

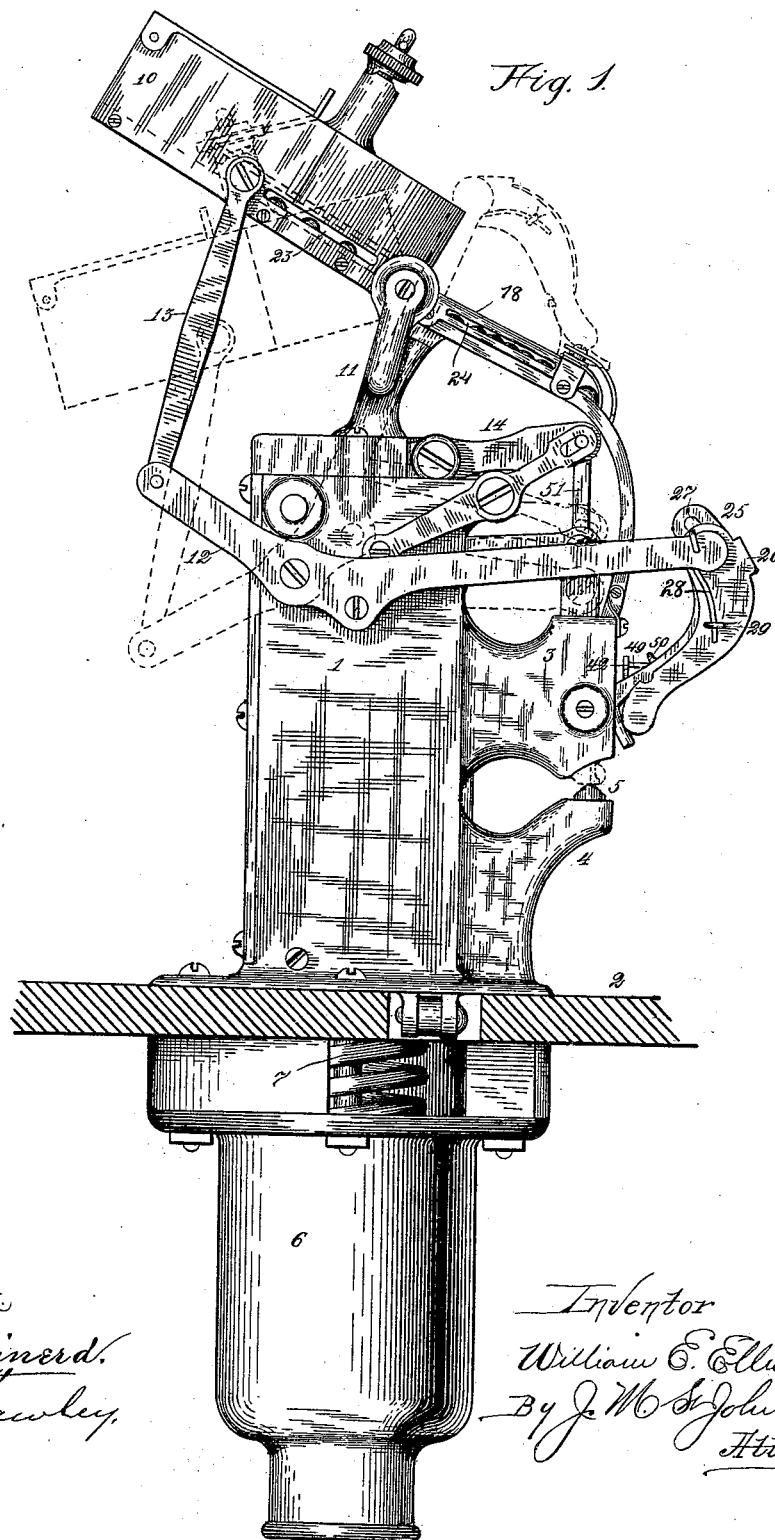
(No Model.)

4 Sheets—Sheet 1.

W. E. ELLIOTT.  
BUTTON ATTACHING MACHINE.

No. 526,012.

Patented Sept. 11, 1894.



(No Model.)

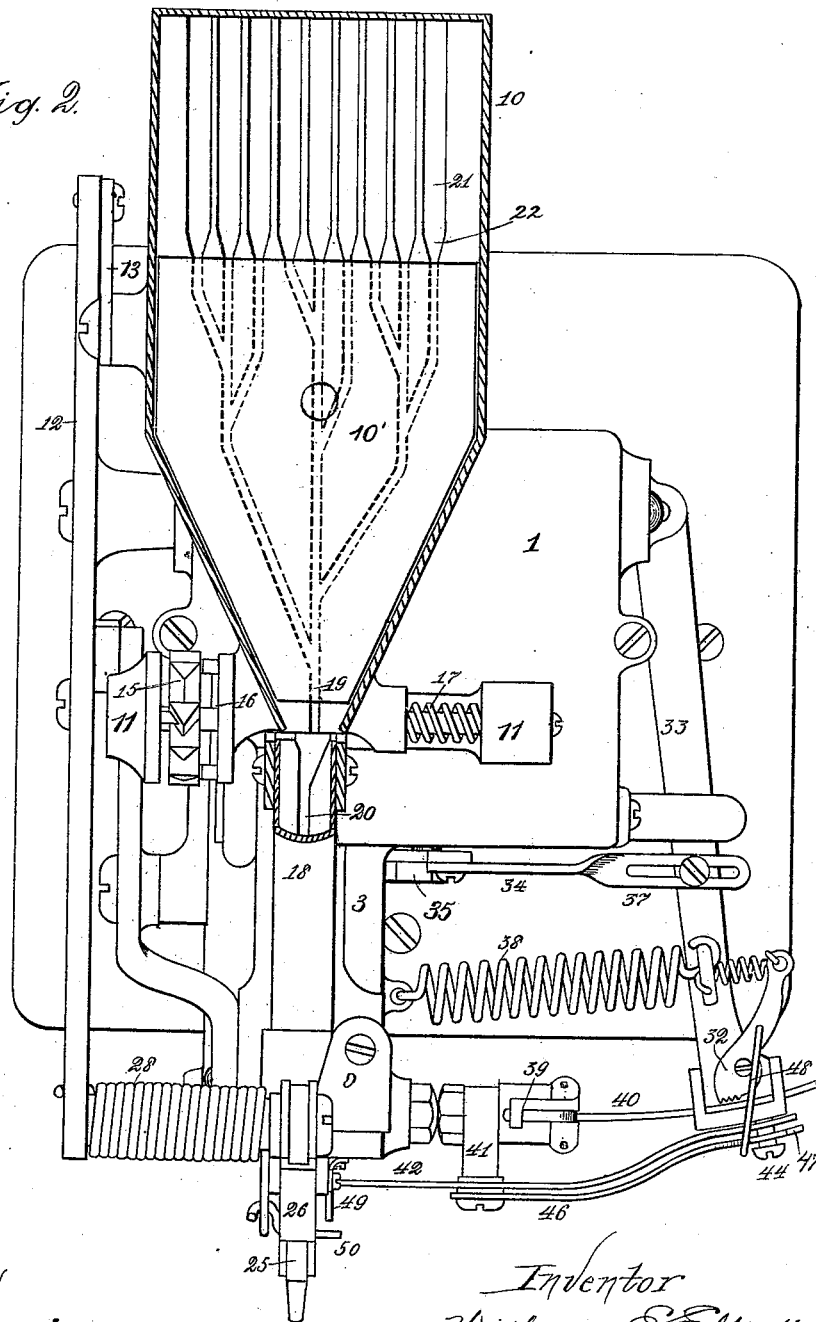
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Fig. 2.



Attest  
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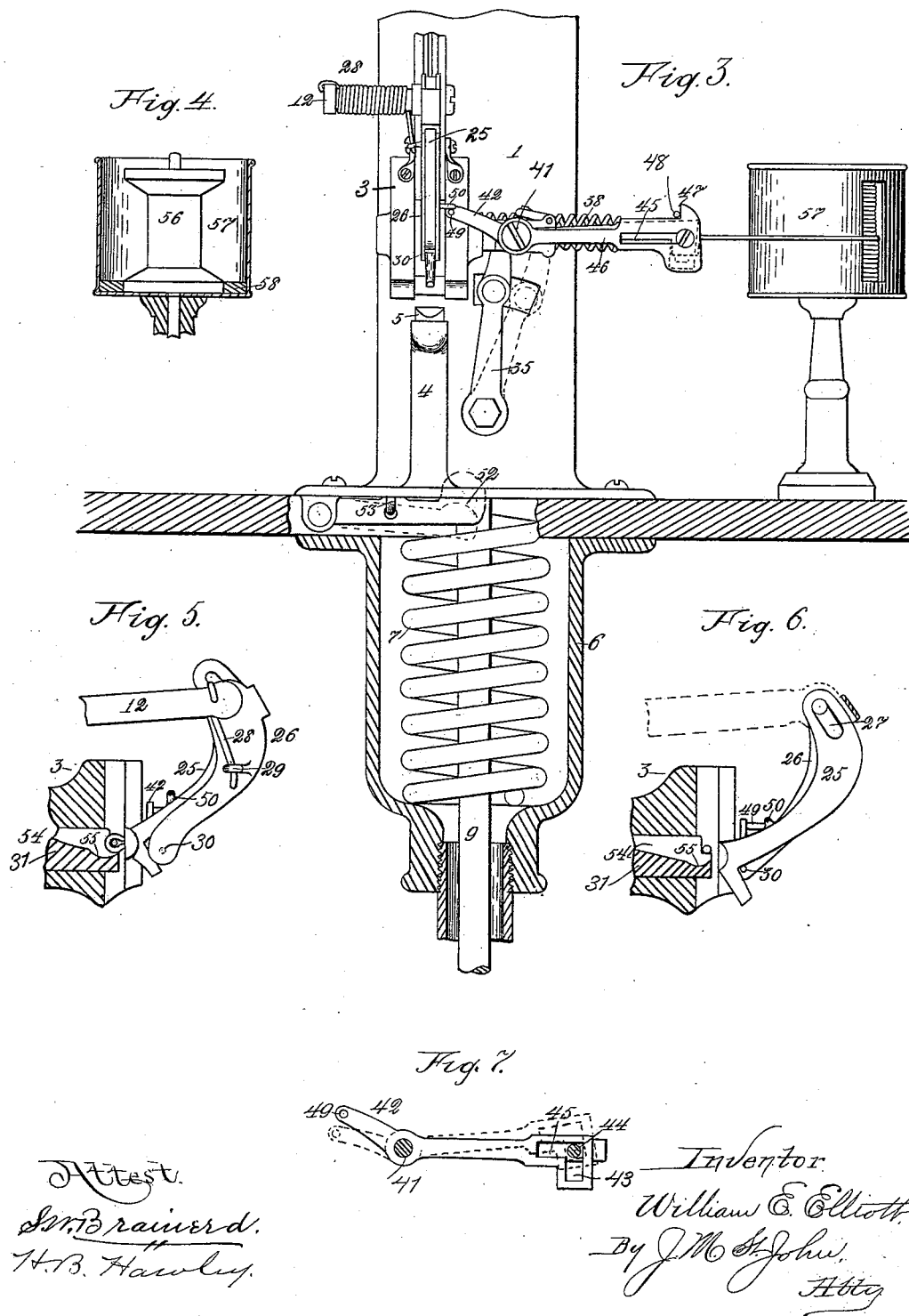
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4 Sheets—Sheet 4.

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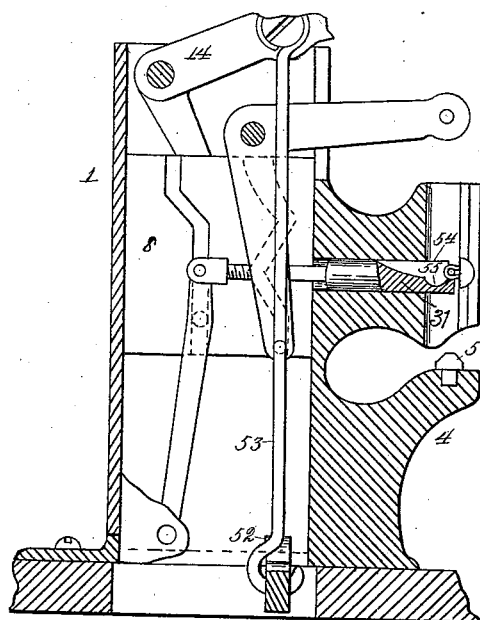


Fig. 8.

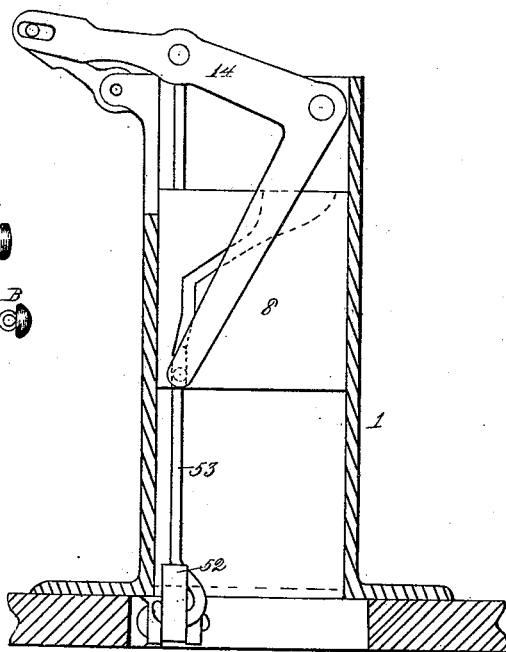


Fig. 9.

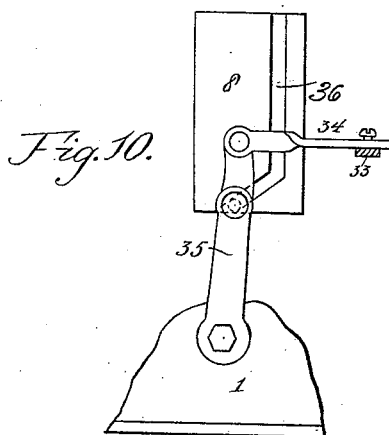


Fig. 10.

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# UNITED STATES PATENT OFFICE.

WILLIAM E. ELLIOTT, OF MARION, IOWA.

## BUTTON-ATTACHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 526,012, dated September 11, 1894.

Application filed January 24, 1890. Serial No. 337,972. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. ELLIOTT, a citizen of the United States, residing at Marion, in the county of Linn and State of Iowa, have invented certain new and useful Improvements in Button-Attaching Machines; 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.

My invention relates to machines for attaching buttons to shoes or fabrics, and is an improvement on a machine of the same class for which I have filed an application for Letters Patent, dated September 30, 1889, Serial No. 325,600; and the invention consists mainly in improvements in the button and wire feeding apparatus of the said machine, and in certain details of construction.

The object of my invention is, in general, to improve the construction of machines for attaching buttons to shoes or fabrics, and this object I attain in the machine herein described and illustrated in the drawings which accompany and form a part of this application, in which the same reference letters and numerals indicate the same or corresponding parts, and in which—

Figure 1 is a side view of the principal portion of my machine, the standard and foot lever by which the machine is operated being omitted. Fig. 2 is a top plan view of the machine, showing more particularly the button hopper and the wire feeding mechanism. In this view the button hopper is shown in horizontal section, the section being taken just above the bottom of the button hopper. Fig. 3 is a fragmentary front elevation of the machine, the portion of the machine below the table being shown in section. Fig. 4 is a sectional view, showing the wire spool and the casing within which the wire spool is inclosed. Fig. 5 is a detail view of the button feed finger, showing the position of the feed finger at the lower end of its travel, when it has been successful in grasping a button and carrying it down to the staple forming mechanism. Fig. 6 is a similar view showing the position of the feed finger when it has failed to carry down a button. Fig. 7 is a detail view of a portion of the wire feeding appa-

ratus. Fig. 8 is a sectional elevation of the shell 1, showing the cam block, the grooves in the face of the cam block, and the parts actuated thereby. The section is taken on the left side of Fig. 3. Fig. 9 is a similar sectional elevation, taken on the right side of Fig. 3. Fig. 10 is a front elevation of the cam block, showing how the wire feeding mechanism is operated.

In the drawings, 1 is the main casing or shell of the machine, which is secured to a suitable table 2. Projecting from its front are the head block 3 and the anvil 4. Within the head block are mounted the staple forming and driving devices, and in the top of the anvil block 4 is placed the clinching die 5. Below the table 2 is a tubular standard 6, which has in its upper portion a chamber adapted to receive the spring 7, which spring bears against the bottom of this chamber and against the cam block 8 mounted within the shell 1 and serves to raise the cam block when it is depressed. To the lower end of the standard 6 is pivoted a foot lever, not shown, by means of which the machine is operated, and a rod 9 passing through the standard connects this foot lever with the cam block. All of these parts of the machine correspond to similar parts of my former machine and do not require a detailed description here.

10 is the button hopper, the shape of which is practically the same as that of my former machine. It is pivoted, however, at its front end, to trunnions 11, and is caused to swing up and down about its pivot during the operation of the machine, by a link 13, connecting with the pivoted lever 12, which lever is connected with the bell-crank 14 by a suitable link, and is therefore caused to swing when the cam block 8 reciprocates. Means similar to that employed in my former machine are here employed to give the button hopper a lateral shake as it swings up and down, these means consisting of the cam wheel 15 provided with projections engaging with similar projections 16 on one bearing of the button hopper, and a spring 17 tending to hold the projections of the button hopper and cam wheel together.

Registering with the mouth of the button hopper 10 is the button chute 18, terminating, as in my former machine, in a slotted guide

leading to the staple forming mechanism. Since in this machine the button hopper is pivoted at its front end, I am able to make the termination of the groove 19 in the bottom of the button hopper coincident with the axis about which the button hopper vibrates, so that the swinging of the button hopper does not occasion a separation of the mouth of the button hopper from the button chute, as in my former machine, and no provision is necessary for preventing escape of the buttons while the button hopper and button chute are separated. Since the button hopper has some lateral movement, it is necessary to make the mouth of the groove 20 in the bottom of the button chute 18 somewhat flaring, so that the buttons are at all times free to pass from the button hopper into the button chute. In this machine I have likewise provided means for preventing the passage from the button hopper of buttons the shanks of which are not in a condition to permit of the feeding of the fastener wire through their eyes. It occasionally happens that a button will have an extra large shank, or a shank which is so distorted that it would be impossible to feed a wire through it, or that some buttons will still have bits of thread clinging to their shanks. It is impossible in an automatic machine to feed wire through the eyes of such buttons, and it is therefore important that they should be prevented from passing into the button chute and so into the staple forming mechanism. For this reason I form the grooves in the bottom of the button hopper with sudden contractions at a point just before the buttons pass under a superimposed plate 10', shown in Fig. 2, as in my former machine, the function of this plate being to retain the buttons in their grooves and prevent choking at the mouth of the button hopper. It is necessary that at the farther end of the button hopper the grooves shall be rather broad, so that the shanks of the buttons may readily be caught therein. Buttons with extra large shanks, buttons with deformed shanks, or buttons which have bits of thread about their shanks cannot pass these contractions, but will lodge there, and so will be prevented from passing under the superimposed plate and into the button chute. I have likewise provided the button hopper and button chutes with slots, 23 and 24, in their sides, through which a wire may be inserted to move a button which may have lodged anywhere.

The button feed finger is mounted on the the outer extremity of the lever 12, and consists of three parts, viz: the button feed finger proper, 25, and the two plates 26, one placed on each side of the finger 25. The feed finger 25 has in its upper side a slot 27 through which passes the pivot which attaches it to the lever 12, so that the feed finger may have some movement independent of the plates 26, which are simply pivoted to the lever 12. Connecting these plates 26 is a pin 30, which

is behind the feed finger. A spring 28 connecting lever 12 and said plates 26 tends to press the pin 30 against the back of the feed finger, and so to press the feed finger and the button which it may be carrying firmly against the staple forming die 31.

In the operation of the machine, it is quite essential that the feeding of the button to the staple forming die and the feeding of the wire through the eye of the button should be as nearly simultaneous as possible; also, in case of the failure of the button feed finger 25 to carry a button to the staple forming mechanism, it is quite essential that the wire feed shall not operate, since staples might be formed, driven, and clinched, although they did not carry buttons with them. By the improved form of wire feed which I have devised I have overcome this difficulty. This wire feed is most clearly shown in Fig. 2. It consists of a pivoted dog or grip 32, provided with teeth to grasp the wire 40. A spring tends to hold the teeth of the dog against the wire. This dog 32 is carried by a pivoted lever 33, which is connected by a rod 34 with an arm 35, Fig. 10, which carries a pin working in the slot 36 in the front of the cam block. The rod 34 has in it a slot 37, which permits of movement of the lever 33 irrespective of the movements of the rod 34. The lever 33 is pulled inward by the spring 38, and is pushed out again by the rod 34. On the inward movement of the lever 33 the grip 32 engages with the wire 40 and feeds it inward into the staple forming mechanism within the head block. During the outward movement of the lever 33 the wire is held by a take-up dog 39. On a suitable stud is pivoted an arm 42, shown in detail in Fig. 7. In one end of this arm 42 is a slot 45, at the outer end of which is a downwardly-extending notch 43. In this slot works a screw 44, carried by the lever 33. Just outside of the arm 42, and corresponding with it in shape, is another arm 46, likewise supported from the stud 41. This arm likewise has in its outer end a slot to permit of the free passage of the screw 44. The outer end of the arm 46 likewise has an upwardly projecting shoulder 47, and a finger 48 carried by the dog 32 engages with this shoulder when the lever 32 is in its extreme downward position, and throws the dog 32 out of engagement with the wire.

On the inner extremity of the rod 42 is a pin or lug 49, projecting horizontally and toward the front. This lug is seen partly in Figs. 5 and 6, in which figures its function is most apparent. The plate 26 on the right-hand side of the feed finger 25 likewise carries a lug 50, which projects horizontally and to the right. If the feed finger 25 carries with it a button in its descent, then the head of the button holds the feed finger so far out from the head block that the lugs 49 and 50 do not engage; but if, however, the feed finger has failed to grasp a button and carry it

down, then the feed finger is forced inward by the spring 28 until it rests against the staple forming die, and when this happens the lugs 49 and 50 engage and the lug 49 is depressed, raising the outer end of the arm 42 and causing the screw 44 to slip into the notch 43 of the slot 45. The lever 33 is thus locked, and it is impossible for the wire to be fed forward until the feed finger 25 has descended, carrying with it a button.

The staple forming and driving mechanism of this machine is substantially the same as that of my former machine, and needs no description here. The device by means of which the clinching of the staple is caused to be performed by the direct downward movement of the foot lever has been somewhat changed, however. This device is shown in Fig. 3. 52 is a lever pivoted at one end and connected by means of the rod 53 with the bell-crank 14, Fig. 9, which operates the plunger 51, which plunger drives the staple. When the staple has been driven through the fabric and against the clinching die by the plunger 51, the cam block 8 strikes the free end of the lever 52, and carries it down, thus likewise carrying down the bell-crank lever 14 and plunger 51, and by the direct action of the foot lever forcing the ends of the staple down upon the top of the clinching die, thus clinching the staple. I have likewise improved the construction of the staple forming die 31, as will be seen by reference to Fig. 3, by providing the groove 54 in this die which receives the shank of the button with a slight depression or cavity 55, separated from the front of the die by a slight ledge. In practice, difficulty has been experienced in securing the proper feeding of the fastener wire through the eye of the button, owing to the differences in the shapes of the shanks of different buttons, as indicated by the two buttons A and B shown in connection with Fig. 8, some shanks being much smaller and flatter than others. Thus with a die of the ordinary construction adapted to work with buttons like A, if a button having a shank like B be introduced into the groove in the die, the eye of the button is carried so high that the wire will not enter the eye, but will strike some portion of the shank of the button. A similar difficulty will be experienced with buttons like A if a die adapted for buttons like B were used. The depression 55 obviates this difficulty. This depression or cavity receives the curvature of large shanks like that of button B so as to centralize the eye with the wire, while the shanks of buttons like A are supported by the ledge just in front of the depression 55, so that the eye of the button is likewise central with the fastener wire. I have likewise improved the construction of the casing 57 which incloses the wire spool 56, by providing a false bottom, 58, formed as an annular ring, within the central part of which the end of the spool fits, as shown in Fig. 4. By this means the wire is prevented

from slipping under the spool and jamming there.

The operation of this machine is in general the same as that of my former machine. By successive depression and release of the foot lever the cam block 8 is caused to reciprocate up and down within the shell 1, and communicates motion through the pins working in the grooves in its faces to the various parts of the machine. The bell-crank 14 is thus caused to swing and communicates its motion to the lever 12, which causes the button hopper 10 to swing up and down, the button hopper being likewise caused to vibrate from side to side by the action of the cam wheel 15, and by this means the buttons within the button hopper are agitated, their shanks catching in the grooves in the bottom of the button hopper, and from these grooves the buttons slide under the superimposed plate 10' into the button chute 18. When the lever 12 rises it carries with it the feed finger 25, which moves up until it rests on the top of the button chute. When the lever 12 moves downward again the button feed finger 25 catches the button at the mouth of the button chute and carries it downward, the button being guided by a slotted guide, as in my former machine, and the shank of the button is inserted in the slot in the staple forming die 31. The action of the spring 28 forces the button into the groove in the staple forming die, and the lever 12 swinging downward somewhat after the button has reached its seat, causes the finger 25 to rock and press the button firmly into its seat. The rod 34 is now pulled inward through the action of the arm 35 and the pin working in the groove in the front of the cam block, and the spring 38 is thus permitted to draw inward the arm 33, the grip 32 engaging with the wire 40 and carrying it forward, thus feeding it through the eye of the button. By mechanism similar to that of my former machine the wire is now cut and formed into a staple which is then driven through the fabric so that its point rests against the clinching die. The cam block 8 now strikes the end of the lever 32 and the motion of the lever 32 is communicated by the rod 33 to the bell-crank 14 and so to the plunger 51, which then presses the staple down upon the clinching die by the direct action of the foot lever, thus clinching the staple. This operation presupposes that the button feed finger 25 has been successful in grasping a button and carrying it downward from the button chute to the staple forming mechanism. Should it have been unsuccessful, however, then the feed finger will be pressed inward by the spring 28 into the position shown in Fig. 6, and the lugs 49 and 50 will thereby be brought into engagement, the arm 42 being raised so as to cause the screw 44 to enter the notch 43, and lock the arm 33, so that no wire is fed forward into the staple forming mechanism.

Having thus completely described my in-

vention, what I claim, and desire to secure by Letters Patent, is—

1. In a button attaching machine, the combination, with a button hopper pivoted at or near its outlet end, of actuating mechanism for imparting vertical and lateral vibration to said button hopper, and a button chute having a flaring mouth registering with the outlet of said button hopper, whereby buttons are permitted to pass from said hopper to said chute without interruption from the vibration of said hopper, substantially as described.

2. The herein described button hopper which is provided with a bottom having a series of parallel grooves merging into a series of converging grooves which finally communicate with a single groove, with means for pivotally mounting said button hopper at its outlet end and permitting its being tilted in a vertical plane, and with a bridge plate which extends from said series of parallel grooves at one end to a point adjacent to the outlet of said hopper at its other end, and thereby covers said converging grooves and holds the button shanks in said latter grooves while they are being fed to the outlet of said hopper, substantially as described.

3. In a button attaching machine, the herein-described button feed finger composed of the central feed finger proper 25 having the slot 27, and of the pivoted side plates 26 connected by the pin 30, substantially as described.

4. The combination, with the oscillating lever 12, of a feed finger composed of the parts 25 and 26, and the spring 28 adapted to press inwardly the lower end of said feed finger, substantially as described.

5. In a button attaching machine, the combination, with button and wire feeding mechanisms, of a stop mechanism for preventing the feeding of wire when the button feeding mechanism fails to feed a button, substantially as described.

6. In a button attaching machine, the combination, with button and wire feeding mechanisms, of a switch for disengaging the wire feeding mechanism from the wire when the

button feeding mechanism fails to feed a button, substantially as described.

7. In a button attaching machine, a wire feed composed of the grip 32, the take-up 39, means for moving said grip backwardly, and a spring 38 for moving the grip forwardly, thereby feeding the wire, substantially as described.

8. In a button attaching machine, the combination, with the wire feed and the button feed finger, of the switch 42 which is adapted to engage with said wire feed in its outward position and provided at its inner end with the lug or pin 49 for engaging with the lug or pin 50 on said button feed finger, whereby said wire feed is locked when no button is under said feed finger, substantially as described.

9. In a button attaching machine, the combination, with the wire feed, of the switch 42 adapted to automatically engage with said wire feed, the stop 47 engaging with the finger 48, and the grip 32, whereby said grip is disengaged at the extreme outward position of the feed, substantially as described.

10. In a button attaching machine, the combination, with the plunger 50 and the connecting arm 14, of the cam block 8, the pivoted lever 52 and the connecting rod 53, substantially as described.

11. In a button attaching machine, the herein-described die 31 having the groove 54 formed with the cavity 55, which is adapted to receive the button shanks, substantially as described.

12. In a button attaching machine, the herein-described reel for wire, the same consisting of the casing 57, the spool 56, and the bottom 58 having a recess therein adapted to receive the lower end of the spool, whereby the wire is prevented from slipping under the end of said spool, substantially as described.

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

WILLIAM E. ELLIOTT.

Witnesses:

S. W. BRAINERD,  
FRANK G. CLUKE.