(No Model.) 2 Sheets—Sheet 1.

C. E. DENTON.

BUTTON ATTACHING MACHINE.

No. 479,705. Patented July 26, 1892.

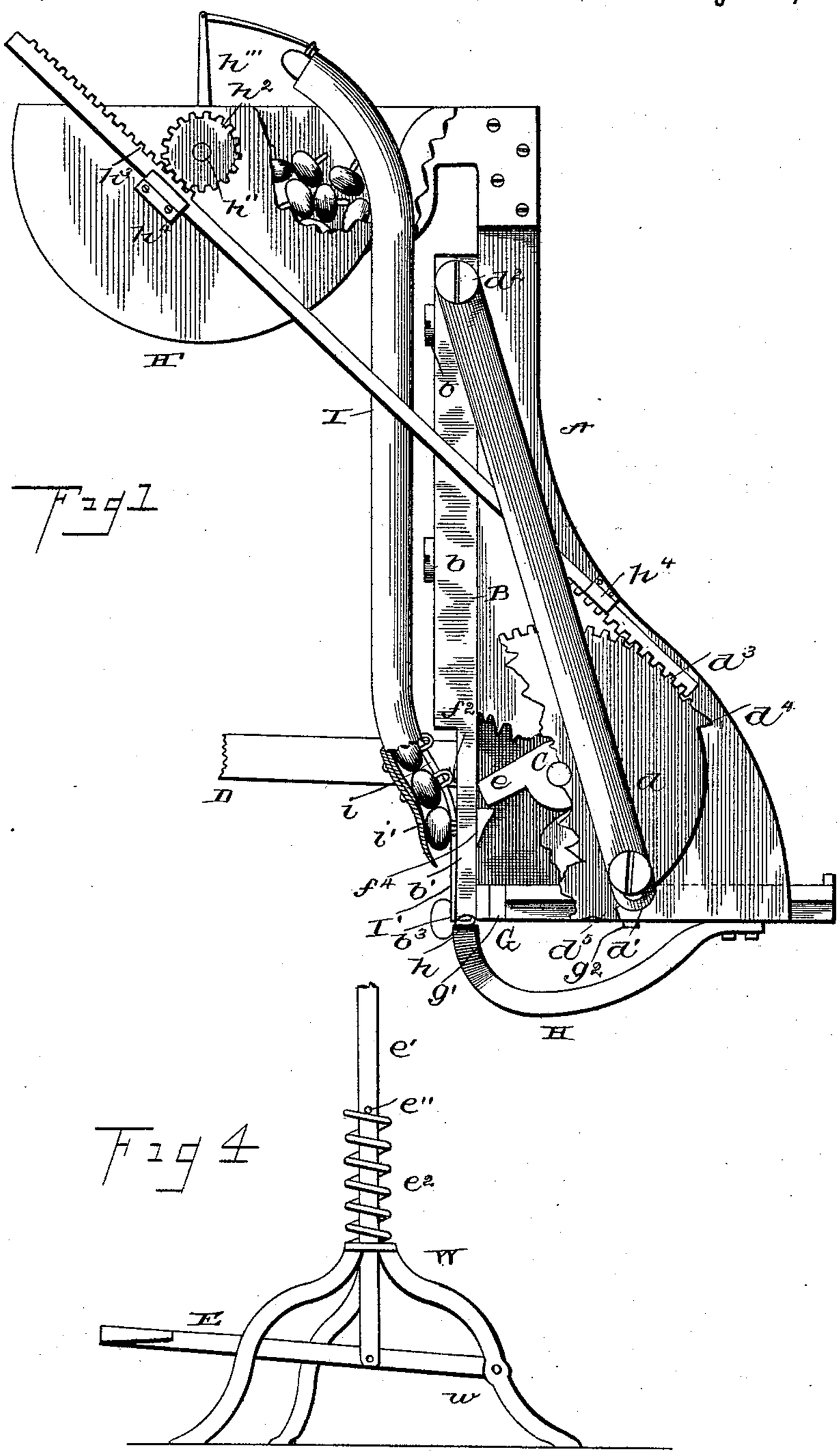

Fig 1

Fig 4

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(No Model.) 2 Sheets—Sheet 2.

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Fig 5

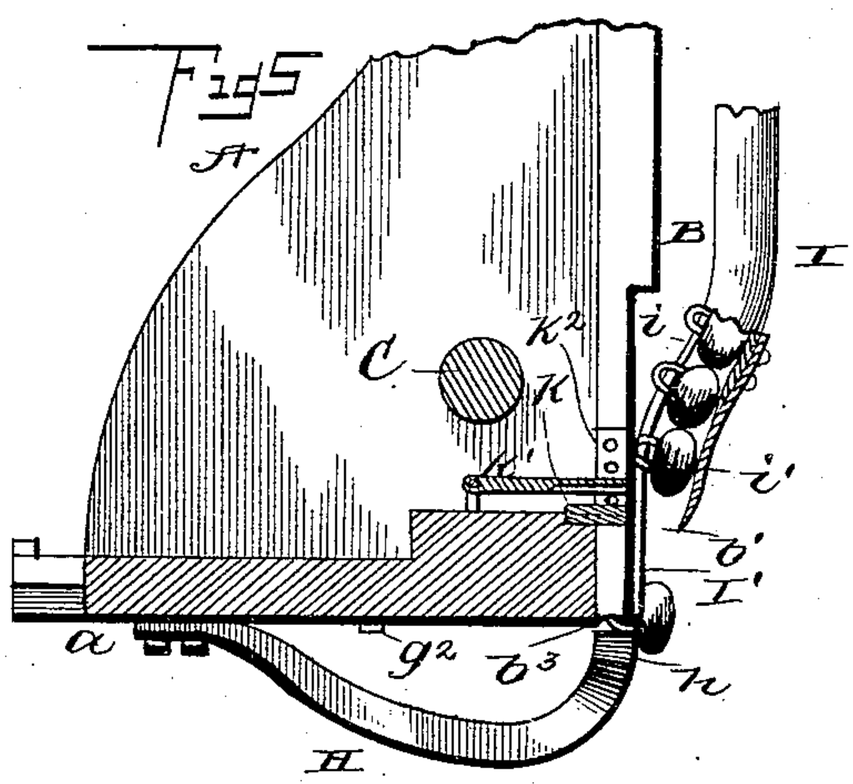


Fig 6

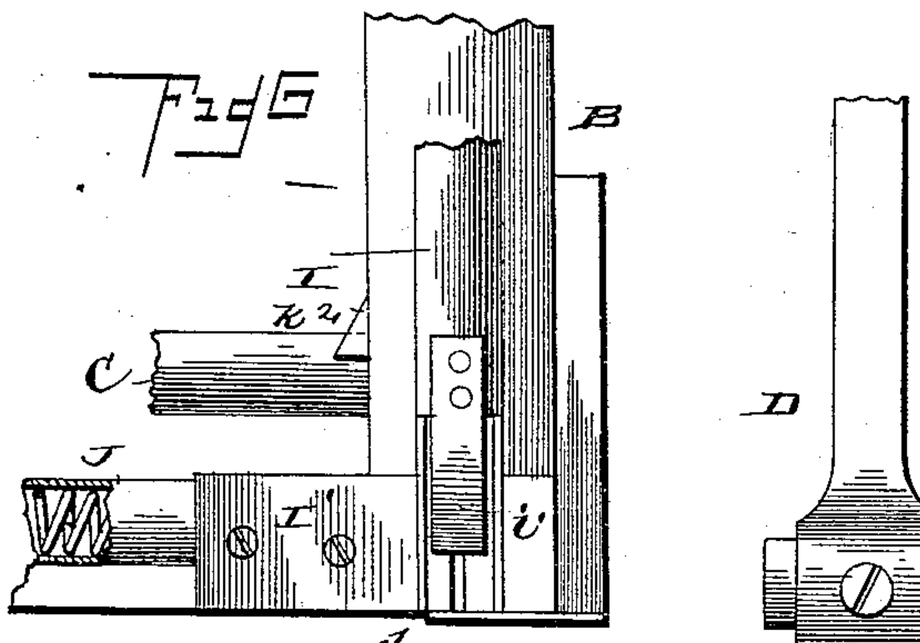


Fig 2

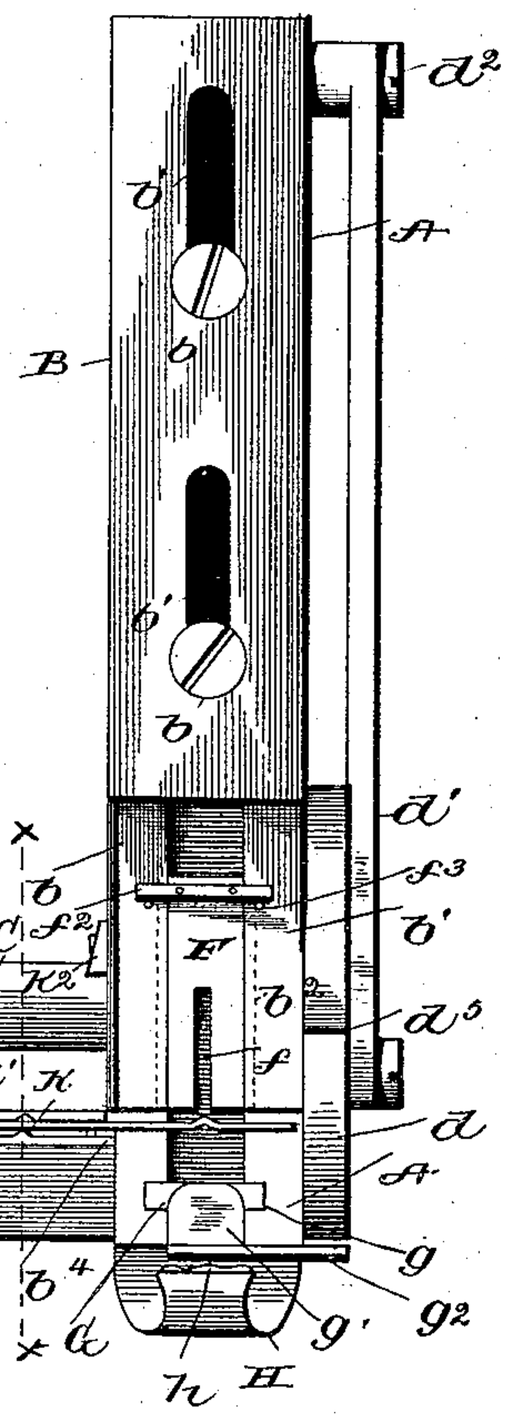


Fig 3

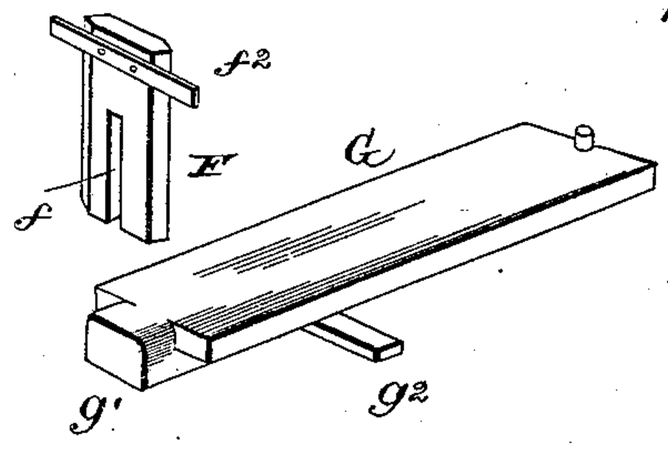
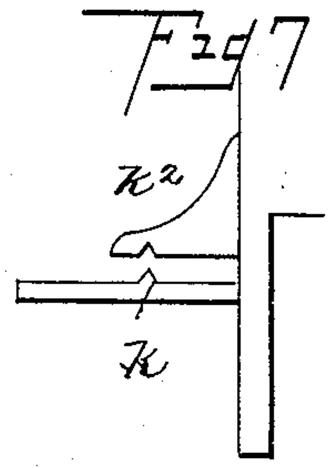


Fig 7



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UNITED STATES PATENT OFFICE.

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BUTTON-ATTACHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 479,705, dated July 26, 1892.

Application filed March 12, 1891. Renewed June 29, 1892. Serial No. 438,376. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. DENTON, a citizen of the United States of America, residing at Attica, in the county of Harper and State of Kansas, have invented certain new and useful Improvements in Button-Stapling Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to button-stapling machines, having for its object the production of a machine of this class which shall be continuous in operation, simple in construction, and composed of a minimum number of parts.

The invention comprises a stapling-machine having a spring-impelled wire-holder, a vertically-moving cutting and bending bar or plate, a staple-forming bar or mandrel, and a clinching bar or block, all operated through the agency of a single wheel and its shaft.

The invention further comprises the detail construction, combination, and arrangement of parts, substantially as hereinafter fully set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in side elevation of my improved stapling-machine with parts broken away. Fig. 2 is a front view thereof, the button hopper and chute being removed. Fig. 3 is an enlarged view of details. Fig. 4 is a similar view of the foot-treadle and its adjuncts. Fig. 5 is a transverse sectional view on the line $x\,x$, Fig. 2. Fig. 6 is a detail view showing connection of button-tube to base-plate. Fig. 7 is a detail view of a modification.

Referring to the drawings, A designates a vertically-disposed frame or support, and a a lower horizontal plate rigidly secured to or formed with said frame, and this plate is rigidly attached to a supporting stand or table (not shown) of any suitable shape. The vertical frame A is perpendicular on its front face and curved on its lower rear portion.

B is the cutting and bending bar or plate, capable of moving vertically. This bar or plate is held in place by two screws b, projected through slots b' thereof and secured to frame A, and by this means the bar or plate is held as against lateral movement. From the lower end of this bar or plate B project two parallel arms $b\ b$, having grooves or recesses b^2 in their inner opposite edges and similar grooves b^3 in their lower ends for holding the staple ends. The outer lower edge of arm b is inclined or angled, and is coincident with a removable stationary knife b^4, secured to the top of the front edge of plate a, and the same, in connection with arm b, serves to cut or sever the wire. The plate a is preferably thickened where knife b^4 is secured, so as to elevate the point of severance of the wire.

C is the operating-shaft, mounted in frame A, and upon one end is rigidly secured a wheel d, to which is connected the lower slotted end of a pitman d', the other end of said pitman being connected by a pin d^2 to the bar or plate B, whereby the latter receives its up-and-down movement. About three-fourths of the periphery of this wheel is provided with cogs or teeth d^3, and at the ends of such toothed portion are pins or shoulders $d^4\ d^5$. From shaft C projects a lug e, located within frame A, and to the outer end of said shaft is secured a short hand-lever D, by which the machine may be operated directly by hand. It is, however, preferred to operate by foot-power, and hence to this hand-lever is connected the upper end of a rod e', which at its lower end is connected to a foot-treadle E, fulcrumed to one of the legs w of stand W. A coil-spring e^2, bearing on the legs w and against a cross-pin of rod e', serves to return the parts to their normal position and hold the treadle elevated.

F is the clincher bar or block whose vertical side edges fit within the grooves or recesses b^2 of bar or plate B. In the lower half of the bar or block F is formed a vertical slot f. A cross bar or plate f^2 is secured to the front of bar or block F and its projecting ends engage pins f^3 in the front face of arms $b\ b$, whereby the said bar or block is moved upward with the cutting and bending bar or plate. From the rear of this bar or block projects a flange or shoulder f^4, with which lug e of shaft C is designed to engage.

Within the lower end of frame A is a horizontally-disposed staple former or mandrel G, which consists of a T-shaped bar moving in opposite grooves or recesses g in the side plates of frame A. This bar has a forward

reduced end g', around which the staple is formed, and from the under side thereof projects a short arm g^2, with which the pins or shoulders $d^4 d^5$ of wheel d will engage, thereby moving the said staple-former alternately forward and backward. This bar or mandrel also serves as a temporary support for the button and staple and clincher bar or block during the initial operation of forming the staple. To the under side of frame A is rigidly secured one end of an arm or support H, to the forward end of which is attached a die h, upon which the staple is clinched, the same being directly beneath and in the path of the clincher bar or block.

H′ is a button hopper or receptacle; h'', a shaft passed transversely therethrough; h''', a jointed picker arm or finger secured on said shaft and having an outer pointed end; h^2, a pinion on one end of said shaft, and h^3 a rack bar or rod held by keepers h^4 and engaging the teeth of pinion h^2 and wheel d. By means of this wheel d and the rack-bar motion is imparted to the shaft and picker arm or finger.

I is a supply-tube suitably secured at its upper end to the button-receptacle H″, and at its lower end it is provided with a plate I′, preferably formed therewith, and through which screws are passed for holding the lower end of the tube against the front edge of plate a. Said tube is slightly curved at its ends, and the upper end is projected up into and just above the upper portion of said hopper. In the rear wall of this tube is a continuous slot i for the button-shanks, and to the front of said tube, at its lower end, is attached a flat spring i', which presses against the lower button in the tube, thus holding the said button in the exact position to which it may be forced by the upper terminus of the slot in the clincher bar or block until the wire is passed through the shank of the button and the bar or block is forced downward, carrying the button with it, during which time the force of the spring is still against the button. The weight of the buttons in the tube will force the next button along and cause its shank to project into slot f, and at this point the pressure of the spring will be brought to bear upon it, (the lower button having passed from under the same), and the shank of said next or second button will be engaged by the upper terminus of the slot and forced to exact position for reception of the next section of the wire. In this manner a continuous supply of buttons is had, each button being in position for the shank to receive the wire. The revolution of the shaft h and the picker arm or finger causes the latter in its back-and-forth movement to engage the shanks of buttons in the receptacle and carry the latter up and allow them to slide off into the upper end of the supply-tube, the shanks of the buttons being projected through the slot of the latter. While in certain revolutions possiby no buttons will be gathered by the picker arm or finger, yet in others a large quantity thereof are secured, and in this manner a uniform supply is obtained.

To the front edge of plate a is secured a wire-feeding device J. The same consists of a tube j and a block j', wherein is fulcrumed a clutch-lever j^2, having a lower weighted end j^3, whereby the upper pointed end of said lever is made to bind firm against the wire x, which is passed longitudinally through the tube j, and the forward movement occurs only as the wire is cut and used. Against this block j' bears one end of a coil-spring j^4, the other end of which bears against the outer end of tube j. This spring impels the block and its clutch-lever forward, and in this manner the wire is fed beneath the arms of the cutting and bending bar and also under the clinching-bar. The forward movement of the wire is limited by the extreme end thereof being in contact with the inner face of wheel d. When block j' reaches the full extent of its movement, the operator disengages the lever j^2 from contact with the wire and forces said block backward as against the action of the coil-spring, and upon allowing the lever to drop to its normal position its upper end will again engage and bite against the wire. If the wire should fail to pass through the shank of a button, it can be quickly drawn back by simply pushing the block, care being taken not to loosen the clutch.

Adjacent the forward end of tube j is the stationary knife b^4, which latter is provided with an inverted-V-shaped lug or crest k. Immediately above this knife is a small plate k', pivoted at its inner end and designed when in its normal position to form a guide or passage way for the wire. This plate has a groove or recess corresponding with the lug or crest. A lug or projection k^2, secured to one side edge of the bar or plate B, is designed at each operation to engage and bear upon the movable plate k' and force the same down upon the knife, whereby a kink is formed in that portion of the wire which is to engage the shank of the button next provided with a staple. In lieu of the movable plate k' the lug k^2 can be located near the end of arm b, and extended to serve in place of said plate, the same results being thereby secured.

The operation of my improved button setting or stapling machine will be understood from the following. (See Fig. 7.) The button hopper or receptacle is first supplied with bottons and the feed or supply tube filled with the latter, the lower one of which buttons has its shank extended into the slot of the clincher bar or block and so held by the spring. The wire is inserted through the shank of the first button, and the kink therein engages said shank. The operator by bearing down directly on the hand-lever or pressing on the foot-treadle will force the cutting and bending bar or plate downward, and in connection with the stationary knife the wire will be cut diagonally, leaving a point thereon. The fur-

ther movement of this cutting and bending bar or plate B carries the button and its wire downward until the latter bears upon the bar or mandrel G, and at this point the button and clincher bar or block are temporarily stopped, while the wire is bent around the mandrel to form the staple. The clincher bar or block will then be resting on said bar or mandrel, and the instant the lug *e* on the shaft C engages shoulder f^4 of said clincher bar or block the bar or mandrel G is moved rearward out of the way by reason of pin or shoulder d^4 of wheel *d* coming in contact with arm g^2. As the latter reaches the extent of its movement the lower end of the pitman will have reached the limit of its movement; but the slot in said pitman will allow the cutting and bending bar or plate to stand stationary while the lug *e* on shaft C forces the clincher bar or block farther down and clinches the staple around the button-shank, which is then supported on the die of arm H. The upper end of the slot *f* has then for some time been in contact with the shank of the next following button, which is then in exact position for the wire to pass through when the parts are elevated. The latter is effected by the raising of the hand-lever, and the bar or mandrel G is returned to its forward position by pin or shoulder *d*, of wheel *d* engaging with the arm of said bar or mandrel. The device is then in position for the above operation to be repeated. As the cutting and bending bar or plate was lowered in forming the first staple the wire was kinked by the plate *k'*, and hence said wire is ready for the next button. Thus it will be seen that in each operation the wire is cut and bent in one movement of the cutting and bending bar or plate, the staple is firmly clinched, a second button is fed, the wire is kinked ready for said second button, and is automatically fed forward and inserted through the eye or shank of such button. A stapling-machine constructed as herein described is extremely simple, cheap and durable, and free from all complication, and in its entire structure only two springs are employed. It is also positive in its movement and there is little or no danger of its failing to fully perform all its functions at each operation.

I claim as my invention—

1. The herein-described improved button-stapling machine, comprising the supply-tube, the clincher bar or block having a slot therein, the cutting and bending bar or plate, the movable bar or mandrel, the shaft, the wheel secured thereon and having pins or shoulders projecting therefrom and engaging said bar or mandrel, and the stationary arm or support having a clinching-die at its outer end, substantially as set forth.

2. The herein-described improved button-stapling machine, comprising the supply-tube, the clincher bar or block having a slot coincident with the lower end of said tube and a cross-bar having projecting ends, the movable cutting and bending bar or plate having front projecting pins with which the ends of said cross-bar engage so as to be moved thereby, the sliding bar or mandrel, the stationary arm or support, and the means for moving said cutting and bending bar and mandrel, substantially as set forth.

3. The herein-described improved stapling-machine, comprising the operating-shaft having a lug secured thereon, the supply-tube having a slot therein for the button-shanks and a lower open end, the spring secured to said latter end, the movable clincher bar or block provided with a vertical slot and a flange or shoulder and having a temporary support, a rigid arm or support carrying a clinching-die at its outer end, and means for cutting and bending the wire, said clincher bar or block having an additional movement after the staple is formed and the temporary support is withdrawn by reason of contact of said lug with said flange or shoulder, substantially as set forth.

4. The herein-described improved button-stapling machine, comprising the frame or support, the stationary knife secured thereto having an oblique end, the movable cutting and bending bar secured to said frame and having lower parallel arms, one of which at its lower end conforms to said stationary knife, the clincher bar or block loosely mounted between said arms of the cutting and bending bar, the movable mandrel located in the lower end of said frame or support, the stationary arm or support having a clinching-die at its outer end, the shaft engaging said clincher bar or block, the wheel on said shaft having pins or shoulders engaging said bar or mandrel, and the pitman connected to said wheel and to said cutting and bending bar, substantially as set forth.

5. The herein-described improved button-stapling machine, comprising the frame or support, the movable cutting and bending bar secured to said frame, the stationary knife having a lug or crest, the clincher bar or block loosely secured to said cutting and bending bar, the mandrel movable beneath said clincher bar or block, the spring-impelled wire-feeding device, and the movable plate having a groove or recess corresponding to said lug or crest for forming a kink in the wire, and means for moving said cutting and bending bar and bar or mandrel, substantially as set forth.

6. In a button-stapling machine, the wire-feeding device herein described, consisting of the tube, the block therein through which the wire is passed, the weighted lever engaging said wire, and the spring bearing against said block and impelling the same forward, substantially as set forth.

7. The herein-described improved button-stapling-machine, comprising the frame or support, the movable cutting and bending bar secured thereto and having lower parallel arms, the stationary knife, the clincher bar

or block located between said parallel arms and having a cross bar or plate engaging studs or pins on the front of said arms and also having a shoulder projecting from its rear side, the shaft having a lug designed to engage said shoulder, the bar or mandrel moving in the lower end of said frame or support and having a forward reduced end designed to project between said parallel arms and form a temporary support for said clincher bar or block and provided with an arm or projection on one side, the wheel secured on said shaft, having two pins or shoulders for engaging said arm or projection, the pitman secured at its upper end to said cutting and bending bar and having a lower slotted end connected to said wheel, and the rigid arm or support having a clinching-die beneath said clincher bar or block, substantially as set forth.

8. In a button-stapling machine, the combination, with the frame or support, of the button receptacle or chamber, the feed or supply tube leading therefrom and having a slot therein and a lower open end, the spring-plate secured to said lower end, the shaft having a pinion in one end, the picker arm or finger secured to said shaft, the rack bar or rod engaging said pinion, the main shaft, the wheel secured thereon, having teeth on a segment of its periphery and with which said rack bar or rod engages, and the lever and treadle for operating said main shaft, substantially as set forth.

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

CHARLES E. DENTON.

Witnesses:

BENJ. C. COOK,

CAROLUS E. VOORHES.