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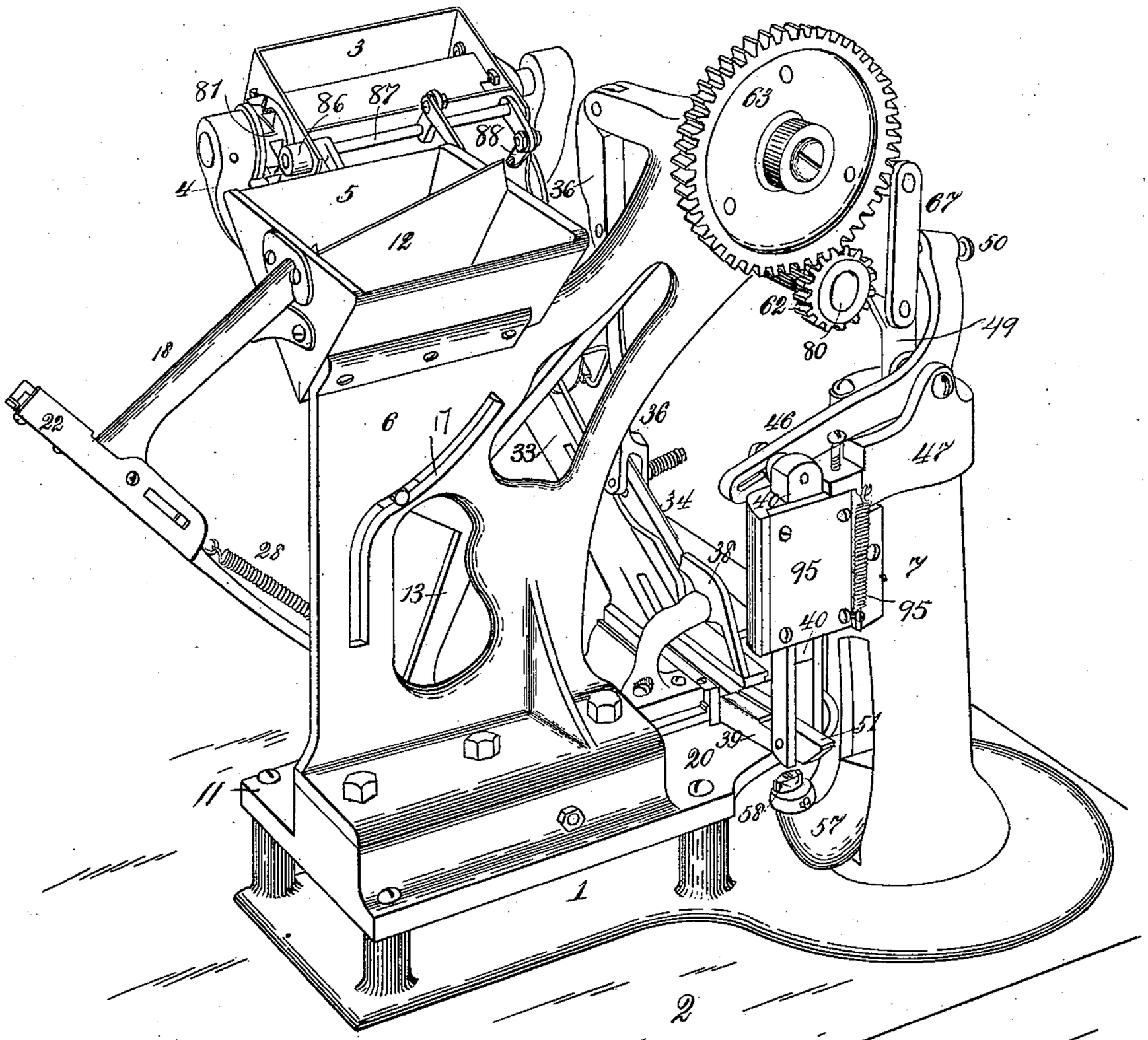
W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 1.



Attest.

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H. B. Hawley.

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(No Model.) 8 Sheets—Sheet 2.

W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 2.

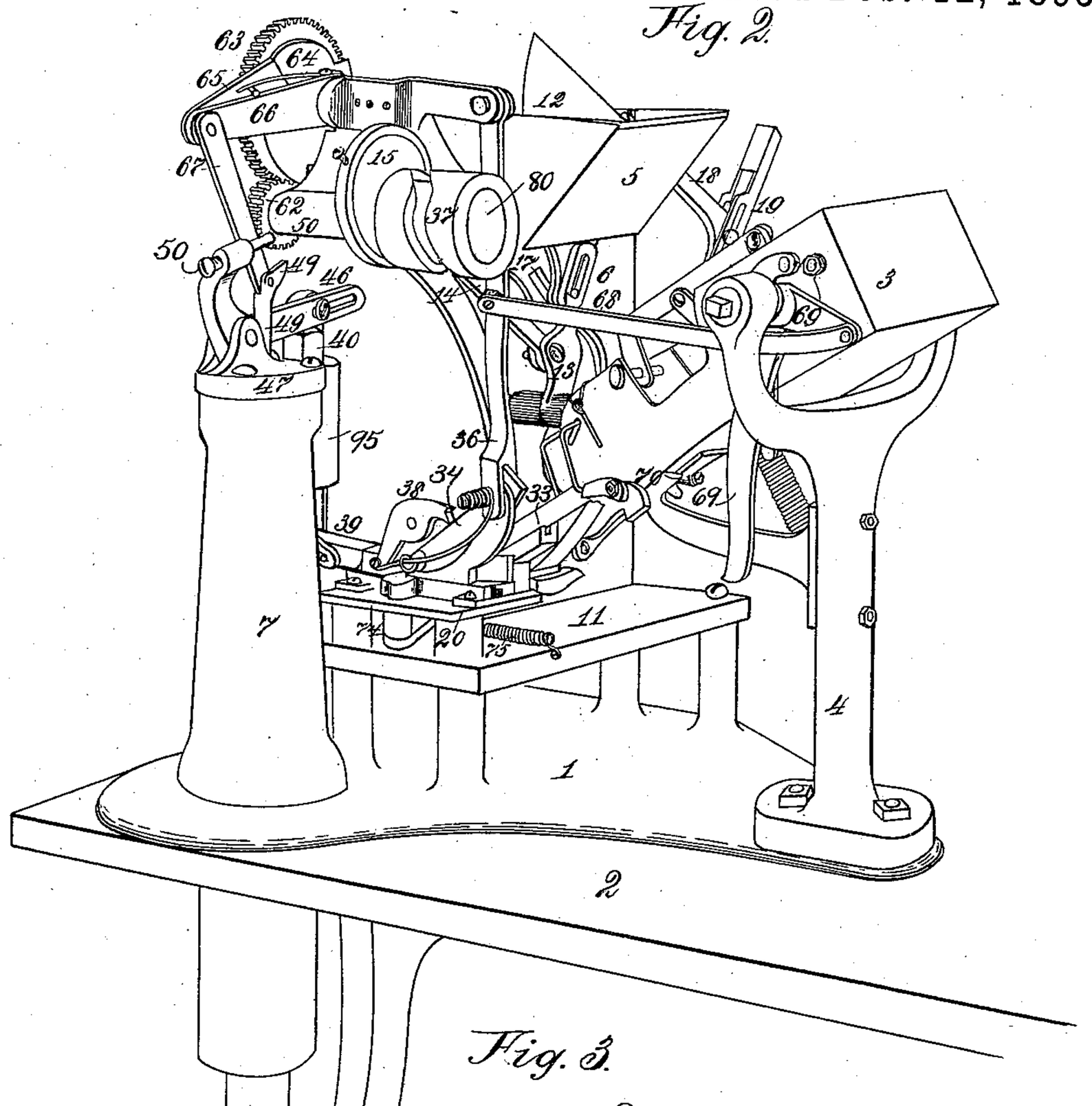
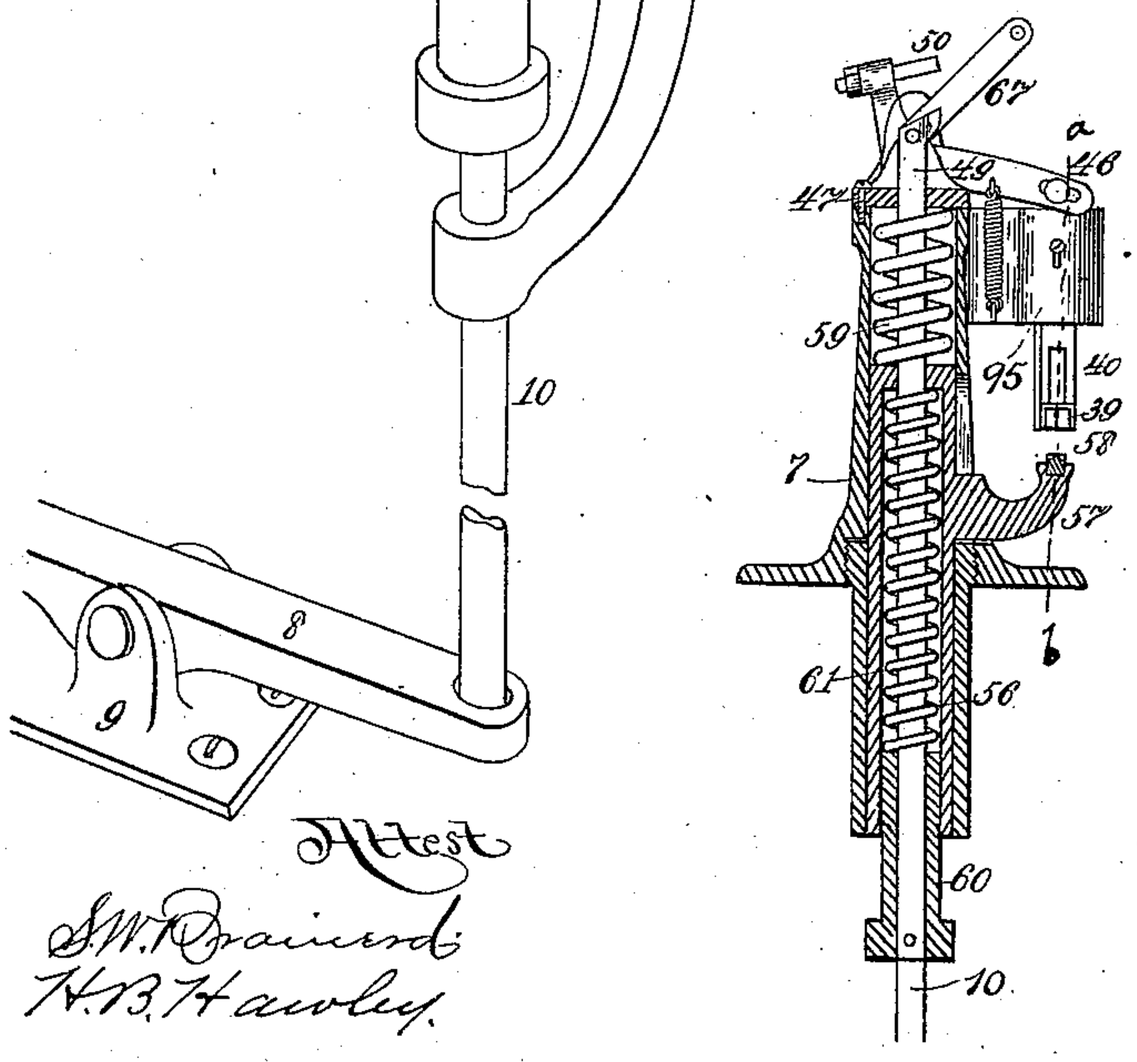


Fig. 3.



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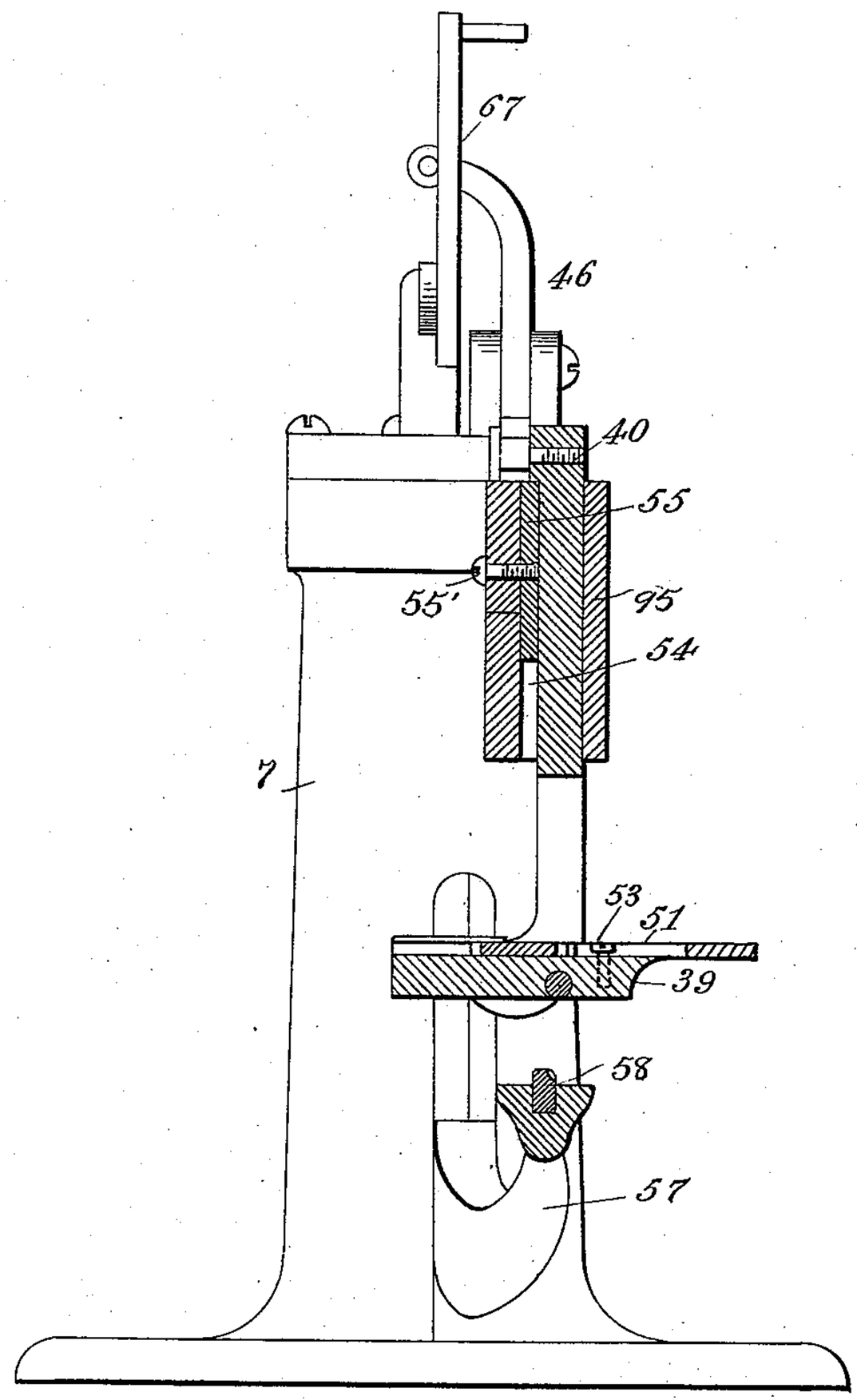
8 Sheets—Sheet 3.

W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 4.



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(No Model.)

8 Sheets—Sheet 4.

W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 5.

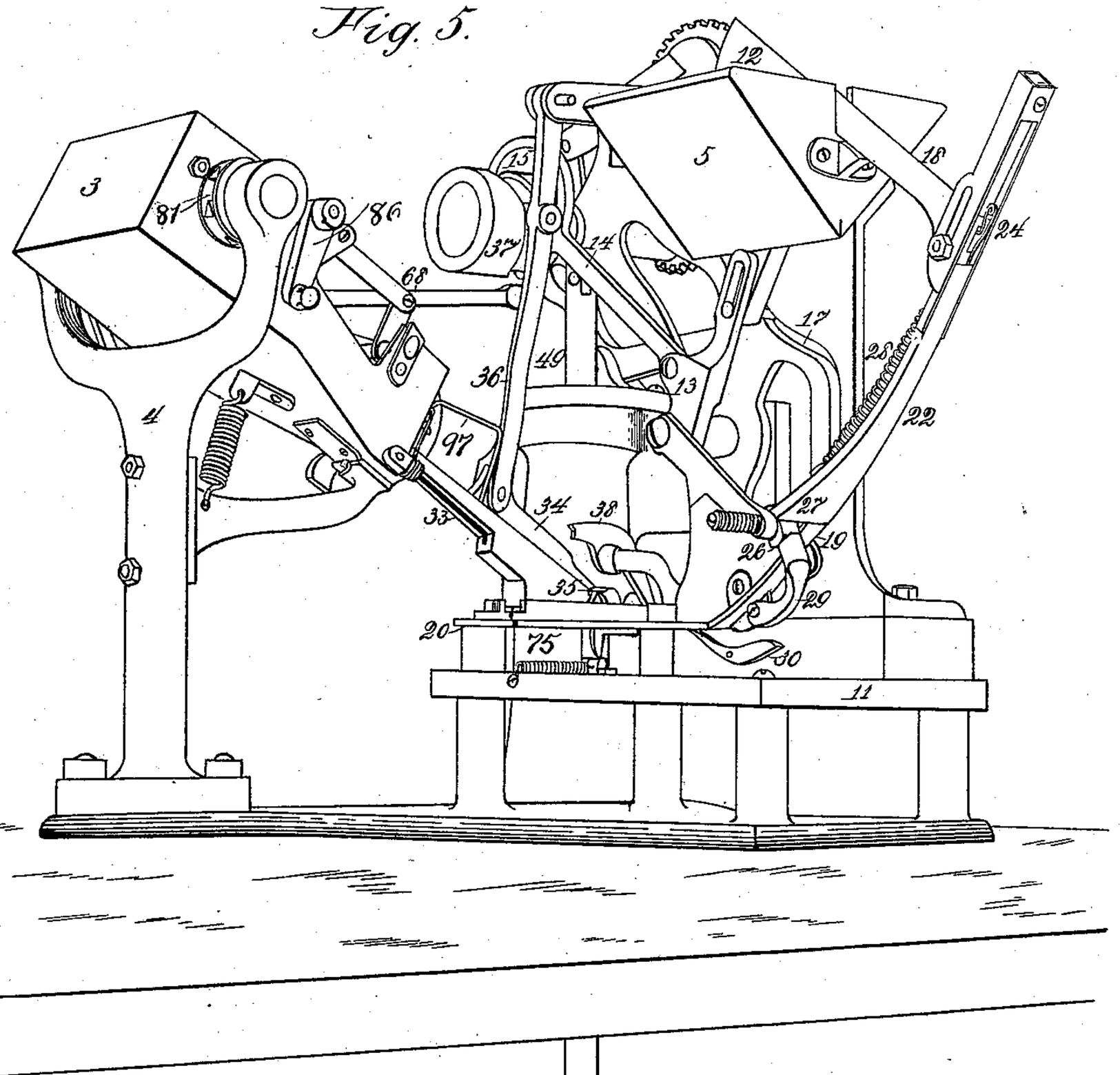


Fig. 6.

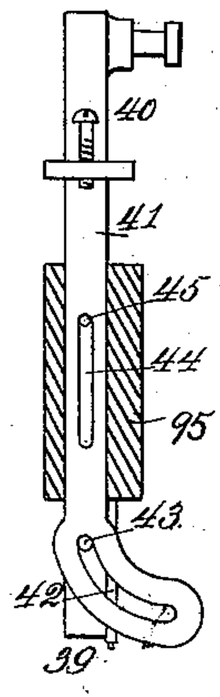
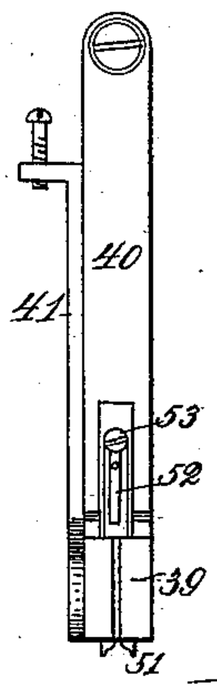


Fig. 7.



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W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 8.

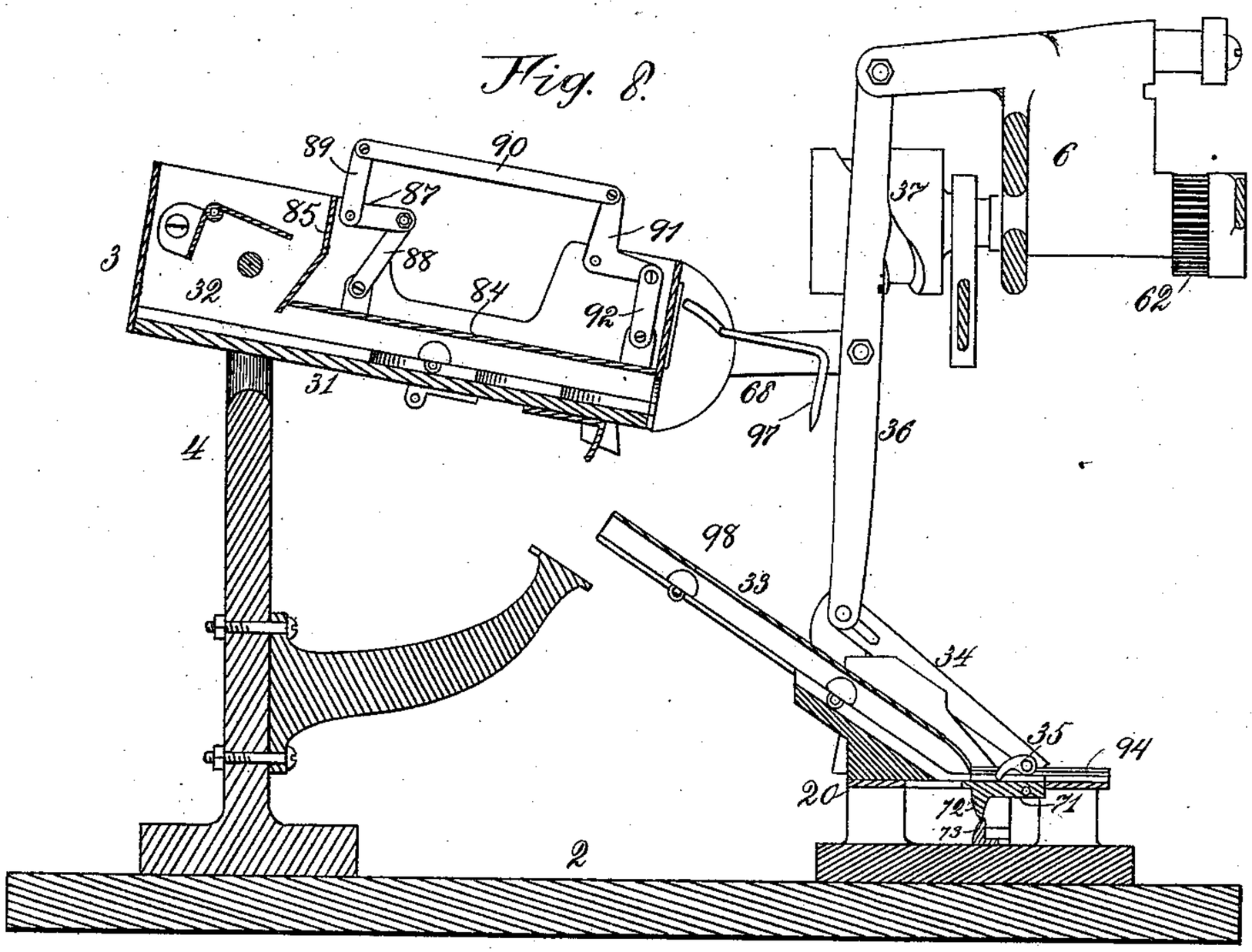
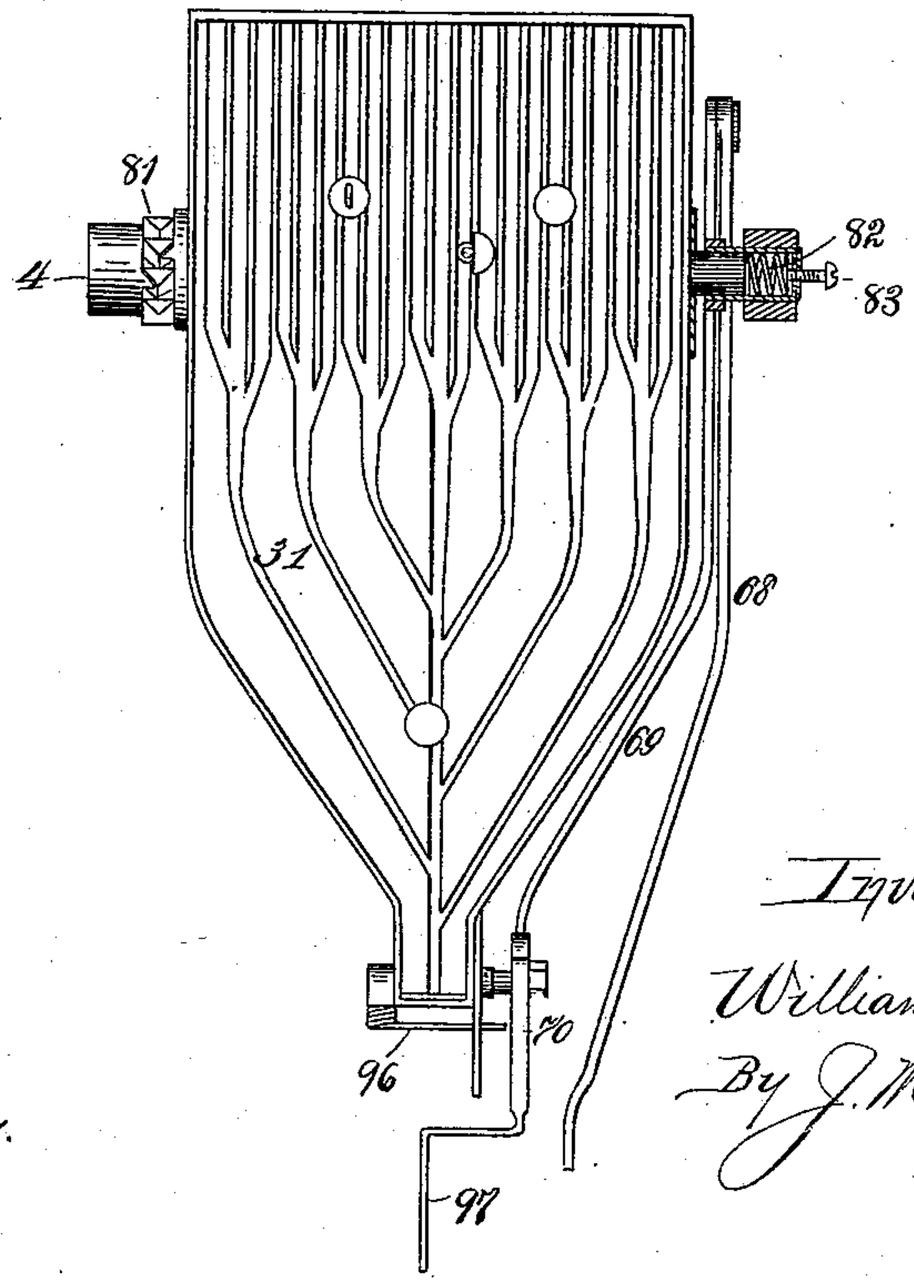


Fig. 9.



Attest.
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(No Model.) 8 Sheets—Sheet 6.

W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 10.

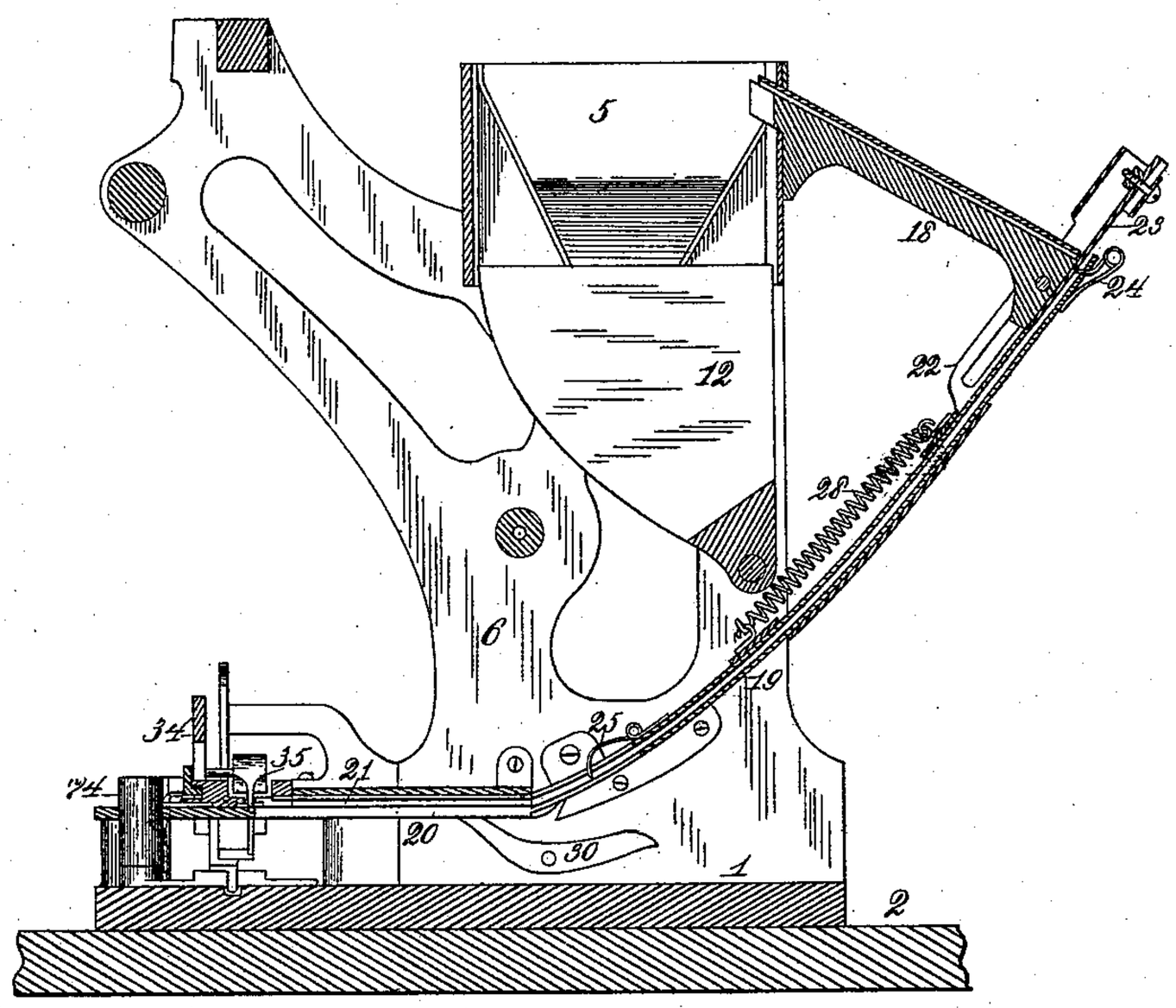


Fig. 12.

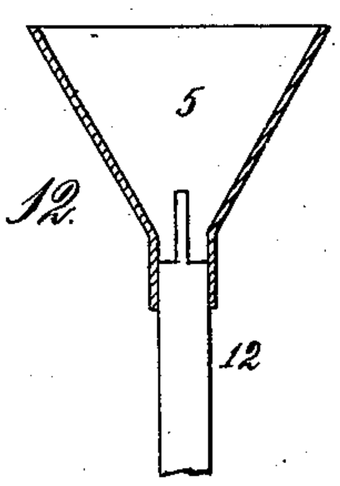
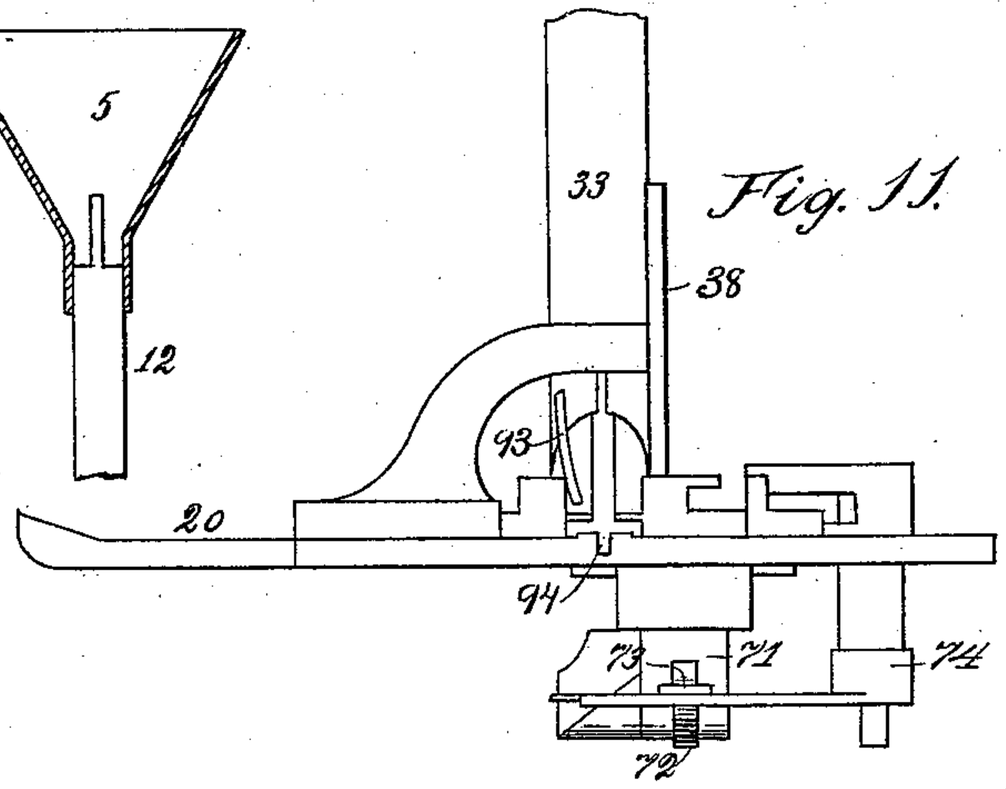


Fig. 11.



Witnesses:
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(No Model.) 8 Sheets—Sheet 7.

W. E. ELLIOTT.

BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

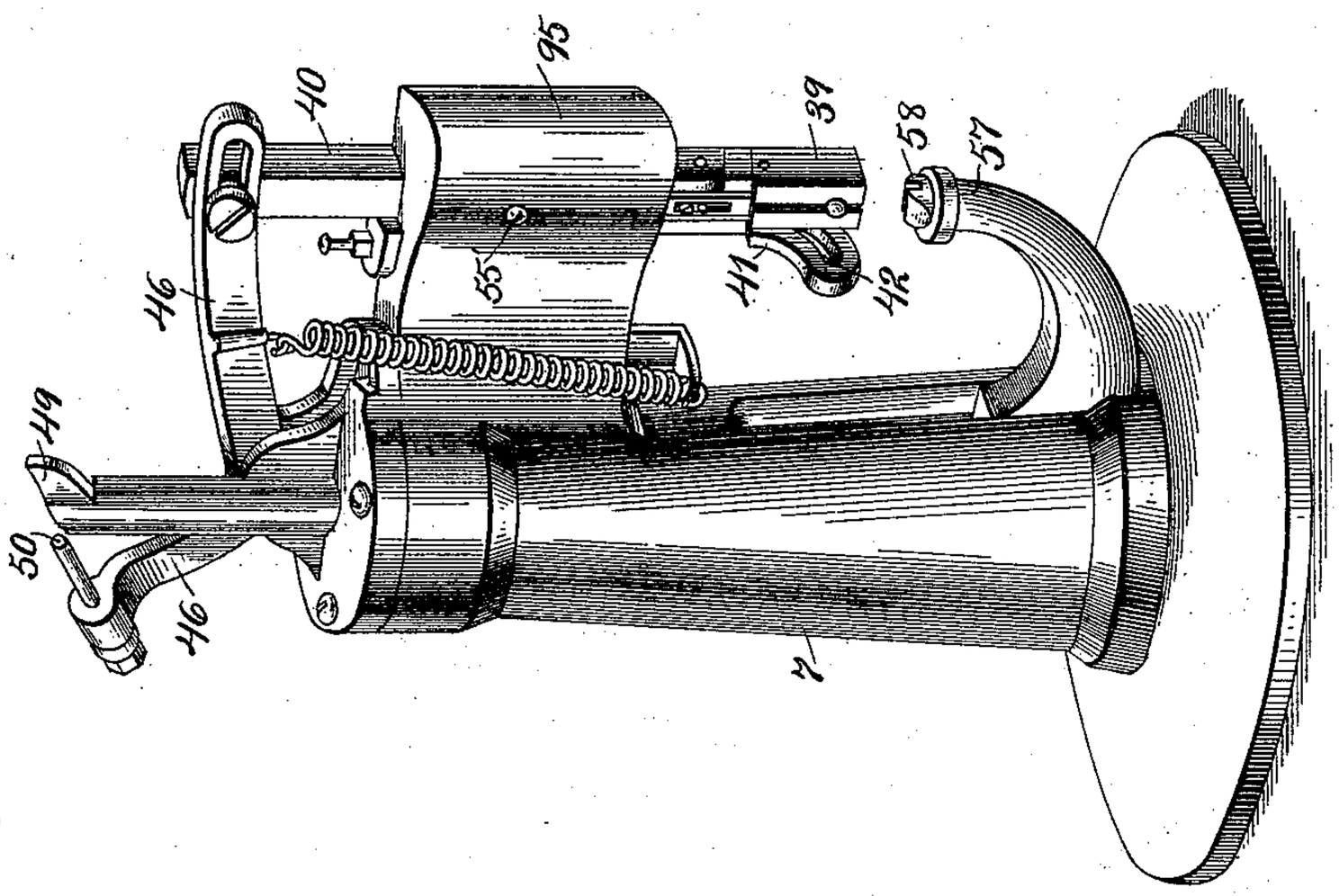

Fig. 14.

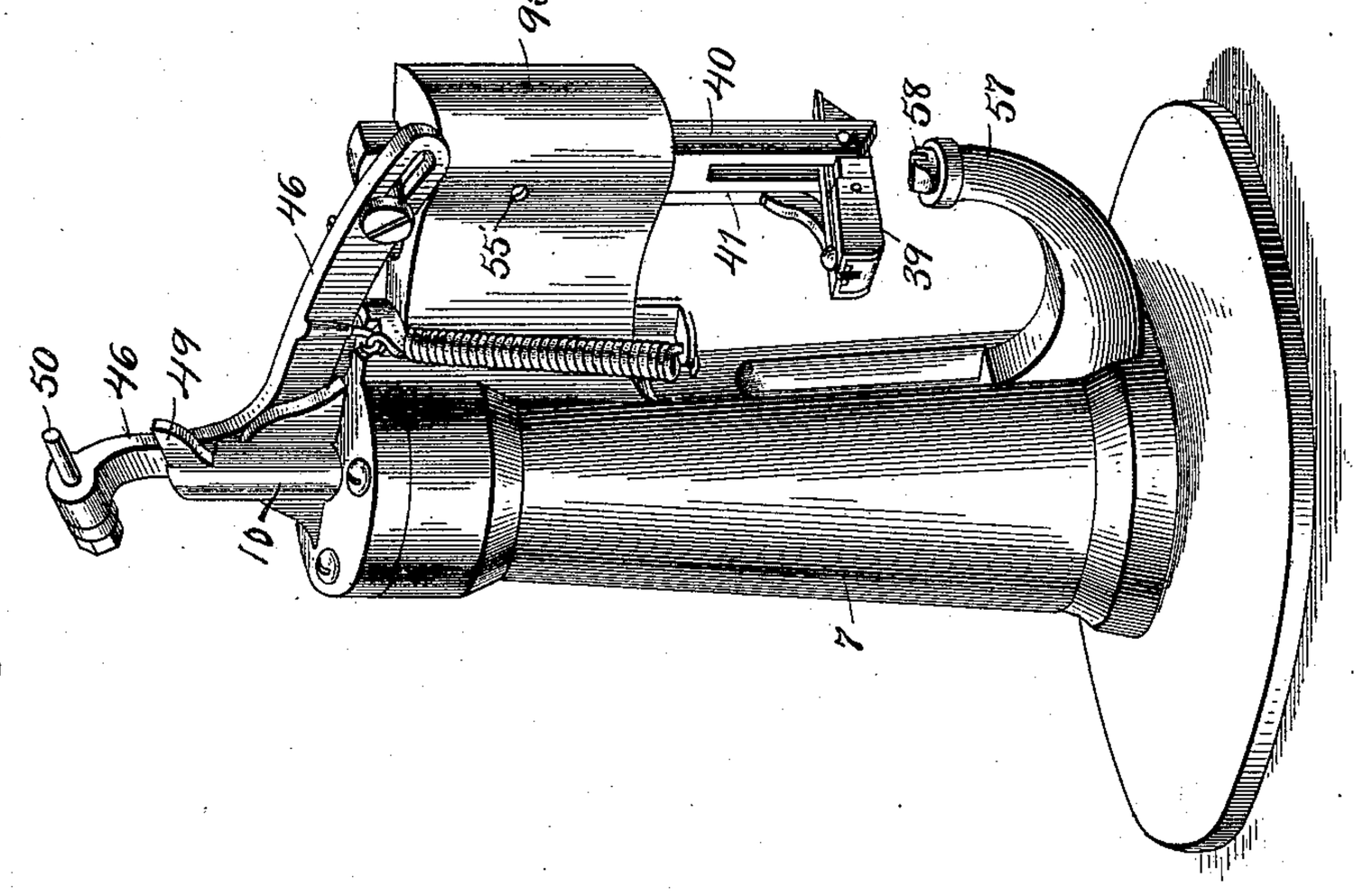

Fig. 13.

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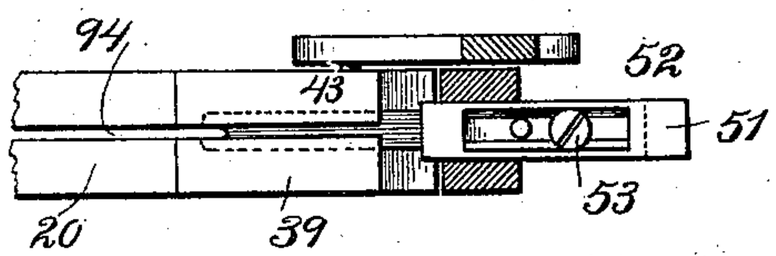
BUTTON ATTACHING MACHINE.

No. 533,874. Patented Feb. 12, 1895.

Fig. 15.



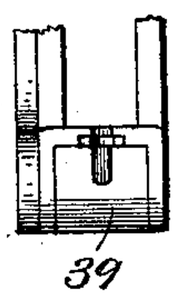


Fig. 16.

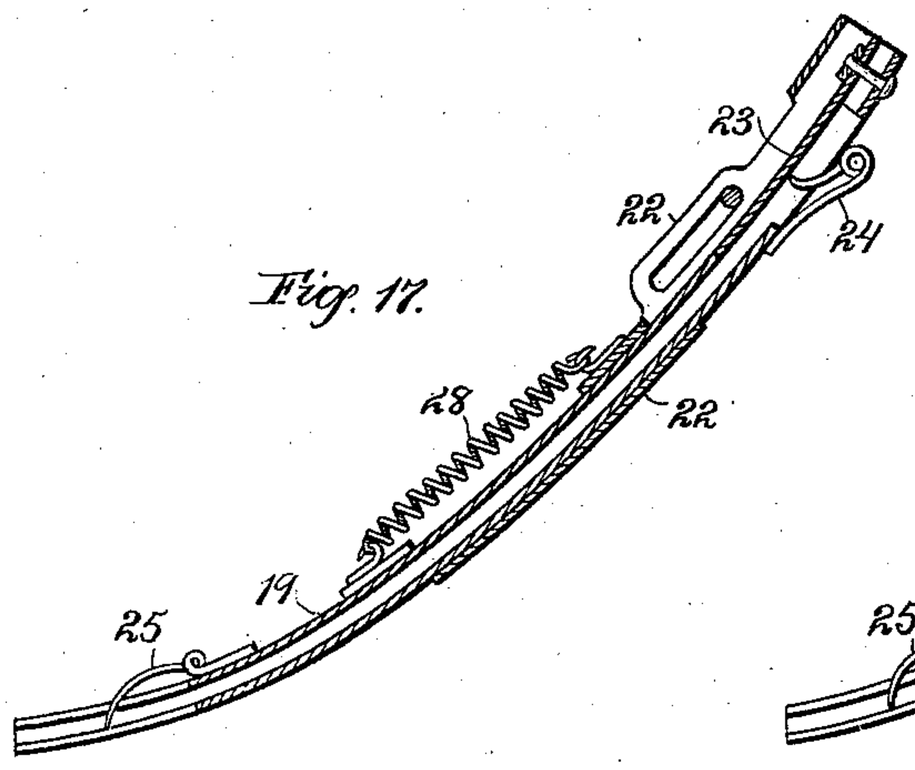


Fig. 17.

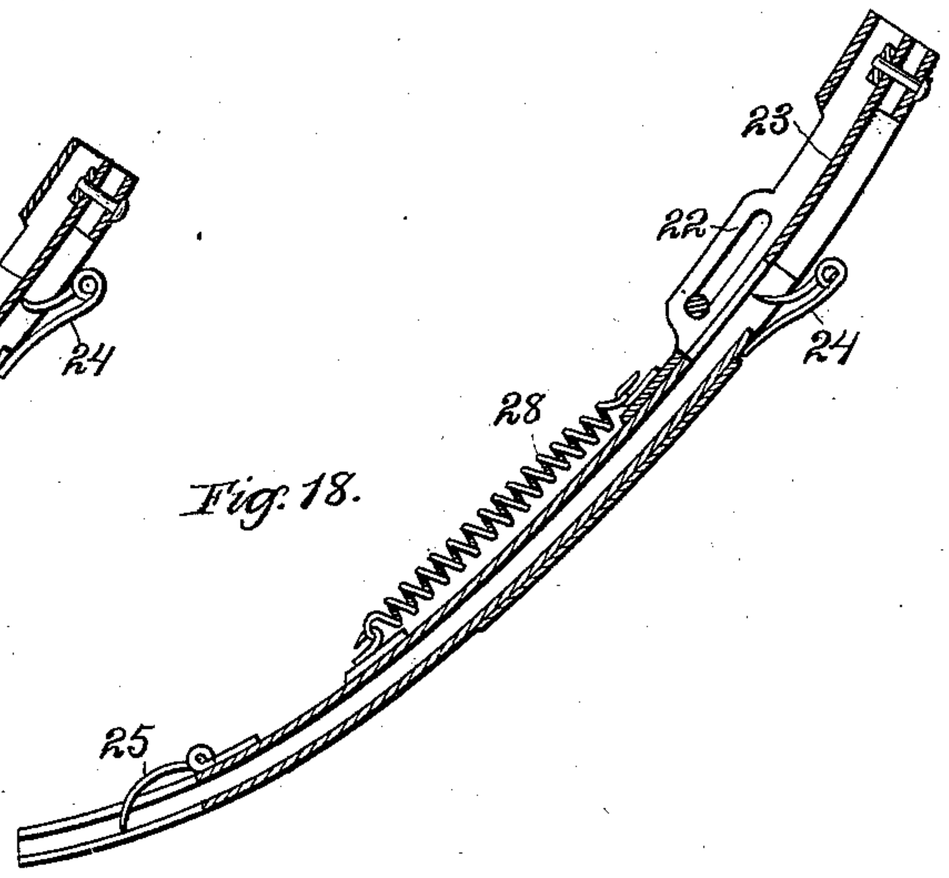


Fig. 18.

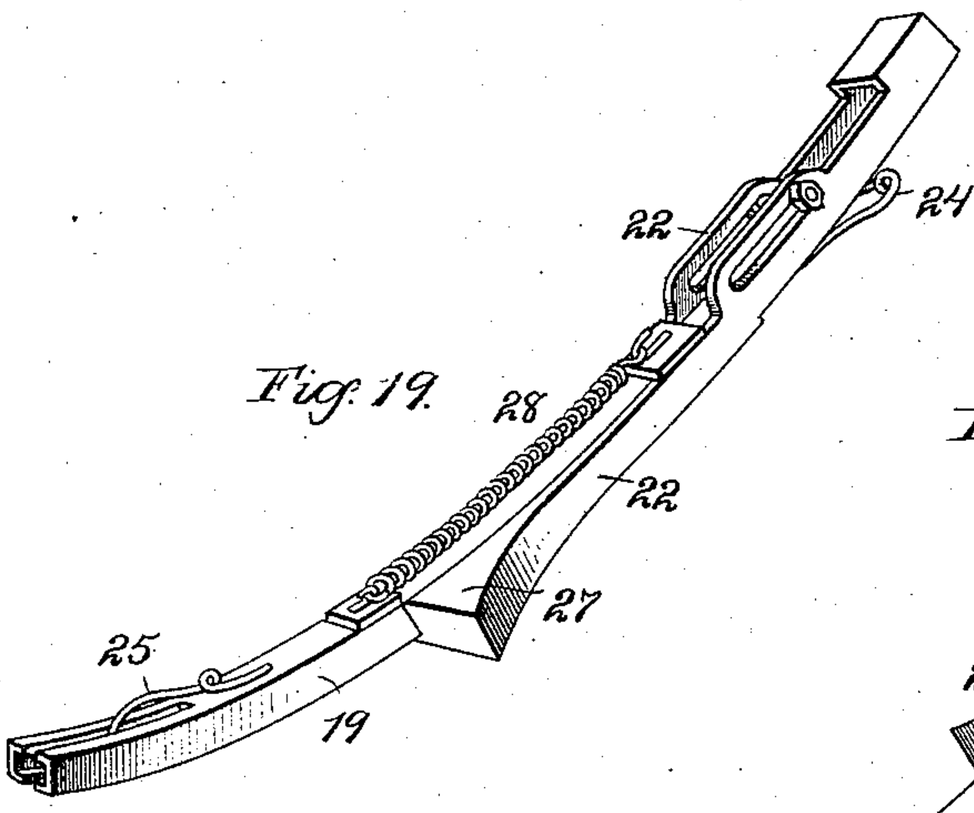


Fig. 19.

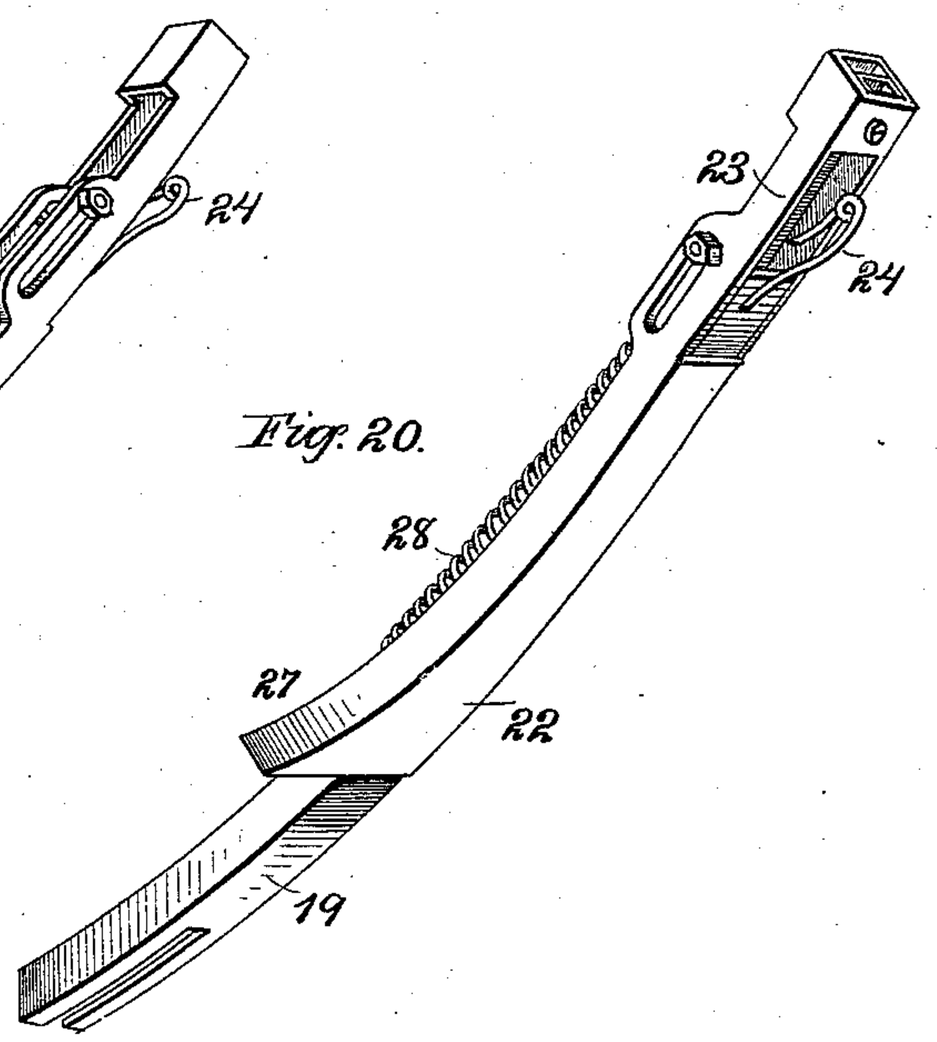


Fig. 20.

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H. M. Goodwin

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UNITED STATES PATENT OFFICE.

WILLIAM E. ELLIOTT, OF MARION, IOWA.

BUTTON-ATTACHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 533,874, dated February 12, 1895.

Application filed November 5, 1889. Serial No. 329,377. (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 particularly to that class of button attaching machines wherein the buttons and fasteners are placed in suitable receptacles of the machine, the buttons and fasteners being automatically fed from their receptacles and each fastener threaded through the eye of a button, the fastener being then driven through the fabric and clinched; and my invention consists in the novel construction, combination, and arrangement of the various parts constituting my machine, and in the novel means employed for taking the buttons and the fasteners attached thereto from the feeding mechanism and attaching the same to the fabric.

In this machine the button hopper used resembles the button hopper of another button attaching machine of my invention, for which I have filed an application for Letters Patent, dated November 30, 1889, Serial No. 325,600, and the button feeding and fastener feeding and threading mechanism correspond to similar mechanism in a button machine for which a patent was granted to me on August 13, 1889, No. 408,700. This specification is not designed to comprehend through this combination any of the special features set forth and claimed in the above-mentioned application and patent. This specification sets forth, however, certain improvements upon devices set forth in the foregoing application and patent, and particularly upon devices set forth in the patent.

The object of my invention is to produce a machine, which, being supplied with buttons and suitable fasteners, will automatically connect said buttons and fasteners and attach the fasteners to the fabric. This object is attained in the mechanism herein described and illustrated in the drawings which accompany and form a part of this application, in which the same reference numerals indicate the same or corresponding parts, and in which—

Figure 1 is a front perspective view of my machine, showing the same attached to a suitable table or counter, and in condition for operation. Fig. 2 is a side perspective view of the machine, and shows the foot lever and rod connected therewith by which the machine is operated. Fig. 3 is a sectional elevation of the fastener driving and clinching mechanism, looking from the rear of the machine, the section being taken on the center line of the clinching anvil. Fig. 4 is a side view of the driving and clinching mechanism, which is shown as sectioned on the line *a*—*b* of Fig. 3. Fig. 5 is a side perspective view of my machine, the view being taken from the side opposite to that from which Fig. 2 was taken. Fig. 6 is a detail view of the guide 41 which controls the movements of the pivoted carrier 39, to be hereinafter mentioned. Fig. 7 shows the plunger, the pivoted carrier, and the guide 41. Fig. 8 is a vertical section of the machine on the center line of the button hopper and chute. Fig. 9 is a plan view of the button hopper, the superimposed plate and mechanism therefor being omitted. Fig. 10 is a sectional elevation taken on the center line of the fastener hopper and chute. Fig. 11 is a fragmentary front elevation of the button table and the parts connected therewith. Fig. 12 is a transverse section of the fastener hopper. Fig. 13 is a detail perspective view of the fastener driving and clinching mechanism, showing the carrier in a horizontal position, the carrier having just received a button. Fig. 14 is a similar view of the fastener driving and clinching mechanism, showing the carrier in a vertical position, the fastener being about to be affixed to the fabric. Fig. 15 is a detail plan view of the pivoted carrier, showing likewise a portion of the button table 20. Fig. 16 is a detail end view of the pivoted carrier. Fig. 17 is a detail vertical section of the fastener chute. It shows the cut-out blade, to be hereinafter mentioned, in the extreme downward position. Fig. 18 is a similar view of the fastener chute, showing the cut-out blade in the extreme upward position. Figs. 19 and 20 are

detail perspective views of the fastener chute, showing particularly the slide mounted upon said chute, which slide carries the above mentioned cut-out blade.

In the drawings, 1 is a base or bed plate adapted to be attached to a suitable table or counter 2. To this bed plate is secured a standard 4 which pivotally supports the button hopper 3, a column 7 which supports the driving and clinching mechanism, and a base plate 11 to which is fastened a standard 6, which supports the fastener hopper 5.

The principal features of the fastener feeding mechanism are fully described in my above mentioned patent, No. 408,700. In order, however, that the operation of the present machine may be fully understood, I will again describe this fastener feeding mechanism and its operation. 5, as before stated, is the fastener hopper, supported by the standard 6. The hopper has converging sides, and in it is placed a thin plate 12 which passes through a slot in the bottom of the fastener hopper. A pin attached to the lower end of this plate 12 works in the groove 17 of the standard 6. The bell-crank lever 13 is likewise pivotally connected to the lower end of the plate 12, the pivot working in a slot in one arm of the bell-crank. This bell-crank is actuated by a rod 14 connected with an eccentric 15 on the shaft 80, and as the eccentric is revolved and the bell-crank 13 is thereby caused to swing, the pin in the groove 17 is caused to move and the plate 12 is first raised vertically and then tilted about a center coinciding with the opening at the entrance of the fastener raceway 18. In thus moving upward the plate 12 catches a number of the fasteners or staples, the legs of which straddle its upper edge, and when the plate is tilted the fasteners slide off from the plate 12 into the fastener raceway 18, which, as shown in Fig. 10, is provided with a central ridge registering with the edge of the plate 12, so that the fasteners slide off from the plate on to this central ridge and thence down through the raceway to the chute 19 which is placed at a reverse angle to the raceway, so that the points of the fasteners first strike the raceway.

The improvements in this part of the fastener feeding device over that of my former machine consist in the means by which the fasteners are caused to issue singly from the raceway, and likewise in the means whereby they are caught by the feed finger and inserted through the button shanks. The chute 19 is inclosed by the slide 22, shown most clearly in Figs. 5, 10, 17, 18, 19 and 20. This slide is open on top for most of lits length. It is likewise provided with a considerable opening in its bottom, to permit the end of the spring 24 to reach to the mouth of the raceway 18. The slide is provided with a cut-out blade 23, which fits closely against the mouth of the raceway. The slide 22 is adapted to slide back and forth over the chute 19, motion being given to it by means to be hereinafter described. In Figs. 5 and 18 the slide is represented at the upper end of its stroke, while in Figs. 10, 17, 19 and 20 it is represented as at the lower end of its stroke, and in this position the end of the cut-out blade rests against the end of the upper side of the chute 19, so that the cut-out blade is apparently a continuation of the top of the chute. It is not to be confounded with the latter, however. When the slide moves upward the edge of the cut-out blade rises to a point slightly above the top of the fastener raceway 18, allowing a single fastener to drop from the raceway upon a spring 24 carried by the chute 19. In the downward movement of the slide 22 the cut-out blade 23 detaches the fastener from the end of the spring 24, at the same time closing the mouth of the fastener raceway, so that no more fasteners can issue therefrom, and the fastener drops down the chute 19 to a point near the end thereof, where it is caught by the spring 25, the points of the fastener hanging downward.

The end of the chute abuts against the table 20, in which is a groove 21 which forms a continuation of the fastener chute, and which leads to a point where the buttons and fasteners are connected. The slide 22 is provided with a projection 27 at its lower end, see Figs. 5, 19, and 20, and the lower arm of the bell-crank lever 13 in swinging backward strikes this projection 27 and moves the slide upward. The slide is returned to position by the spring 28. The lower arm of the bell-crank 13 likewise carries the device for feeding the fastener forward through the eye of the button. This device consists of a feed finger 29 so pivoted to the bell-crank 13 as to be capable of movement in both horizontal and vertical planes, and provided with a spring which tends to press it upward. The feed finger carries a point which enters the chute 19 through a slot in the bottom of the chute, this slot likewise extending through the bottom of the groove 21. The rear limit of this slot in the bottom of the chute is behind the spring 25. On its forward stroke the feed finger disengages the fastener from the spring 25 and carries it forward, pressing downward and out of the way a pivoted guide or switch 30. The rear end of this guide or switch 30 is much heavier than the front end, so that the front end is normally held against the bottom of the table 20, and when the feed finger 29 moves backward again the guide 30 carries it downward out of the slot in the groove 21 and when the finger has passed out of the guide 30 it springs up again into the slot in the chute, being thus carried past the fastener held by the spring 25, and into position to feed the fastener forward when the bell-crank 13 again moves forward.

The button hopper 3 is substantially the same as the button hopper described in my above mentioned application, Serial No. 325,600. As previously stated, the button hopper is

pivotally supported by the standard 4, and by means now to be described is caused to swing up and down about its pivot.

36 is an arm pivoted at its upper edge to the support 6. It carries a pin which works in the groove of the cam 37, mounted on the shaft 80, so that as the shaft is revolved the arm is caused to swing back and forth.

69 is a bell-crank lever mounted on the pivot of the button hopper 3, and one arm of this bell-crank lever is connected by the link 68 with the arm 36, so that as said arm swings back and forth the bell-crank lever 69 is caused to swing about its pivot. The other arm of the bell-crank lever is adapted to engage with the pivoted dog 70 carried by the button hopper, and as the bell-crank 69 swings about its pivot it strikes this dog and causes the button hopper to rise, against the tension of a spring shown in the drawings. As with the button hopper of the machine described in my above mentioned application, Serial No. 325,600, there is also provided means for giving the button hopper a lateral vibration as it swings up and down, consisting, as in my former machine, of the toothed cam wheel 81 engaging with projections or teeth of the bearing and of the hopper itself, and a spring 82 for holding the hopper and cam wheel close against the bearing. By this means the buttons within the button hopper are thoroughly agitated during the operation of the machine. The pressure exerted by the spring 82 is adjustable by means of the screw 83, at the end of which is a plate bearing against the end of the spring.

As shown in Fig. 9, the bottom of the button hopper is provided with a number of grooves which converge at the narrow end of the hopper into a single groove which leads to the mouth of the button hopper. A plate 84 extends over a portion of the bottom of the button hopper, being parallel with the bottom and separated therefrom by a distance slightly greater than the thickness of the heads of the buttons which are being used, and this distance is adjustable, as is hereinafter described, to different sizes of buttons. To the rear end of the plate is attached another plate 85, which projects upward, forming the front wall of the button magazine. When the button hopper vibrates in the manner above described, the buttons within this button hopper are thoroughly shaken up and the shanks of the buttons tend to fall into the grooves, and to slide down the grooves. The grooves are somewhat narrower than the breadth of the button shanks, and the buttons therefore arrange themselves with their shanks lengthwise of the grooves. The plate 84 is for the purpose of preventing any of the buttons from leaving the grooves after passing out of the button magazine and so falling down and choking the mouth of the hopper. It likewise insures that all of the buttons shall be fed to the threading mechanism in an upright position.

The means for adjusting the height of the plate 84 above the bottom of the button hopper consists of an arm 86 attached to the shaft 87, which extends across the button hopper. To this shaft are attached levers which are connected by links 88 to the rear end of the plate 84, and another lever 89 connected by a link 90 with a pivoted bell-crank lever 91 at the narrow end of the button hopper, which connects by means of the link 92 with the front end of the plate 84. Moving the arm 86 causes the shaft 87 to rotate, thereby raising or lowering the plate 84, according to the direction in which the arm 86 moves.

The mouth of the button hopper 3 registers with the button chute 33 when the button hopper is at the lower end of its swing, and suitable means, as in my former machine, is provided for preventing the buttons from passing out of the button hopper. This consists of a spring 96, shown in Fig. 9, which in its relaxed position lies across the mouth of the button hopper, and prevents buttons from escaping from the button hopper. The spring 96 occupies this position, however, only when the button hopper is swinging up and down. As the button hopper nears the lower end of its swing the end of the spring strikes the top of the button chute 33 and is lifted clear of the mouth of the button hopper, thereby permitting buttons to pass from the button hopper into the button chute. The buttons then slide down this chute, their shanks lying within a groove in the bottom of the chute, to the end of the chute, where they are caught and held by a slight spring 93, shown in Fig. 11.

As above stated, the dog 70, with which the lower arm of the bell-crank 69 engages, is pivotally connected to the hopper 3. One end of this dog is provided with a hooked extension 97, provided with a tapered point, which, when the button hopper is at the lower end of its swing, projects through an opening 98 in the top of the button chute 33. The purpose of this device is to prevent the too rapid feeding of buttons into the button chute, by stopping altogether the feeding of buttons when the button chute becomes choked. Normally, when there are but few buttons in the button chute, the end of the hook 97 will reach nearly to the bottom of the button chute 33; but should the buttons accumulate in the button chute to such an extent as to fill the chute as far as the opening 98, then when the button hopper descends the point of the hook 97 will not be able to descend to the bottom of the chute, but will strike upon the head of a button, and as the button hopper descends, will swing the dog 70 slightly about its pivot, thus "tripping" it, so that when the arm of the bell-crank 69 next rises it will not engage with the dog 70, and the button hopper will not be lifted and no more buttons will be fed into the button chute.

When, through the action of the button feed finger 34 the supply of buttons in the chute 33 is somewhat reduced the button

upon the head of which the hook 97 is resting will slip down the chute, the end of the hook not bearing upon it with sufficient force to hold it in place, thus permitting the point of the hook 97 to fall to the bottom of the chute. When the arm of the bell-crank 69 next rises the button hopper is lifted, as before, and the feeding of buttons into the button chute is again resumed.

The button chute communicates with the groove 94 in the table 20, and from the spring 93 the buttons are carried forward one by one by a button feeding mechanism which is substantially the same as that described in my above mentioned Patent No. 408,700.

34 is the feed finger, which is pivotally connected to the arm 36, the pivot passing through a slot in the finger 34. The end of this finger carries a hook or button holder 35, having practically the shape of the head of a button, and this button holder is adapted to enter the button chute through a slot in the top thereof, and push forward a button when the arm 36 moves forward. When the finger 34 moves forward, the end passes under and lifts a pivoted guide 38, similar to the guide 30 previously mentioned. On its return movement, however, the finger 34 passes up over the top of the guide 38, the button holder 35 being thus carried up and out of the groove 94, and when the feed finger has reached the rear end of the guide 38 it drops off and the button holder again enters the slot in the button chute, just in rear of the spring 93, thereby cutting out the button held by said spring preparatory to pushing the button forward again on the next forward movement of the finger 34.

The form of the cam 37 is such that the feed finger which pushes the button forward holds it for an instant at the junction of the grooves 21 and 94 of the table 20, *i. e.*, at the junction of the button and fastener grooves, while a fastener is threaded through the eye of the button in the manner described in the specification of my above-mentioned patent, No. 408,700. The button is then fed forward by the feed finger into the end of a pivoted carrier or transferrer 39, which is at this moment in the position shown in Figs. 1, 13, and 15, forming a continuation of the button groove 94. This carrier or transferrer and the means by which it is operated are shown in detail in Figs. 4, 6, 7, 13, 14, 15, and 16. It consists of a block of metal of a generally rectangular shape, pivoted to two downwardly projecting legs of the plunger 40, the length of these legs being such as to permit the carrier to assume a vertical position between them, as shown in Figs. 6, 7, and 14.

Projecting from the side of the carrier 39 is a pin 43 (Fig. 6) working in the curved slot 42 of the guide 41, which guide is mounted in bearings in the head block 95, and a spring 95′, seen in Fig. 1, tends to hold it down. The plunger 40 likewise passes through the head block 95, being suitably guided therein, and is pivotally connected to one arm of the bell-crank lever 46, pivoted to the top of the column 7. The other arm of the bell-crank carries a pin 50, to be hereinafter mentioned.

Referring now to Fig. 3, 10 is a rod passing through the column 7, which rod is attached at its lower end to the foot lever 8 by which the machine is operated. The head 49 of this rod 10 is of the somewhat peculiar shape shown, and is adapted to engage with the pin 50 carried by the bell-crank 46. To this head is pivoted the link 67 to be hereinafter mentioned. Upon the rod 10 is mounted the sleeve 60, the lower end of which is flanged. The sleeve 60 lies partly within another sleeve 56, which carries the clinching anvil 57, projecting through a slot in the front of the column 7. A spring 69 incloses the rod 10, one end of the spring bearing against the end of the sleeve 56, the other end bearing against the sleeve 60. Above the sleeve 56 is another spring 59, one end of which bears against the end of the sleeve, and the other end of which bears against the top of the column 7. The anvil 57 is directly below the carrier or transferrer 39 when the latter is in its vertical position.

Within the carrier 39 is mounted a thin driver 51, shown in Figs. 4, 7, and 15. A slot 52 in the upper side of this driver and a screw 53 working in said slot permit of some movement of the driver within its bearings in the carrier 39. The end of the driver is formed to correspond with the shoulders of the fastener. There is likewise a slot in the face of the carrier 39, which permits of the passage of the shank of the button. In the operation of this portion of the machine, the carrier 39 is first in the position shown in Figs. 1 and 13, with the groove in its face in line with the button groove 94. The driver 51 is on a level with the shank of the button in this groove 94. The feed finger 34 feeds the button forward from the button groove 94 to the carrier 39, the shank of the button entering the slot in the face of the carrier. The operation of the staple feeding mechanism is such that after the staple is threaded through the eye of the button and the button is moved forward by the button feed finger 34, the points of the fastener trail behind, the shoulders being in front. When the button is fed into the carrier 39 the shoulders of the fastener strike the end of the plunger and push it backward, the fastener entering the groove within which the driver works. The legs of the fastener are naturally slightly divergent, and since the groove in the carrier 39 is somewhat narrower than the distance between the points of the fastener the legs of the fastener are pressed together somewhat, the pressure of the legs of the fastener against the sides of the groove in the carrier serving to hold the fastener and button in place and to make it impossible for the fastener to fall out. During this time the rod 10 has been moving upward, and its head now strikes the pin 50 carried by the bell-

crank lever 46, thus causing the bell-crank lever to move about its pivot and to raise the plunger 40. The guide 41, however, remains stationary, being held down by the spring 95′, and the shape of the groove 42 in this guide is such that as the carrier is raised by the plunger 40 the pin 43 carried by said carrier and working in the groove 42 causes the carrier 39 to swing into a vertical position, as shown in Fig. 14.

Within the guide 41 and above the groove 42 is a vertical groove 44, and a pin 45 carried by the plunger 40 works in this groove. When the movement of the plunger 40 and carrier 39 just described first commenced this pin 45 was at the bottom of the groove 44, and consequently when the plunger rose the pin 45 exerted no effect on the guide 41. By the time the carrier 39 has reached the vertical position shown in Fig. 14 the pin has reached the top of the groove 44, and now lifts the guide 41 against the tension of the spring 95′. The flange on the lower end of the sleeve 60 now strikes the sleeve 56 and carries up said sleeve and the anvil 57 which forms a part thereof. By the time that the anvil has lifted perceptibly, however, the bell-crank 46 has swung so far as to carry the pin 50 off from the head 49 of the rod 10, so that the plunger 40 is no longer lifted by the bell-crank 46. The upward movement of the anvil 57, however, brings the fabric against the lower end of the carrier 39, and lifts the same with the plunger 40 attached thereto. The upper end of the driver 51 now strikes the end of a plate 55 held in place within the headblock 95 by a screw 55′ and is prevented from rising farther, and inasmuch as the anvil 57 and carrier 39 still continue to rise, the driver 52 forces the points of the fastener through the fabric and against the clinching die 58 carried by the anvil, and thus causes the fastener to be clinched, the clinching being done, as will be seen, by the direct downward movement of the foot lever. When the foot lever is released the anvil 57, plunger 40, guide 41, and carrier 39 are carried down again by the various springs, and the carrier 39 is caused to swing again into the horizontal position by the pin 43 working in the groove 42 of the guide 41, in position to receive another fastener and button.

Pivoted to the upper portion of the support 6 is the gear wheel 63, and meshing with this gear wheel 63 is a pinion 62 keyed to the shaft 80, which shaft has bearings in the support 6, and carries the eccentric 15 and grooved cam 37. The inner face of the gear wheel 63 is provided with a ratchet 64, and a pawl 65 carried by the swinging lever 66 engages with this ratchet. A link 67 pivotally connected to the lever 66 and to the head 49 of the rod 10 serves to communicate the motion of the rod 10 to the lever 6 and thence to the pawl 65, ratchet 64, gear wheel 63 and pinion 62, thus causing eccentric 15 and cam 37 to revolve, and thereby operating the button and fastener feeding mechanisms.

The operation of my button attaching machine is as follows:—When the foot lever 8 is operated its motion is communicated by the means just described to the eccentric 15 and cam 37. By this means the bell-crank 13 is caused to swing, raising the plate 12 within the hopper 5 and causing it to tilt toward the raceway 18. As the plate 12 rises through the fastener hopper the fasteners catch on its upper edge and when this plate 12 tilts the fasteners slide off from the plate and down the fastener raceway 18 to the end thereof, where they are caught and held by the spring 24. While one arm of the bell-crank lever 13 has been raising the plate 12 the other arm has come in contact with the projection 27 of the slide 22 on the fastener chute 19, and has raised the slide to the upper limit of its travel. When the bell-crank swings back again the plate 12 drops, and the spring 28 is permitted to draw down the slide 22. As the slide 22 descends, the cut-out blade 23 depresses the spring 24 sufficiently to permit the fastener held thereby to drop into the fastener chute 19 and slide down the said chute, the cut-out blade closing the mouth of the fastener raceway so that but one fastener escapes. The fastener slides down the chute 19 until it is caught and held by the spring 25. By the next movement of the bell-crank 13 the fastener feed finger 29 is carried back under the guide 30 and so past the fastener held by the spring 25, and when the finger has reached the end of the guide 30 it springs up, its end entering the slot in the lower side of the chute 19, behind the fastener. The bell-crank 13 then carries the feed finger 29 forward, and as the feed finger moves forward it carries with it the fastener and by this means the fastener is fed to the point of intersection of the button and fastener grooves. During the time that the fastener feeding mechanism has been operating in the manner just described, the button feeding mechanism has likewise operated. By the revolution of the cam 37 the arm 36 has been caused to swing. This motion is communicated to the bell-crank 69 by the link 68, causing the bell-crank to swing about its pivot, and the lower arm of the bell-crank in rising strikes the dog 67 and lifts the same, causing the button hopper 3 to swing upward about its pivot. At the same time that the button hopper moves upward the action of the cam wheel 81 causes a lateral vibration of the button hopper. The double motion thus imparted to the button hopper causes the buttons contained therein to be thoroughly agitated, and the shanks of the buttons drop into the grooves in the bottom of the hopper, thus bringing the buttons to an upright position. The buttons then slide down the grooves to the mouth of the button hopper and when the hopper is again at the lower limit of its swing and its mouth is con-

sequently in communication with the opening in the button chute 33, one or more of the buttons will be permitted to pass from the button hopper to the button chute, down which they will slide until stopped by the spring 93. The movement of the arm 36 now carries back the button feed finger 34 and the button carrier 35 is carried up out of the groove 94 and so over the button held by the spring 93, by the pivoted guide 38. When the carrier 35 reaches the end of the guide 38 it drops into the slot in the top of the button chute, thus cutting out a button. When the arm 36 swings forward again the feed finger 34 pushes forward this button to the point of intersection of the button and fastener grooves 21 and 94, the form of the groove in the cam 37 being such as to cause the button to pause for an instant at this point of intersection. In this manner a button is brought to the point of intersection of the button and fastener grooves an instant before its fastener has been carried by the fastener feed finger 29 to the same point. In the manner described in my above mentioned patent, No. 408,700, one leg of the fastener is threaded through the eye of the button, and the fastener is then turned so that when the button is fed forward by the feed finger 34 the points of the fastener will trail behind. The pivoted carrier 39 is now in the position shown in Fig. 1, the position for receiving a button and fastener. The feed finger 34 now pushes forward the button and fastener attached thereto into the carrier 39, the shank of the button entering the slot in the face of the carrier, while the fastener enters the groove in which the driver 51 works, pushing back the driver. The legs of the fastener, by pressing outward against the sides of this groove, hold the fastener and button in place. During this time the rod 10 has been rising, being carried up by the movement of the foot lever 8. The head 49 of the rod 10 now strikes the pin 50 carried by the bell-crank lever 46, and causes the latter to swing, thereby raising the plunger 40. The rise of the plunger 40, through the action of the groove 42 in the guide 41 and the pin 43 working in this groove causes the carrier 39 to swing into the vertical position. The flanged head of the sleeve 60 now strikes the end of the sleeve 56, and carries it up with the anvil 57, over which is placed the fabric to which the button is to be attached. At the same moment the pin 50 slips off from the head 49 of the rod 10, so that the carrier 39 is moved no farther by the bell-crank 46. The anvil 57 in rising brings the fabric into contact with the carrier 39, so that the fabric is held firmly upon the clinching die 58. The further upward movement of the anvil 57 raises the carrier 39 and the plunger 40 still farther, and the plate 55 striking the top of the driver 51 holds the latter stationary, while the carrier 39 moves upward, so that the fastener is pushed out of the groove in the carrier 39 and is thrust through the fabric and against the clinching die 58, by which it is clinched. When the anvil 57 and plunger 40 again descend the fabric is released and the carrier 39 swings up into position to receive another button and fastener.

It will be seen that this machine automatically adjusts itself to different thicknesses of fabric, to which the button is to be attached, inasmuch as the carrier 39 is pushed upward by contact with the upper surface of the fabric.

In order to avoid any possibility of clogging of the machine due to loose fasteners remaining in the groove 94 of the plate 20, I provide a pivoted grate 71, in the bottom of this groove at the point where the fasteners are threaded through the button shanks. The gate is adapted to remain in the position shown in Fig. 8, while the fastener is threaded through the button shank, and to drop when the button is fed forward, thus allowing any loose fasteners to fall through the table. The means by which this is accomplished is as follows: The under side of the gate is provided with a lug 72, which engages with a similar lug 73 on one arm of the bell-crank 74, the other arm of which is adapted to engage with the feed finger 34 when the latter feeds the buttons and fasteners forward, thus permitting the gate 71 to drop. A spring 75 draws the parts back to the first position after the passage of the feed finger.

Having thus completely described the construction and operation of my improved button attaching machine, what I claim, and desire to secure by Letters Patent, is—

1. In a button attaching machine, the combination, with a button carrier or transferrer pivotally mounted and adapted to receive and carry a button and attached fastener, of means for causing said carrier to swing outwardly into position to receive a button and attached fastener, a feeding device for feeding the button and fastener into the carrier, means for causing said carrier to swing back into position to permit of thrusting said fastener through the fabric, and means for thrusting said fastener through the fabric and attaching it and the button thereto, substantially as described.

2. In a button attaching machine, the combination, with a pivoted carrier or transferrer carrying a reciprocating driver, of a horizontal chute adapted to discharge buttons and connected fasteners to said pivoted carrier, the lower portion of said carrier being adapted to abut upon said chute for the purpose of receiving the buttons and fasteners therefrom, and then to swing upward into the vertical position to attach said buttons to the fabric, substantially as described.

3. In a button attaching machine, the combination, with a pivoted carrier or transferrer, a groove in said carrier for receiving the fastener and a slot in the face of the carrier for receiving the shank of the button attached

to said fastener, of means for causing said carrier to swing outwardly into position to receive a button and fastener, a feeding device for feeding the button and fastener into the carrier, and means for causing the carrier to swing back into position to permit of the fastener and button being attached to the fabric, substantially as described.

4. In a button attaching machine, the combination, with a pivoted carrier or transferrer, a groove in said carrier adapted to receive the fastener, a driver mounted in said groove and a slot in the face of the carrier adapted to receive the shank of the button attached to the fastener, of means for causing said carrier to swing outwardly into position to receive a fastener and attached button, a feeding device for feeding the fastener into the groove of said carrier, means for causing said carrier to swing back into position to permit the fastener and button to be attached to the fabric, and means for causing the driver to push the points of the fastener through the fabric when the carrier is in this position, substantially as described.

5. In a button attaching machine, the combination, with a vertical plunger and means for causing said plunger to reciprocate, of a button carrier pivoted to the plunger, means for causing said button carrier to swing outwardly to receive a button and attached fastener, and then to return to its former position, and a driver adapted to push the points of the fastener through the fabric, substantially as described.

6. In a button attaching machine, the combination, with a vertical plunger and means for causing said plunger to reciprocate, of a button carrier pivoted to the plunger and normally occupying a vertical position, means for causing said carrier to swing outwardly into position to receive a button and attached fastener when the plunger moves downward, means for causing said plunger to swing back into position to attach the button and fastener to the fabric when the plunger moves upward, and a driver adapted to push the points of the fastener through the fabric, substantially as described.

7. In a button attaching machine, the combination, with a chute or raceway, of a carrier pivoted to a vertically movable plunger adapted, when in a horizontal position, to take the buttons and attached fasteners from the end of the raceway and to be tilted vertically and hold them in position to be driven, and a reciprocating driver carried by said carrier for setting said fasteners, substantially as described.

8. In a button attaching machine, the combination, with a chute or raceway, of a carrier pivoted to a vertically movable plunger and adapted, when in a horizontal position, to take the buttons and attached fasteners from the end of the raceway and to be tilted vertically and to hold them in a position to be driven, a finger for pushing the buttons and fasteners from the raceway into the carrier, and a reciprocating driver carried by said carrier for setting said fasteners, substantially as described.

9. In a button attaching machine, the combination, with a chute or raceway, of a carrier pivoted to a vertically movable arm and adapted, when in a horizontal position, to take the buttons and attached fasteners from the end of the raceway and to be tilted vertically and hold them in position to be driven, of a reciprocating driver carried by said transferrer for setting said fasteners, and the plate 55 for reciprocating said driver within said carrier, substantially as described.

10. In a button attaching machine, the combination, with the plunger 40, and the carrier 39 pivoted thereto and provided with a groove adapted to receive the fastener and a slot in its face adapted to receive the shank of the button attached to said fastener, of the driver 51 working in said groove, means for causing said carrier 39 to swing outwardly into position to receive a button and fastener when the plunger 40 descends, a feeding device for feeding the button and fastener to the carrier, means for causing the carrier to swing back into position to attach the button when the plunger 40 rises, and the plate 55 engaging the end of the driver 51 whereby as the carrier 39 rises the driver is caused to thrust the points of the fastener through the fabric, substantially as described.

11. In a button attaching machine, the combination, with the plunger 40 suitably guided and the carrier 39 pivotally attached thereto and adapted to swing outwardly to receive a button and fastener, of the anvil 57 suitably mounted and situated below the carrier, means for causing the anvil to rise, thereby bringing the fabric into contact with the lower end of the carrier and lifting the same, the driver 51 within said carrier, and means for causing the driver to thrust the fastener through the fabric, substantially as described.

12. In a button attaching machine, the combination, with the plunger 40 suitably mounted and pivotally connected to one arm of the bell-crank 46, of the rod 10 connected with the foot lever 8 and adapted to engage the other arm of the bell-crank 46, thereby causing the plunger 40 to reciprocate when the foot lever is depressed and released, a carrier or transferrer pivoted to said plunger and adapted to swing outward to receive a button and attached fastener and then to return to its former position, means for feeding a button and fastener into said carrier or transferrer, and a driver for forcing the points of the fastener through the fabric, substantially as described.

13. In a button attaching machine, the combination, with the rod 10 attached to the foot lever 8, of the sleeve 60 mounted on said rod 10 and having a flanged lower end, and adapted to engage with the end of another sleeve 56, the spring 59, the anvil 57 carried by said sleeve 56, whereby the anvil 57 is caused to

rise and fall when the foot lever is operated, a button carrier located over the said anvil and adapted to hold a button and attached fastener, means for feeding a button and fastener into said carrier, and a driver for forcing the points of the fastener through the fabric and against the said anvil, substantially as described.

14. In a button attaching machine, the combination, with the plunger 40 having a suitable bearing in the head block 95 and means for causing said plunger to reciprocate, of the carrier 39 pivotally connected to the lower end of said plunger, the guide 41 likewise having a bearing in said head block and provided with the curved groove 42, and the pin 43 attached to the carrier 39 and working in said groove, whereby, as the plunger descends, the carrier is caused to swing outwardly, substantially as described.

15. In a button attaching machine, the combination, with a reciprocating plunger, a carrier pivoted to the lower end thereof and adapted to swing outwardly to receive a button and attached fastener and then to swing back into position to permit of said button and fastener being attached to the fabric, of a reciprocating anvil situated directly below said pivoted carrier and adapted to rise and bring the fabric into contact with the end of the carrier, and means for causing the staple to be thrust through the fabric and clinched, substantially as described.

16. In a button attaching machine, the combination, with a fastener hopper having a lifting and tilting plate adapted to catch fasteners within said hopper, a raceway for receiving the fasteners from said lifting and tilting plate, a chute adapted to receive said fasteners from the raceway and carry them downward therefrom, feed mechanism adapted to push said fasteners forward from the lower end of said chute to and through the shanks of buttons, a button feed mechanism adapted to push said buttons and their connected fasteners into a pivoted carrier, the carrier, and the driver attached thereto, substantially as described.

17. In a button attaching machine, the combination, with the clinching mechanism, the fastener hopper provided with a tilting blade, a raceway and chute, and a feed finger adapted to engage the fasteners in said chute and push them through the shanks of buttons, of mechanism for actuating the same, a button hopper adapted to discharge buttons into a suitable chute, a feed-finger adapted to engage one of said buttons at a time and carry it forward to the point of attachment with a fastener, and thence forward and out of the machine, a pivoted carrier, the attached driver, and mechanism for actuating the same, substantially as described.

18. In a button attaching machine, the combination, with a fastener hopper 5, of a fastener raceway 18, a fastener chute 19, a slide 22 mounted on said chute, means for causing said chute to be reciprocated up and down, a spring 24 adapted to catch and hold each fastener as it issues from the raceway 18, and a cut-out blade 23 carried by the slide 22, substantially as described.

19. In a button attaching machine, the combination, with a fastener hopper and means for feeding fasteners therefrom, of the herein described fastener chute adapted to receive said fasteners, and provided with the sliding portion 22, having the cut-out blade 23, the spring 24, and the projecting portion 27, adapted to engage with a moving part of the machine and cause said part 22 to reciprocate, substantially as described.

20. In a button attaching machine, the combination, with a button hopper having in its bottom grooves adapted to receive the shanks of buttons and hold said buttons in an upright position, of a plate parallel to and covering a portion of the bottom of said button hopper and placed at such a distance above the bottom of the button hopper as just to allow buttons the shanks of which are completely within the grooves to pass under said plate, and means for adjusting the height of said plate above the bottom of the button hopper to different sizes of buttons, substantially as described.

21. In a button attaching machine, the combination, with a button hopper, of a plate superposed over a portion of said hopper and having an upturned end forming a side of the button magazine, substantially as described.

22. In a button attaching machine, the combination, with a button hopper having in its bottom a series of grooves converging to a single terminal groove and adapted to receive the shanks of the buttons, of a plate covering the lower portion and outlet of said hopper and adjustable to different sizes of buttons, means for causing the buttons to issue successively from the button hopper, and button feeding mechanism for feeding the buttons successively to the fastener attaching mechanism, substantially as described.

23. In a button attaching machine, the combination, with the button hopper, of the plate 84, the shaft 87 having bearings in the side of said button hopper and the arm 86 keyed to said shaft, and levers and connecting links whereby said plate is raised or lowered by the movement of the arm 86, substantially as described.

24. In a button attaching machine, the combination, with the pivoted button hopper, of the arm 36, means for causing said arm to swing about its pivot, the bell-crank lever 69, the link 68 connecting one arm of the bell-crank lever with the arm 36, and the dog 70 carried by the button hopper and engaging the other arm of the bell-crank lever 69, substantially as described.

25. In a button attaching machine, the combination, with the pivoted button hopper and the button chute in communication therewith, of the pivoted bell-crank lever 69, means for causing said bell-crank to swing about its pivot, the pivoted dog 70 carried by the button hopper and adapted to engage with one arm of the bell-crank, and means for tripping said dog when the button chute becomes clogged, substantially as described.

26. In a button attaching machine, the combination, with a button hopper, of the arm 36, the connecting rod 68, the bell-crank lever 69, the dog or stop 70, intermediate connecting mechanism, the button and fastener feeding devices, and the carrier or transferrer, substantially as described.

27. In a button attaching machine, the combination, with the table 20 provided with intersecting button and fastener grooves, and suitable feeding mechanism for feeding buttons and fasteners along said grooves and for threading a fastener through the eye of each button, of a pivoted gate 71 in said table at the intersection of the button and fastener grooves and means for causing said gate to drop after the passage of each button and attached fastener, substantially as described.

28. In a button attaching machine, the combination, with the table 20, of the pivoted gate 71 provided with a downwardly projecting lug 72, the bell-crank 74, one arm of which carries the lug 73 engaging with the said lug 72, and the other arm of which is adapted to engage with the button feed finger, and the spring 75 for restoring the parts to normal position after the passage of the feed finger, substantially as described.

29. In a button attaching machine, the combination, with button and fastener feeding devices, of the pivoted gate 71, the bell-crank lever 74, means for actuating the same, whereby loose fasteners may be dropped through the table, the transferrer and driver, substantially as described.

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

WILLIAM E. ELLIOTT.

Witnesses:
FRANK G. CLARK,
S. W. BRAINERD.