means for leading wire to the back part of the latter, and means whereby the pushers operate to shove such wire from this position into the path of the former and, subsequently, shove the completed staple from said anvil, into the path of the driver, before the admission of another length of wire thereto, substantially as specified.

22. In a wire-stapling machine, the combination of a stationary anvil, the staple-former, the staple-driver, a pivoted arm at each side of the anvil, means for leading wire to the back part of the latter, and a suitable spring for actuating said pushers forwardly until such wire is in the path of the former and farther forwardly for shoving the completed staple from said anvil, into the path of the driver, before the admission of another length of wire thereto, substantially as specified.

23. In a wire-stapling machine, the combination of a stationary anvil, the staple-former, the driving-bar, a pivoted arm, at each side of the anvil, provided each with a cam-shoulder, means for leading wire to the back part of the anvil, and a suitable spring for actuating said pushers forwardly until said shoulders contact with said former and such wire is in the path of the former and farther forwardly, upon the release of such contact, for shoving the completed staple from said anvil, into the path of the driver, before the admission of another length of wire thereto, said driving-bar being adapted to thereafter strike said shoulders and effect the return of the arms to their initial position, substantially as specified.

24. In a wire-stapling machine, the combination of a stationary anvil, the staple-former, the staple-driver, and a spring-controlled pivoted arm at each side of the anvil, provided each with a cam-shoulder and diminished portion and adapted, when free, to swing forwardly under the spring pressure and shove a length of wire from the back part of the anvil into the path of the former, said shoulders, by their contact with said former, barring further movement of the arms and when released from such contact permitting said arms to swing farther forwardly and the diminished portions to project into the space between said anvil and former and shove the staple formed of such length into the path of the driver, the contact of the driving-bar with said shoulders effecting the return of the arms to their initial positions, substantially as specified.

25. In a wire-stapling machine, the combination of an anvil, a cutting-block, a cutter and former, a guide-block located back of the path of the cutter and former and having one end in close relation with the anvil, said blocks having registering parallel grooves in their meeting surfaces, the groove in the guide-block leading wire to the back part of the anvil, and a pusher on each side of the latter, adapted to shove such wire from this position into the groove in the cutting-block and to the front of the anvil, into the path of said cutter and former and, subsequently, shove the staple formed of said wire off the anvil into the path of the driver, before the admission of another length of wire thereto, substantially as specified.

26. In a wire-stapling machine, the combination of a forming-bar having therein a longitudinal groove, a driving-bar sliding on the presser-bar, a driver in said groove and actuated by the driving-bar, a staple-former detachably secured to the forming-bar and extending wholly across one end of said groove, and a guide projecting partly over each side of the other end of the latter, substantially as specified.

27. In a wire stapling machine, the combination of a presser-bar having its lower end thickened or enlarged, a longitudinal groove in such enlargement, a former detachably secured to the latter and extending across the groove, a driving-bar sliding on the presser-bar, a driver in said groove and actuated by the driving-bar, and a guide projecting partly over each side of the lower end of the groove, substantially as specified.

28. In a wire-stapling machine, the combination of a box or casing having therein an adjustable standard, a table supported by the latter, and a fixed projection on said standard below the lower edge of the box or casing, the space between such edge and projection permitting of the insertion thereinto of the article to be stapled and corresponding with the space between the lowest point of descent of the presser-bar and the top of said table, substantially as specified.

29. In a wire-stapling machine, the combination of a box or casing having therein an adjustable standard, a table supported by the latter, and a handle secured to said standard below the lower edge of the box or casing, the space between such edge and the shank of said handle permitting of the insertion thereinto of the article to be stapled and corresponding with the space between the lowest point of descent of the presser-bar and the top of said table, substantially as specified.

30. In a wire-stapling machine, the combination of a box or casing, a standard adjustably sustained in said box or casing, a table supported by said standard, a longitudinal groove or slide-way in the latter, a reciprocating rod or bar having freedom of lengthwise movement in said slide-way, the clinchers, the clincher-slide connected to and actuated by said rod or bar, and a pair of links each pivotally connected to a clincher and said slide substantially as specified.

31. In a wire-stapling machine, the combination of a pair of pivoted clinchers, a slide suitably actuated, and a pair of links connected each to a clincher and said slide and having their clincher ends inclined inwardly from the vertical axes of their slide-ends, all arranged within a suitable casing, said clinchers being limited in their return movement by the sides of the casing, substantially as specified.

32. In a wire-stitching machine, the combination of a fixed and a movable straightening roller on opposite sides of the interposed wire, and an axially adjustable curved plate, supporting the movable roller, over the periphery of which the wire passes prior to its introduction to said rollers, substantially as specified.

33. In a wire-stitching machine, the combination of a fixed and a movable straightening roller on opposite sides of the interposed wire, an axially adjustable curved plate, supporting the movable roller, over the periphery of which the wire passes prior to its introduction to said roller, and a spring controlled detent in contact with said wire in its passage over said plate, substantially as specified.

In testimony whereof I have hereunto set my hand this 15th day of August, A. D. 1892.

ELDRIDGE R. JOHNSON.

Witnesses:
R. DALE SPARHAWK,
WM. H. POWELL.

Certificate of Correction in Letters Patent No. 496,314.

It is hereby certified that in Letters Patent No. 496,314, granted April 25, 1893, upon the application of Eldridge R. Johnson, of Camden, New Jersey, for an improvement in "Wire-Stitching Machines," an error appears in the printed specification requiring the following correction, viz.: On page 6, in line 42, a comma should be inserted after the word "thereby"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 2d day of May, A. D. 1893.

[SEAL.]

GEO. CHANDLER,

First Assistant Secretary of the Interior.

Countersigned:

S. T. FISHER,

Acting Commissioner of Patents.