I. LARSEN.

BUTTON SETTING MACHINE.

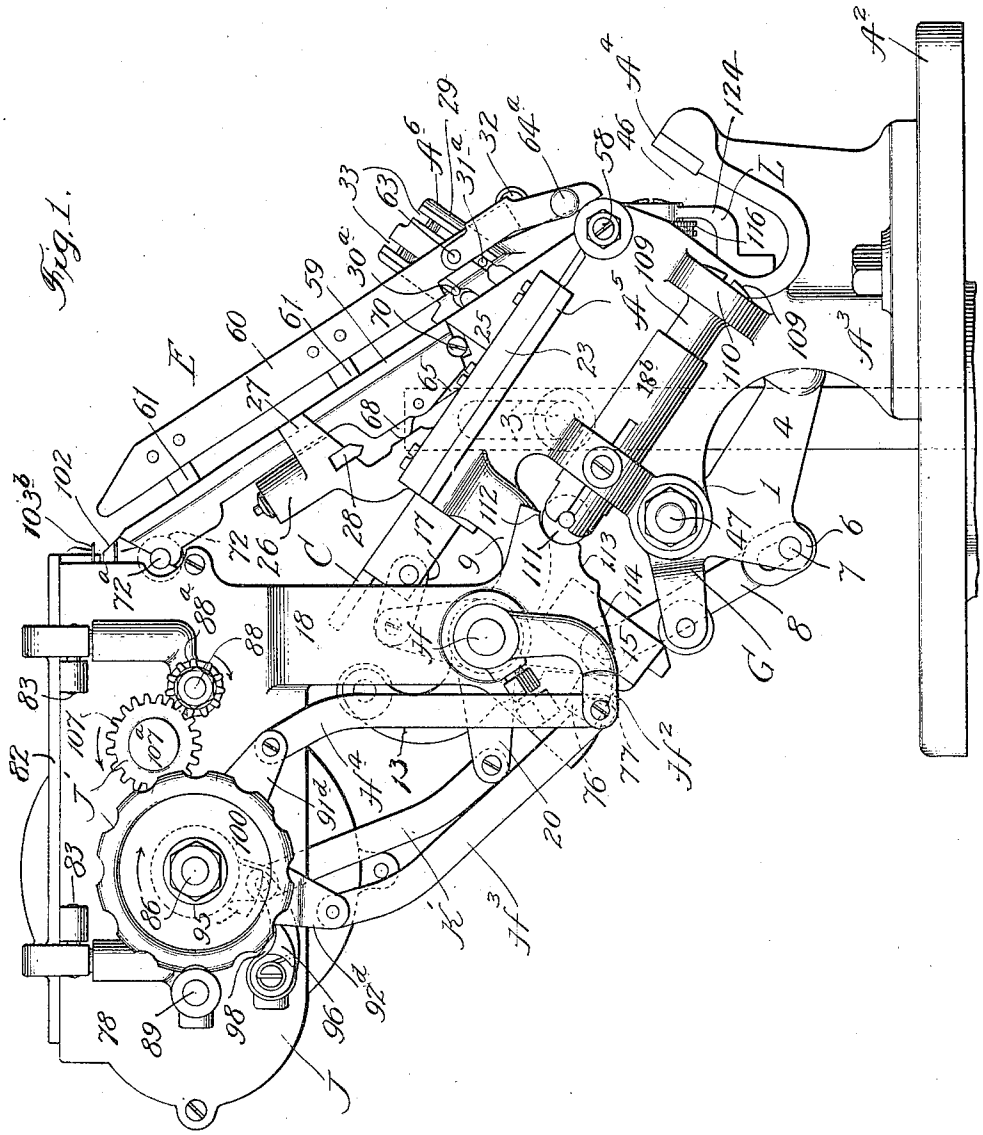
APPLICATION FILED NOV. 13, 1915.

1,282,599.

Patented Oct. 22, 1918.

10 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
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Chas. H. Buell

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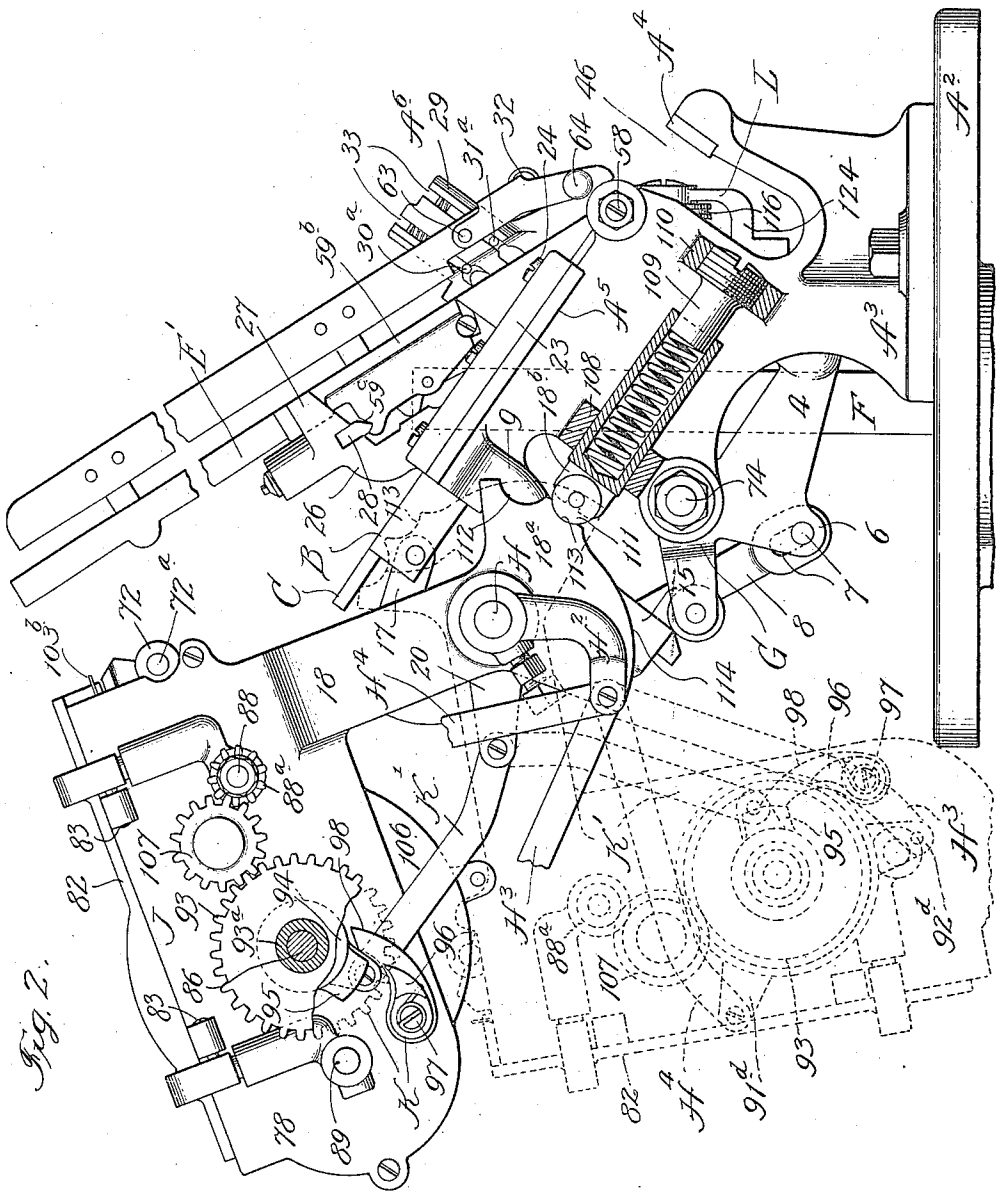


Fig. 2.

Witnesses:
E. E. Stafford.
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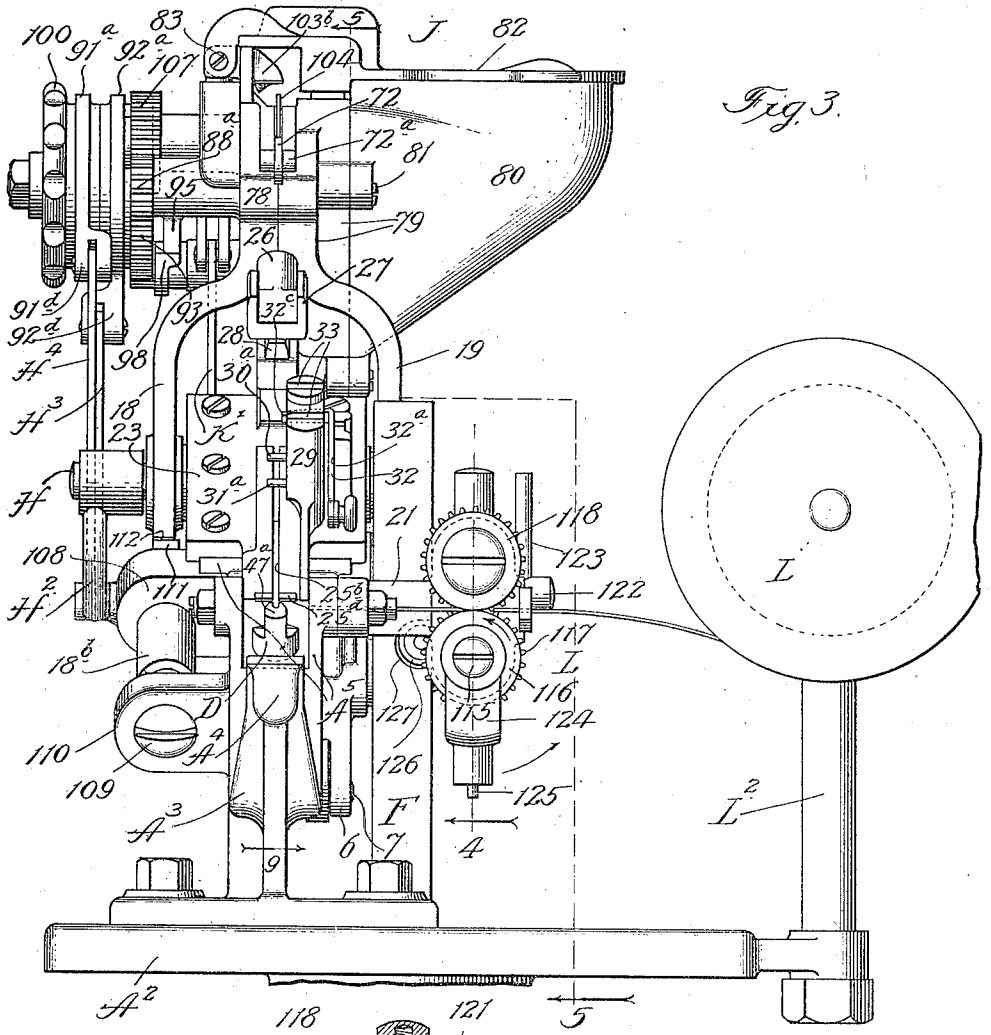
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Fig. 3.



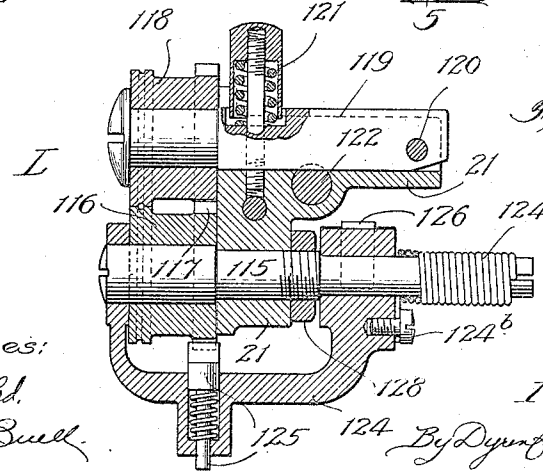


Fig. 4.

Witnesses:
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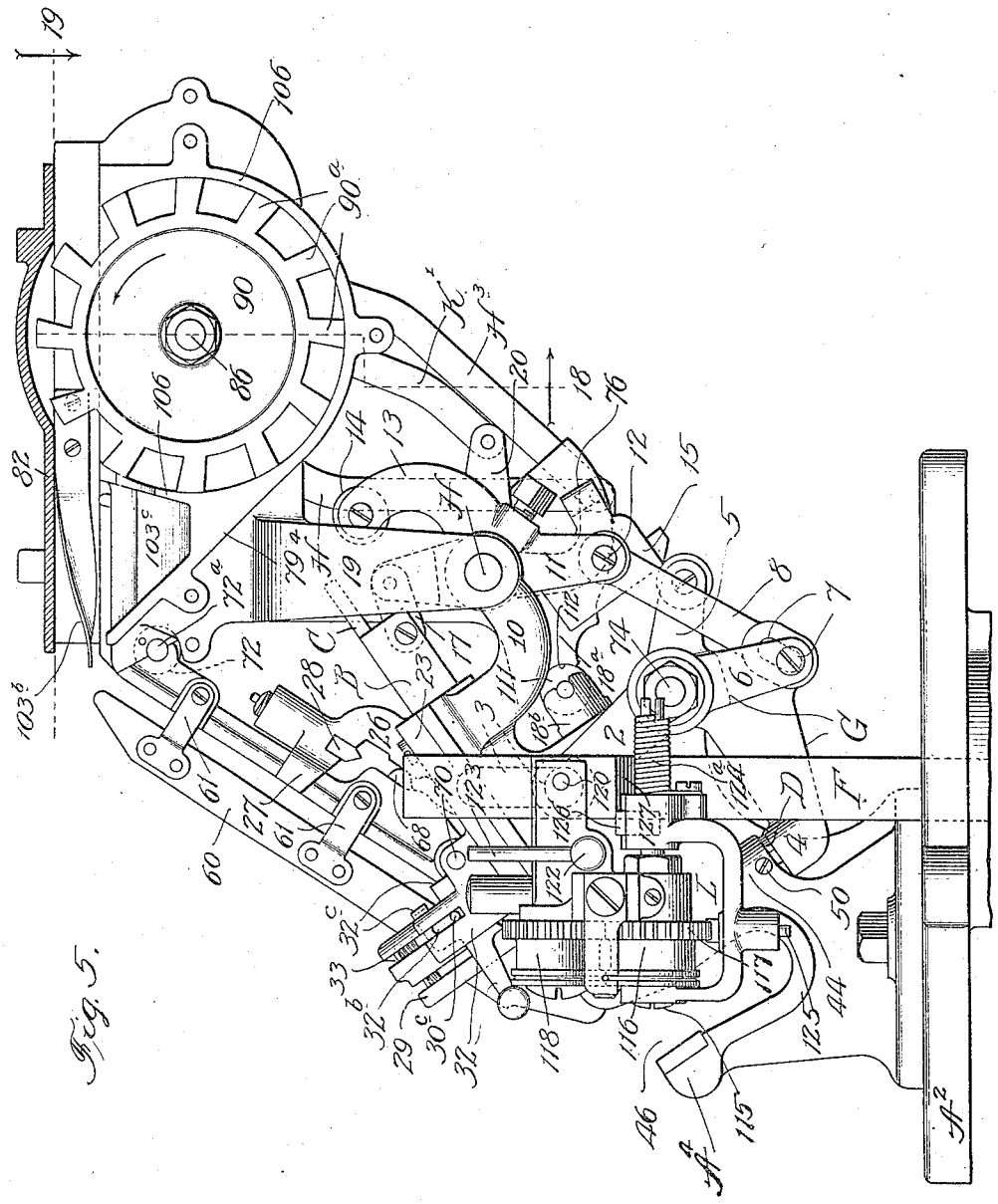


Fig. 5.

Witnesses:
E. E. Gaylord.
Chas. W. Buell.

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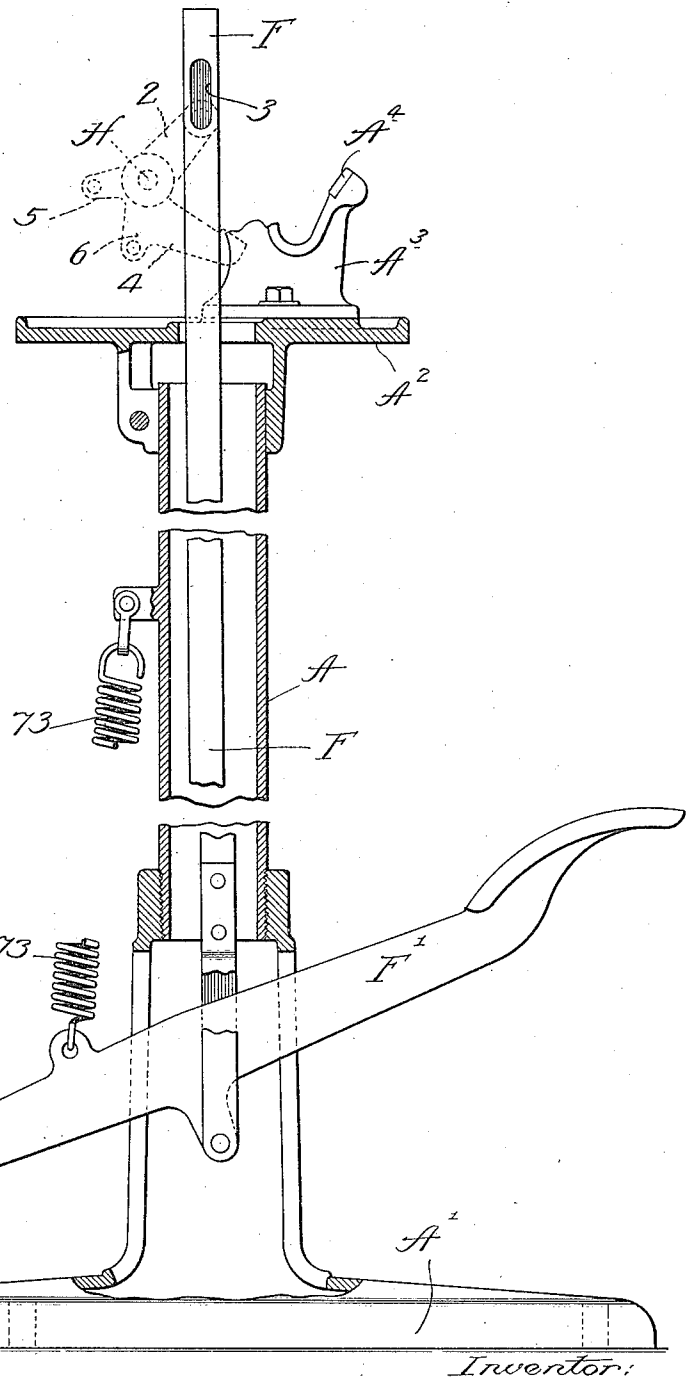
APPLICATION FILED NOV. 13, 1915.

1,282,599.

Patented Oct. 22, 1918.

10 SHEETS—SHEET 5.

Fig. 6.



Witnesses:
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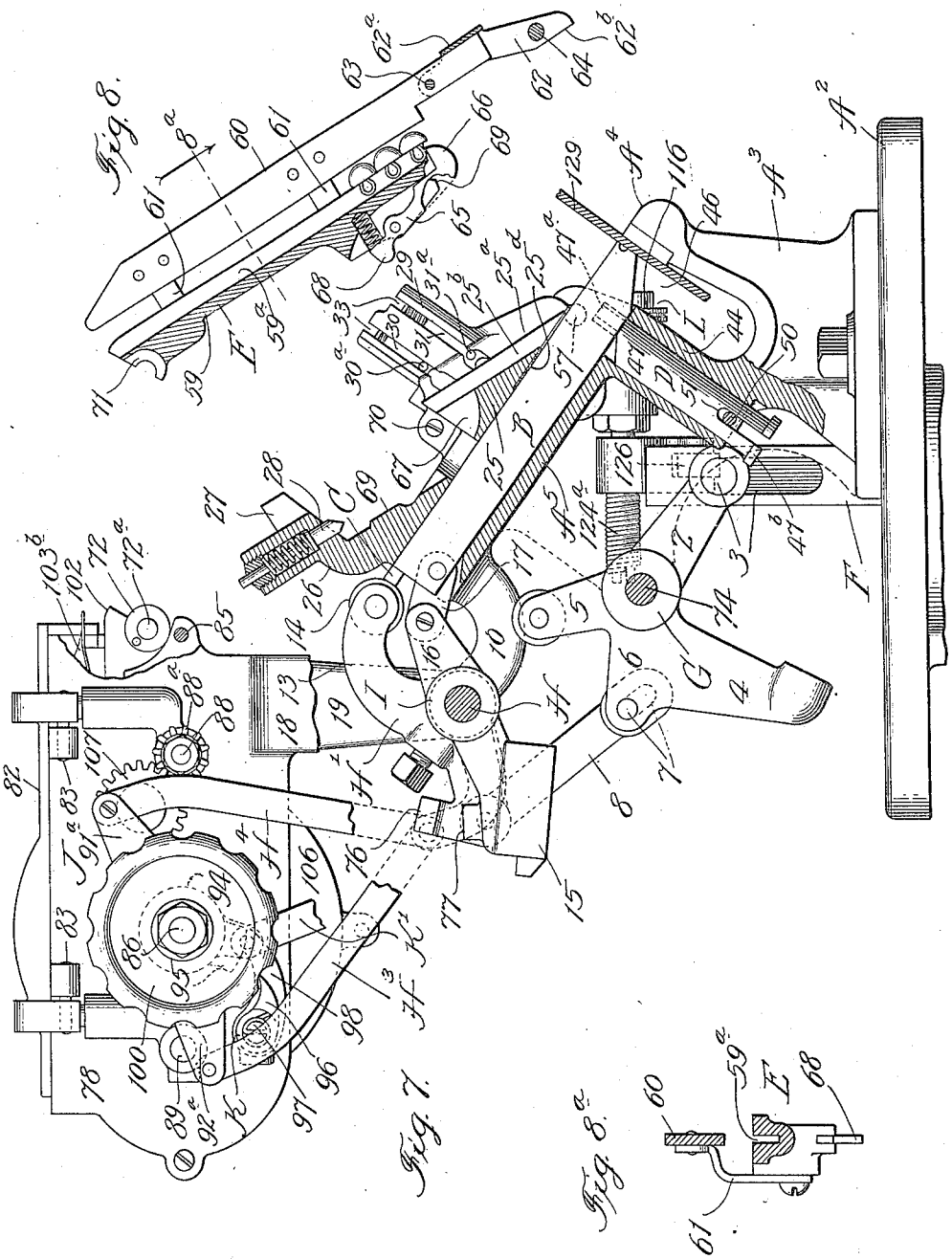


Fig. 7.

Fig. 8.

Witnesses:
Chas. E. Gaylord,
Chas. H. Buell.

Inventor:
Ivert Larsen,
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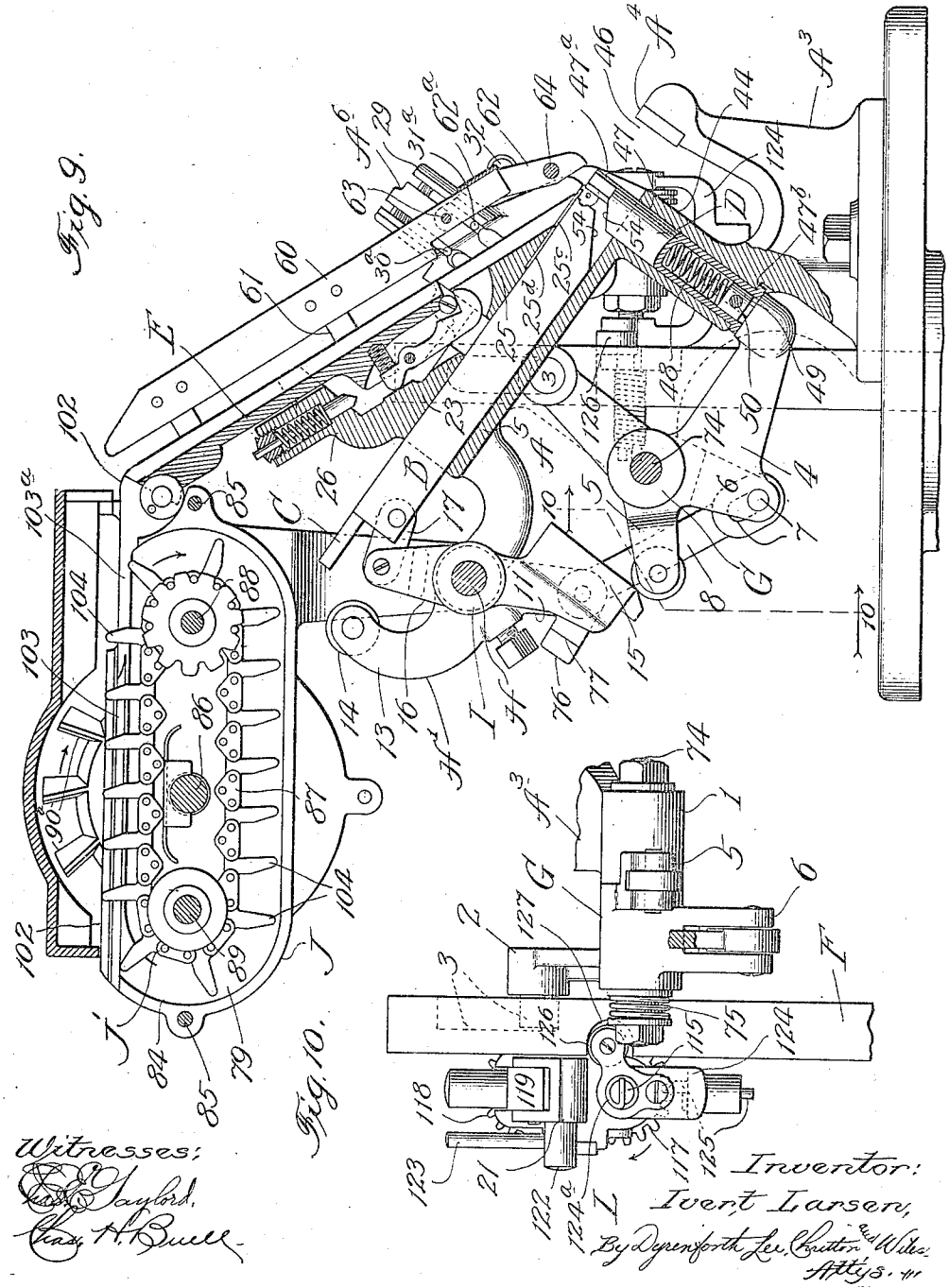


Fig. 9.

Fig. 10.

Witnesses:
Chas. E. Gaylord.
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Fig. 11.

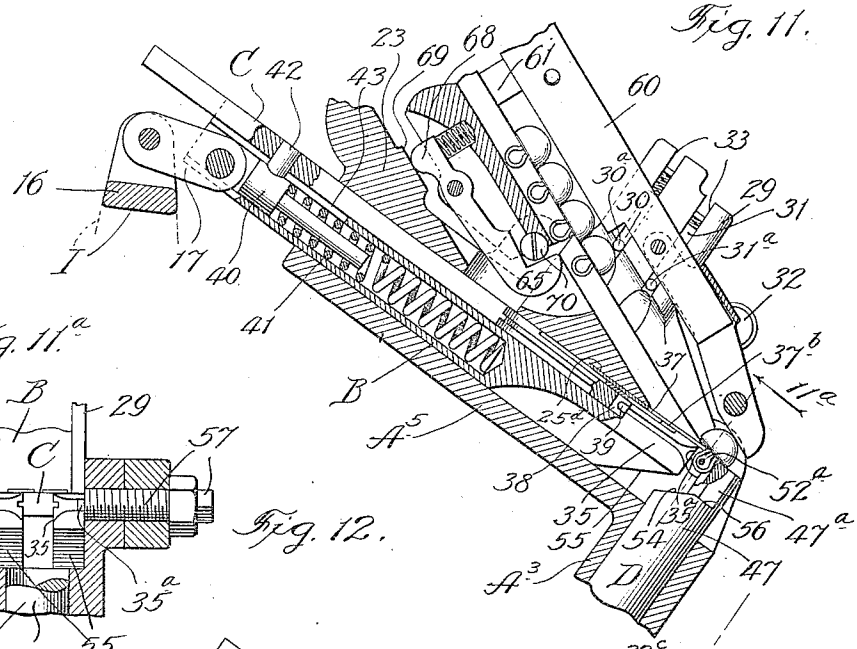


Fig. 11a.

Fig. 12.

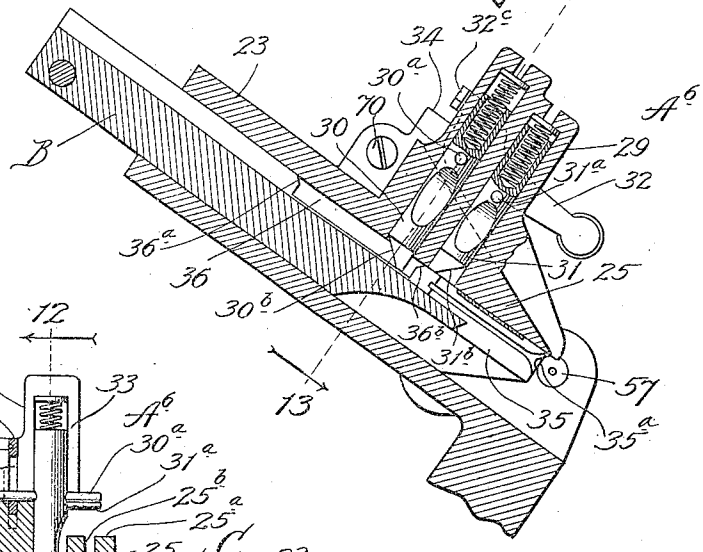
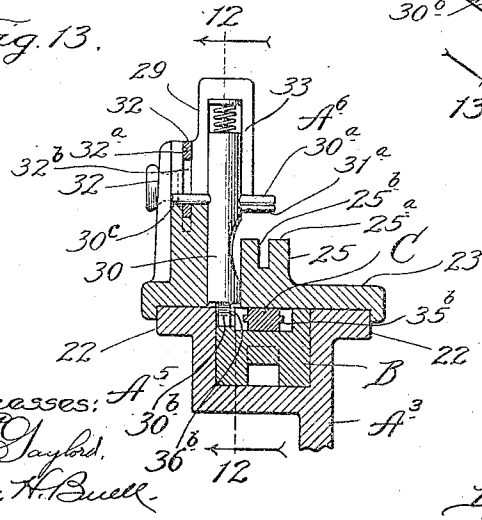


Fig. 13.



Witnesses:
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10 SHEETS—SHEET 9.

Fig. 14.

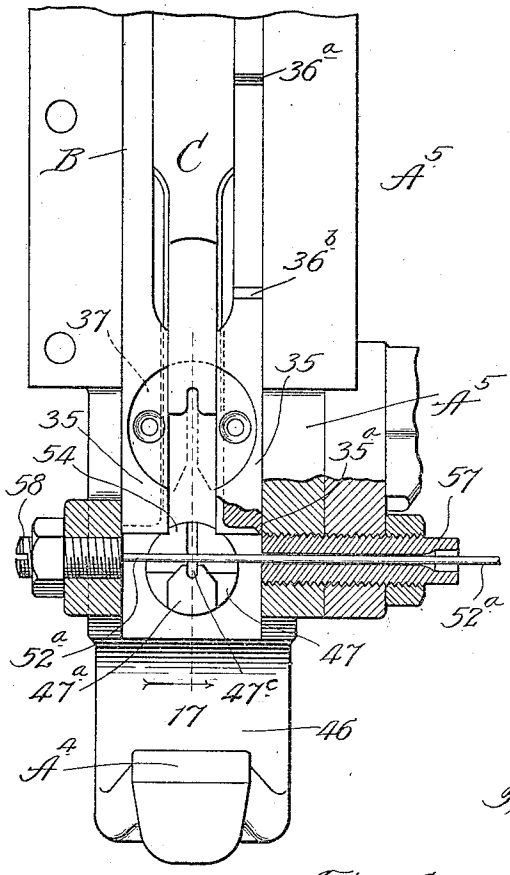


Fig. 15.

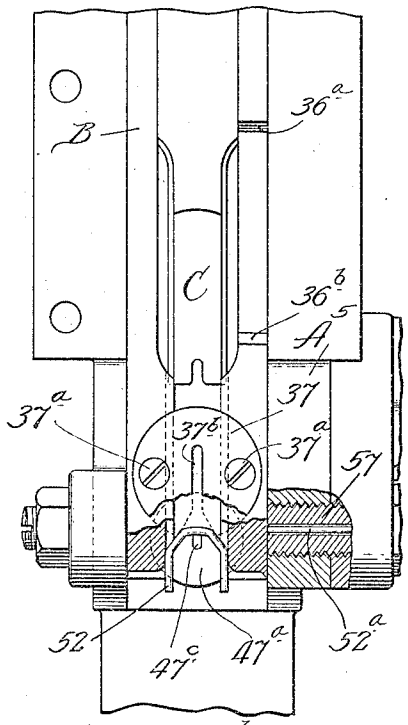


Fig. 16.

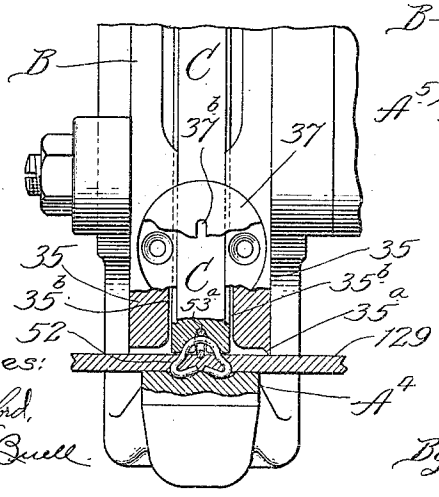
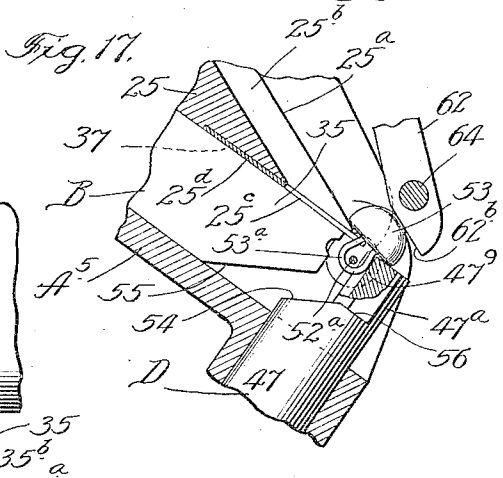


Fig. 17.



Witnesses:

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Thos. H. Buell.

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Fig. 18.

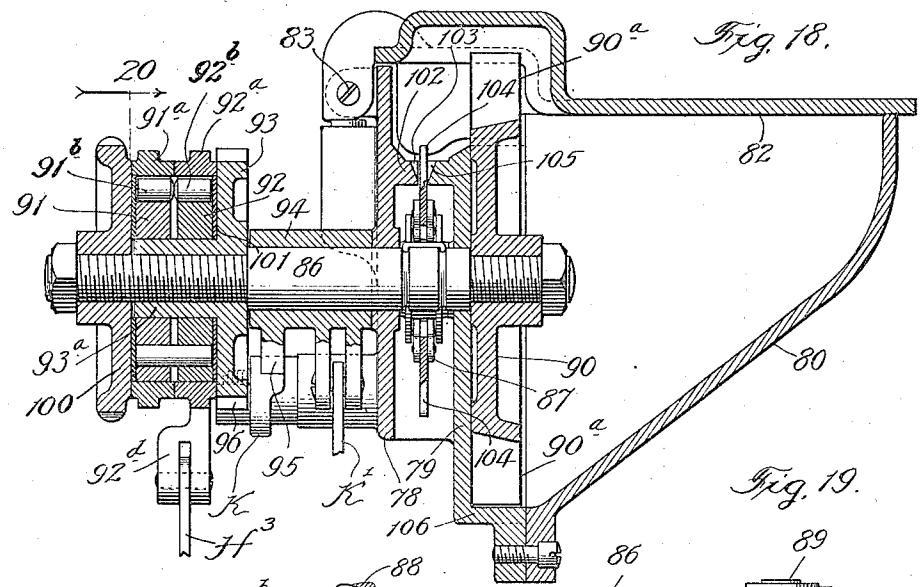


Fig. 19.

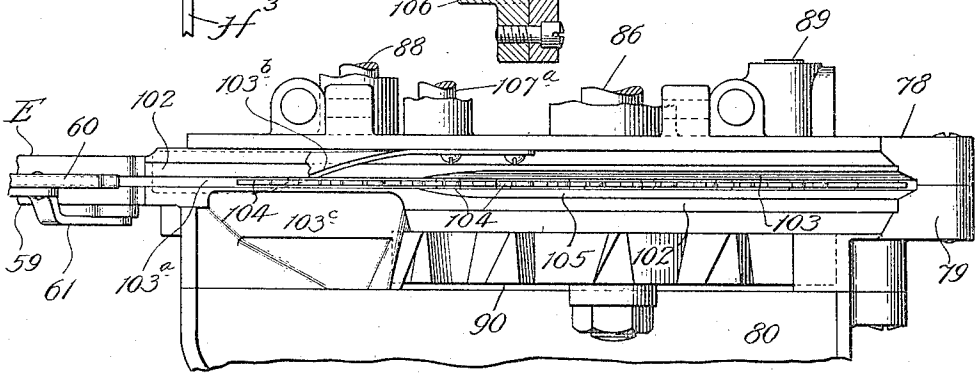


Fig. 20.

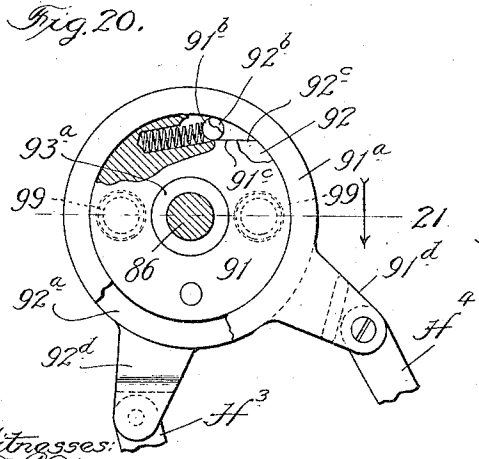
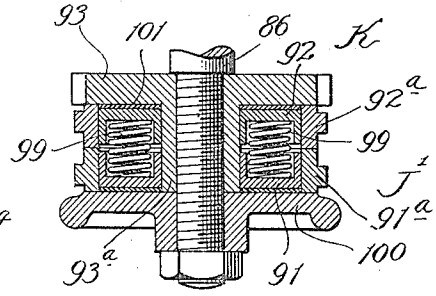


Fig. 21.



Witnesses:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

IVERT LARSEN, OF CHICAGO, ILLINOIS.

BUTTON-SETTING MACHINE.

1,282,599. Specification of Letters Patent. Patented Oct. 22, 1918.

Application filed November 13, 1915. Serial No. 61,299.

To all whom it may concern:

Be it known that I, IVERT LARSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Button-Setting Machines, of which the following is a specification.

This invention relates particularly to button-setting machines having provision for feeding a wire through the button-eye, severing the wire, forming a staple, and attaching the button by means of such staple to fabric or leather. Certain features of the invention are applicable, however, to other machines of the same general character.

The improved machine herein illustrated is particularly adapted to the purpose of applying buttons to shoes. The primary object is to provide a machine of simplified construction and improved operation which can be manufactured at a moderate cost.

Generally stated, the preferred embodiment of the invention which is illustrated comprises a wire-severing and staple-forming plunger working in a forwardly and downwardly inclined guide; a depressible staple-forming male-member, or post, which normally occupies the staple-forming position and which is depressed by the staple-forming plunger after the completion of the staple-forming operation, said staple-forming post having its upper end provided with a recess or socket to accommodate the shank or eye of the button while the wire is being fed therethrough; a staple-driving plunger slidably connected with the staple-forming plunger and having spring connection therewith; a pivotally-adjustable button-hopper equipped with button-feeding mechanism; a rock-shaft which serves also as a pivotal mounting for the hopper and which is equipped with a fixedly-secured staple-plunger-actuating lever and with a journaled staple-forming-plunger-actuating lever which is cam-equipped, said rockshaft having also an arm through the medium of which the button-feeding mechanism is actuated; a second rock-shaft joined by a link with lost-motion connection to the fixedly-mounted lever of said first-named rock-shaft and equipped also with a cam-roller co-acting with the cam of said journaled lever; a vertically-moving main connecting rod which extends through the tubular standard of the frame and has lost-motion connection with an arm of said second-named rock-shaft; wire-feeding mechanism actuated directly by the main connecting-rod; a foot-lever serving to actuate the main connecting-rod; a detachable button-chute interposed between the front upper portion of the hopper and a button-chute section overlying the lower front portion of the staple-forming plunger, the buttons descending by gravity; and a pair of escapement fingers controlling the gravitation of the buttons to the wire-inserting position, said escapement fingers being carried by spring-held plungers which are alternately raised and lowered as the staple-forming plunger reciprocates. The uppermost escapement finger rises to permit a button to pass into engagement with the lower escapement finger when the staple-forming plunger descends; and the lower escapement finger rises to permit the lowermost button to pass to the wire-feeding position when said staple-forming plunger makes the return stroke.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a right-side elevational view (facing with the machine) of the top of the main standard and the mechanisms mounted thereon; Fig. 2, a similar view, partly in section, but showing in full lines an intermediate position of the hopper and in dotted lines a third position of the hopper, this view also showing a substitute detachable button-chute adapted to the use of larger buttons than the button-chute shown in Fig. 1; Fig. 3, a broken front elevational view of the machine; Fig. 4, an enlarged sectional view of the wire-feeding rolls, the section being taken as indicated at line 4 of Fig. 3; Fig. 5, a broken elevational view of the left-hand side of the machine, the pivoted top of the hopper being shown in section, as indicated at line 5 of Fig. 3, and one side of the hopper being removed; Fig. 6, a broken vertical sectional view of the tubular standard of the frame, showing the parts connected therewith; Fig. 7, a view partly in elevation and partly in section, the section being taken in a vertical plane through the longitudinal center of the guide for the staple-forming plunger, this view showing the position of the parts at the instant the staple is being clenched; Fig. 8, a sectional view of the detachable button-chute, which is removed in Fig. 7;

Fig. 8ª, a section taken as indicated at line 8ª of Fig. 8; Fig. 9, a section taken as indicated at line 9 of Fig. 3; Fig. 10, a broken rear elevational view showing the upper portion of the main connecting-rod, the wire-feeding mechanism, and the rock-shaft which has lost-motion connection with the connecting-rod and through which motion is communicated to the rock-shaft which actuates the staple-forming plunger; Fig. 11, an enlarged broken vertical section taken at the plane of the section shown in Fig. 9, but showing the staple-forming plunger and the staple-driving plunger in section, the staple-driving plunger being shown brokenly, however; Fig. 11ª, a broken section taken as indicated at line 11ª of Fig. 11; Fig. 12, a section taken as indicated at line 12 of Fig. 13 and showing details of the button escapement; Fig. 13, a transverse section taken as indicated at line 13 of Fig. 12; Fig. 14, a broken plan view of the lower or bottom half of the inclined guide for the staple-forming plunger, this view showing the staple-forming plunger and the staple-driving plunger and showing also, in section, the transverse guide for the wire; Fig. 15, a similar view showing the position of the parts after the severing of the wire and the forming of the staple; Fig. 16, a broken plan view, partly in section, illustrating the staple-clenching operation; Fig. 17, an enlarged broken vertical section illustrating how the wire is fed through the eye of the button; Fig. 18, a vertical section through the hopper and button-feeding mechanism, the section being taken as indicated at line 18 of Fig. 5; Fig. 19, a broken plan view of the hopper and button-feeding mechanism, with the hopper top removed; Fig. 20, a broken sectional view taken as indicated at line 20 of Fig. 18 and showing details of the ratchet mechanism for actuating the button-feeding mechanism; and Fig. 21, a broken section taken as indicated at line 21 of Fig. 20.

The machine illustrated comprises a main tubular standard A mounted on a base A′ and surmounted by a detachably-mounted small table-plate A^2; a frame-member, or mechanism-mounting A^3 detachably secured to the plate A^2 and provided with an anvil A^4 and an inclined plunger-guide A^5, in which reciprocate the slidably-related staple forming plunger and staple-driving plunger; a button-escapement device A^6 mounted on the removable top-section of the guide A^5; a wire-severing and staple-forming plunger B, which moves in the guide A^5; a staple-driving plunger C which is slidably connected with the plunger B and confined therewith in the guide A^5; a depressible staple-forming male-member, or post, D, movable in a forwardly and upwardly inclined bore with which the frame-member or mounting A^3 is provided at right angles to the guide A^5, as shown in Fig. 11; interchangeable, detachable button-chutes E, E′, adapted to accommodate buttons of different sizes (see Figs. 1 and 2); a vertically-movable actuating plunger or connecting-rod F actuated by a foot-lever F′ (Fig. 6); a tubular rock-shaft G mounted on or carried by a boss 1, with which the frame-member or mounting A^3 is provided at its rear portion (Figs. 1 and 10), the member G having an actuating arm 2, joined by stud-and-slot connection 3 to the connecting-rod F, having also an arm 4 adapted to co-act with the lower end of the depressible staple-forming post D and having also a roller-equipped cam-arm 5 adapted to actuate the rock-arm or lever which actuates the staple-forming plunger, and having also an arm or elbow 6 which has pin-and-slot connection 7 with a link 8 adapted to actuate the rock-shaft which serves to actuate the staple-forming plunger and the arm which actuates the button-feeding mechanism with which the hopper is equipped; a rock-shaft H mounted in rearwardly-extending furcations or arms 9 and 10 with which the rear upper portion of the guide A^5 is equipped, the rock-shaft H having fixedly mounted theron a lever H′ which affords an actuating arm 11 with which the upper end of the link 8 is joined by a pivot 12, and which affords also a cam-arm 13, whose upper end is equipped with a cam-roller 14 adapted to actuate the staple-driving plunger C; an arm H^2 fixedly secured to one end of the rock-shaft H and serving to actuate the button-feeding mechanism through the medium of links H^3 H^4; a rock-lever I rotatably mounted on the rock-shaft H and provided with an actuating-arm equipped with a cam 15 adapted to be actuated in the wire-severing and staple-forming operation by the cam-arm 5, the rock-lever I having also an arm 16 connected by a short link 17 to the rear upper end of the wire-severing and staple-forming plunger B; a button-hopper J provided at its front portion with depending arms 18 and 19 mounted on the rock-shaft H which serves as a pivotal support, the arm 18 having an extension 18ª below the point of pivotal support with which co-acts a spring-pressed plunger 18ᵇ mounted on the frame-member A^3 parallel with the guide A^5, the arrangement being such as to permit the hopper J to be forcibly swung to any one of the three positions indicated; button-feeding mechanism J′ mounted in and on the hopper J and actuated through the medium of the links H^3 and H^4; stop mechanism K controlled by a link K′ connected with a fixed arm or projection 20 which forms an extension of the furcation or frame-member arm 9 through which the rock-shaft H extends; L, wire-feeding

mechanism mounted on the frame-member A^3 through the medium of a bracket 21; and L′, a wire reel carried by a post L^2 mounted on the plate A^2.

The frame may be of any suitable construction. The form shown is admirably adapted to the purpose. The guide A^5 for the wire-bender or staple-forming plunger B is of rectangular cross-section and has its bottom wall and side walls formed by providing a comparatively large groove in the forwardly and downwardly inclined top portion of the casting A^3, as will be clearly understood from Figs. 1 and 13. The portion of the casting A^3 in which the groove is thus formed is provided with lateral flanges 22. The upper wall of the guide is afforded by a detachable inclined top-plate 23 which is secured to the flanges 22 by cap-screws 24. The plate 23 comprises a small casting whose lower front portion is provided with a central longitudinal embossment 25, which affords a chute-section having an inclined top-wall 25^a, which is provided with a longitudinal groove 52^b in which the shank of the button can slide as the button, after passing the escapement A^6, gravitates to a socket in the upper end of the staple-former D, which normally occupies an elevated position which enables the wire to be fed through the eye of the button. The chute-section 25 thus provided tapers to substantially a knife edge at the lower front end, as clearly shown in Fig. 17. The slot 25^b, at its lower end, intercepts a slot 25^c formed in the front edge of a thin steel insert-strip 25^d, which forms the final support and guide for the button as it passes to the former D. The bore or guide for the former D is perpendicular to the inclined guide A^5 and disposed below the lower end of the guide A^5. The member 25^d is thus perpendicular to the former D and lies just above the inclined plane of the upper end of the former D. The chute-section 25, as will be understood from Fig. 9, virtually forms a downward extension of the detachable button-chute E. The top-plate casting 23 has provided integrally with its rear portion a bracket 26 (Fig. 7) which carries a yoke 27 serving as a support for the chute E and which is equipped also with a spring-pressed pawl 28 which serves in securing the interchangeable button-chute E′ in place, as shown in Fig. 2.

The button escapement A^6 (Figs. 3, 5, 12 and 13) comprises a housing 29 formed integrally with the plate 23; a pair of spring-depressed, cam-actuated plungers 30 and 31 contained in bores with which the housing 29 is provided, said bores intercepting the guide in which the staple-forming plunger B works; laterally-extending escapement fingers 30^a and 31^a carried respectively by the plungers 30 and 31 and extending over the slot 25^b, as shown in Fig. 13; and a small lever or manual trip 32, by means of which the upper plunger 30 may be lifted, if desired, to permit a button to pass the upper escapement-finger and descend to engagement with the lower escapement-finger. The housing 29 is provided with slots 33 through which the escapement-fingers work. The lower ends of the plungers 30 and 31 are provided, respectively, with bevel surfaces 30^b and 31^b adapted to ride upon the cam surfaces with which the staple-forming plunger B is provided. The lever 32 is confined in a vertical slot 32^a with which the housing A^6 is provided; and said lever is provided with a slot 32^b which loosely receives an extension 30^c of the escapement-finger 30^a. The front end of the lever is equipped with a knob or handle, and the rear end is provided with an inturned fulcrum-arm 32^c which is adapted to engage a horizontal shoulder or fulcrum bearing 34 with which the housing 29 is equipped at one side of its rear portion. When it is desired to manually elevate the upper feed-finger 30^a, this may be accomplished by lifting the lever 32 through the medium of the knob at its front end, in which operation the fulcrum-member 32^c will bear upon the shoulder 34 and the lower end of the slot 32^b will engage the pin-extension 30^c and lift the plunger 30. The slot 32^b permits the automatic actuation of the plunger 30 in the normal operation of the machine.

The plunger B which operates as a wire-cutter and bender is of rectangular cross-section to work freely in the guide A^5, as will be understood from Figs. 13 to 16, inclusive. It has its lower front end longitudinally slotted, thus affording furcations 35, one of which is provided with a wire shear-edge 35^a, as shown in Fig. 16. The inner faces of the furcations 35 are provided with small grooves 35^b, which accommodate the legs of the staple when the wire is bent about the former D during the descent of the plunger B. The grooves 35^b are continued, as shown in Fig. 13, to accommodate the guide-flanges of the staple-driving plunger C.

The plunger B, as will be understood from Fig. 12, is provided with a longitudinal groove 36, at the upper and lower ends of which are beveled surfaces 36^a and 36^b which serve to actuate the pawls 30 and 31.

To accommodate the staple-driving plunger C, the upper surface of the plunger B is provided with a longitudinal guide-slot in which the plunger C works. The plate 23 serves as a top-wall for the plunger C, as well as for the plunger B. The top surfaces of the furcations 35 of the plunger B are recessed or countersunk to receive a thin steel disk 37 which is secured in place by screws 37^a and which is provided with a longitudi-

nal slot 37[b] (Figs. 11 and 15) adapted to receive the shank of the button, so that the button will be carried thereby to the anvil after the staple-forming operation. The upper surface of the lower front end of the plunger C is suitably recessed or cut away to work beneath the disk 37. The lower front end of the plunger C is provided with a vertical slot 38 to accommodate the shank of the button, and with shallow horizontal recesses 39 adapted to accommodate the crown of the staple, the recess 39 registering with the grooves 35[b] of the plunger B.

As has been stated, the staple-forming plunger B is actuated by the arm 16 of the rock-lever I, through the medium of the link 17. After the wire-cutting and bending operation has been performed, the plunger C is actuated by the cam-roller 14 carried by the arm 13 in performing the staple-driving and clenching operation. During this operation, yielding pressure is communicated to the plunger B through the medium of a follower 40 working against a substantial coil-spring 41 confined in a bore with which the plunger B is provided, as shown in Fig. 11. The follower 40 is attached to the staple-driving plunger C by a stud or pin 42 adapted to work through a slot 43 in the upper wall of the bore which contains the spring 41. By this expedient, the staple-forming plunger which carries the button to the anvil A[4] is yieldingly held against the leather or fabric to which the button is applied.

The plunger-form staple-former D is reciprocable in a forwardly and upwardly inclined guide 44 disposed parallel with the face of the anvil A[4], the bore of said guide intercepting the front end of the guide A[5], which is separated, by a space 46, from the anvil. The staple-former D comprises a depressible post 47 having at its upper end a reduced extension 47[a], about which the staple is formed; and a substantial coiled spring 48 confined in a bore which extends upwardly from the lower end of the post and is supported by a spring follower or plug 49 carried by a screw or stud 50 which extends transversely across and is supported by the lower end of the guide 44. The tubular lower end of the member 47 is provided with a transverse slot 51 which accommodates the stud 50. The lower end of the member 47 is equipped with an external flange 47[b] which abuts against the lower end of the guide 44, which thus serves as a stop limiting the upward movement of the member 47. The arm 4 of the bell-crank lever G is adapted to bear against the lower end of the member 47 when said member is in the wire-feeding and staple-forming position shown in Fig. 9. The upward extension 47[a] of the staple-former is formed by cutting away the rear upper portion of the post 47 and the side-portions, thus producing the contour shown in Figs. 14 and 15, which correspond to the form of the staple 52 which is formed from the wire 52[a]. The reduced rear surface of the extension 47[a] is provided with a vertical slot or socket 47[c], which receives the front leg of the button-eye and whose front wall affords a stop limiting the downward gravitation of the button 53, as indicated in Fig. 17. In the position shown in Fig. 17, the button is supported partially by the member 25[d] of the feed-chute 25 and partially by the upper end of the staple-former 47. In this position, the wire 52[a] is fed through the eye 53[a] of the button, this action occurring at the beginning of the cycle of operations of the machine. The rear upper portion of the post 47 is beveled, as indicated at 54, the bevel-surface being in position to be engaged by bevel-surfaces 55 with which the furcations 35 of the plunger B are provided at their lower front portions. Flanking the base of the extension 47[a] are surfaces 56, over which the lower surfaces of the furcations 35 of the plunger B ride, and thus hold the post 47 depressed during the staple-driving operation.

The wire 52[a] is fed into the machine through a guide 57 which extends through one lateral wall of the plunger-guide A[5]. The length of the staple is regulated by an adjustable stop 58 (Fig. 14) which extends through the opposite wall of the guide A[5].

The detachable button-chute E which in a broad sense constitutes a part of the button-feeding means, comprises (Fig. 8) a chute-section 59 adapted to be interposed between the chute-section 25 and the delivery-point of the hopper J, said chute-section being provided with a longitudinal slot 59[a] adapted to register with the slot 25[b]; an overhanging guard-bar 60 carried by arms 61, the lower longitudinal edge of said bar being disposed over the slot 59[a]; and a gravity-arm 62 carried by the front end of the bar 60, with which it is connected by a pivot 63. The member 62 may be formed by slotting a piece of sheet metal longitudinally at both ends and bending the member to afford a web 62[a] adapted to rest on the front end of the bar 60 in front of the pivot 63. A stud 64 connects the lower front furcations of the member 62 and has one end provided with a knob 64[a], by means of which the member 62 may be lifted, if desired. The front ends of the furcations of the member 62 are cut away or beveled, as indicated at 62[b]. The lower extremity of the bar 60 is cut away at its lower edge to permit movement of the escapement-fingers 30[a] and 31[a], as indicated in Fig. 11.

The chute-section 59 is equipped with a spring-held pivoted pawl 65 which has an upturned finger 66 adapted to afford a but-

ton-stop at the lower end of the slot 59ª, a shown in Fig. 8. The front end of the pawl 65 is adapted to enter a central recess 67 with which the chute-section 25 is provided, thus centering the button-chute E when it is applied to the machine. When so applied, a projection 68 at the rear end of the pawl engages a bearing 69 on the arm 26, thus depressing the front end of the pawl and removing the stop 66 from the channel through which the buttons gravitate. The lower end of the member 59 is provided with a half circular bearing 69 adapted to engage a laterally-extending stud 70 carried by the chute-section 25. The upper end of the member 59 is provided with a half circular bearing 71 which is slotted and adapted to interlockingly engage a central disk 72 and lateral studs 72ª carried thereby, with which the hopper J is equipped immediately below the front end of its discharge-slot. In applying the button-chute E, the lower end is first brought into proper engagement with its bearings, and the rear end of the button-chute is then swung back until the member 59 rests in the yoke 27, after which the hopper is swung forward about the pivot H until the disk 72 and studs 72ª engage the slotted bearing 71.

The substitute feed-chute E′ is constructed essentially like the button-chute E, but is adapted for use when the hopper J is in disuse. The button-chute E′ is shown as of greater length than the button-chute E. The mode of attachment at the lower end is the same as has been described. No means of attachment to the hopper is provided at the rear upper end. The member 59ᵇ, which corresponds with the member 59, is provided at its lower side with a notch or bearing 59ᶜ adapted to be engaged by the pawl 28. It will be noted that the pawl or detent 28 has a double bevel at its lower end, which enables the button-chute E′ to be snapped into place or removed, when desired.

The lower end of the main actuating plunger or connecting-rod F is pivotally joined to the foot-lever F′, as shown in Fig. 6. The foot-lever is held normally elevated by a heavy coil-spring 73. As has been stated, the upper end of the connecting-rod F has stud-and-slot connections 3 with the arm 2 of the rock-lever G which the connecting-rod F actuates. The connections 3 comprise a laterally-projecting stud on the front end of the arm 2 and a vertical slot in the inner side of the upper portion of the connecting-rod F, as will be understood clearly from Figs. 7 and 10.

The rock-lever G, as has been stated, is carried by an arm or bearing 1, with which the frame-member A³ is equipped at its rear portion. It is mounted to turn on a bolt or shaft 74 (Fig. 10) and is confined between a tension-spring 75 on one end of said bolt and the bearing 1. The pivot and slot connection between the arm or elbow 6 of the member G and the link 8 comprises a stud or screw carried by the slotted elbow 6 and a slot extending longitudinally of the link 8, as will be understood from Figs. 5 and 7.

In the normal position of the parts, the roller of the cam-arm 5 is substantially in engagement with the cam-arm 15 of the rock-lever I. As has been stated, the first action in the cycle of operations of the machine is that of feeding the wire through the medium of the mechanism L, this action being caused by the first movement of the connecting-rod F in a manner to be presently described. During the wire-feeding action, the rock-lever G remains idle, owing to the stud-and-slot connection 3. Then the member G is rotated, bringing the cam-arm 5 into action and turning the rock-lever I through the medium of the cam-arm 15, the rock-shaft H in the meantime remaining idle, owing to the pin-and-slot connection 7. Subsequently, the rock-shaft H is rotated, and through the medium of the rock-lever H′, which is rigid with the shaft H, the staple-driving plunger C is caused to perform its working stroke. The rock-shaft H is returned to its normal position by the spring 73 connected with the foot-lever F′; and the rock-lever I is returned to its normal position by a laterally-extending stop 76 (Fig. 7) which engages a shoulder 77 with which the cam-arm 15 is equipped, it being noted that when the staple-driving plunger C is forced downwardly to the limit of its stroke, the stop or projection 76 of the rock-lever H′ moves away from the shoulder 77 of the rock-lever I.

In the preferred construction, the hopper J comprises a side-member 78 (Fig. 3) carried by the pivot-arm 18; an intermediate vertical plate 79 carried by the pivot-arm 19; a detachable hopper-section 80 connected with the intermediate plate by screws 81; and a top 82 joined by pivots 83 to the side-member 78. The members 78 and 79 afford a housing 84 for an endless conveyer-chain. The members 78 and 79 are secured together by screws 85 (Fig. 9).

The button-feeding mechanism J′ comprises a shaft 86 which is actuated by ratchet-devices through the medium of the links H³ and H⁴; a conveyer-chain 87 confined in the housing 84 and supported by wheels mounted on shafts 88 and 89; a button-elevating wheel 90 fixedly secured to the inner end of the shaft 86; a pair of ratchet-disks 91 and 92 mounted on the projecting end of the shaft 86 so as to communicate motion to said shaft; rings or sleeves 91ª and 92ª embracing said disks; clutch-rollers 91ᵇ

and 92^b confined between the inner surfaces of the rings and said disks; and bevel surfaces 91^c and 92^c afforded by recesses with which the disks 91 and 92 are provided, respectively, the rings 91^a and 92^a being equipped, respectively, with arms 91^d and 92^d connected with the links H^3 and H^4. The arrangement is such the when the arm H^2 swings upwardly during the depression of the foot-lever, thus lifting the links H^3 and H^4, the ring 92^a will turn the shaft 86, while the ring 91^a moves idly; and in the return stroke, the ring 91^a will continue the turning movement of the shaft 86, while the ring 92^a works idly.

The stop mechanism K comprises (Figs. 2, 18 and 21) a gear 93 (which forms also a part of the button-feeding mechanism J') mounted on the shaft 86 to turn with the disks 91 and 92; a sleeve or tubular rock-shaft 94 journaled on the shaft 86 and adapted to be rotated through the medium of the link K' when the hopper is swung to the intermediate position shown in full lines in Fig. 2; a cam 95 carried by the sleeve 94; and a spring-held detent or pawl 96 carried by a pivot 97 mounted on the hopper and having formed integrally therewith a cam arm 98 which engages the cam 95. When the hopper is turned to the intermediate position shown in Fig. 2, the sleeve 94 is rotated to move the cam 95 from engagement with the cam-arm 98, thereby permitting the detent 96 to engage the teeth of the gear-wheel 93, so that the mechanism J' will not be turned when the machine is operated, assuming the hopper to be in the intermediate position.

The gear 93, as shown in Fig. 21, is provided with a sleeve 93^a, upon which the disks 91 and 92 are mounted. Interposed between the disks which are provided with suitable sockets are coil-springs 99 which tend to force the disks apart. The disks are confined between the gear 93 and a disk or knob 100 which have threaded connection with the shaft 86. Fiber disks 101 are interposed between the disk 91 and the member 100 and between the disk 92 and the gear 93, and the construction is such that the desired amount of friction can be created to communicate ample power to turn the shaft 86 in the normal working of the machine; but should the machine become clogged in the feeding of the buttons, a slippage will occur, thereby obviating danger of breakage.

The members 78 and 79 which form the housing for the conveyer-chain are provided, as will be understood from Figs. 18 and 19, with ledges which afford a slotted horizontal button run-way 102 through the slot 103 of which work the button-conveying arms 104 with which alternate links of the chain 87 are provided. The walls of the slot 103 are beveled, as indicated at 105, to facilitate the lodgment of the buttons therein as they are elevated and dumped by the teeth 90^a of the wheel 90. The wheel 90 works within a circumferential wall 106 with which the member 79 of the hopper is provided; and the bottom of the hopper-member 80 is inclined so that the buttons will gravitate between the teeth at the lower portion of the wheel. The teeth have their front surfaces beveled or undercut toward the plate 79; and the bottoms of the slots between the teeth also slope toward the plate 79, so that buttons will be carried upwardly, as indicated in Fig. 5, and discharged into the slot 103. At the front end of the slot, the slot is contracted, as indicated at 103^a, and formed with vertical walls adapted to accommodate only the shanks of the buttons. As shown in Figs. 5 and 19, the hopper-member 78 is equipped with a wiper-spring 103^b which is adapted to dislodge improperly positioned buttons, or any surplus of buttons, and cause them to slide back through a passage 103^c, having an inclined wall, into the interior of the hopper. The passage 103^c is formed in front of the circumferential wall 106 within which the button-elevating wheel 90 rotates. This feature of improvement is adapted to facilitate the return of improperly lodged buttons or any surplus of buttons to the bottom of the hopper, without interfering with the operation of the wheel 90. The chute or run-way 102 terminates slightly in front of the front end of the hopper and is curved to join the upper end of the detachable button-chute, so that a continuous run-way for the buttons will be afforded. As will be understood from Figs. 1, 9 and 19, motion is communicated from the gear-wheel 93 through an idler 107 mounted on a stub-shaft 107^a to the pinion 88^a mounted on the shaft 88 which actuates the conveyer-chain.

As has been stated, the pivot-arm 18 of the hopper is equipped with an extension 18^a, which co-acts with a spring-held plunger or detent 18^b. The spring-pressed plunger 18^b is mounted in a guide 108 projecting laterally from the frame-member A^3, the tension of the spring of said plunger being adjustable by means of a screw 109 which extends through a boss 110. The rear upper end of the plunger or detent 18^b is equipped with a cam-roller 111 which is adapted to engage either one of two curved recesses 112, 113 with which the arm or segment 18^a is provided at its lower edge. The segment 18^a also affords a curved surface 114 upon which the roller 111 may ride when the hopper is swung to the position indicated by dotted lines in Fig. 2. The recess 112 corresponds with the upright position of the hopper; and the recess 113 corresponds with the intermediate position of the hopper.

The wire-feeding mechanism L, as has been stated, is mounted on the bracket 21, which projects laterally from one side of the frame-member A^3. The construction and arrangement will be understood from Figs. 3, 5 and 10. The bracket 21 carries an adjustably-secured shaft 115, upon the front end of which is journaled the lower feed-roll 116 which has formed integrally therewith a pinion 117, which meshes with a similar pinion formed integrally with a feed-roll 118 journaled on the front end of a bar or shaft 119 whose rear end is connected with the bracket 21 by a pivot 120. The upper feed-roll is yieldingly held in a depressed position by a spring 121, but may be lifted by a rock-shaft or eccentric 122 equipped with a handle 123. A pawl-carrying yoke 124 is journaled on the shaft 115, this yoke being equipped with a pawl 125 adapted to actuate the pinion 117, in the direction indicated by the arrow in Fig. 10 when the yoke 124 is swung outwardly away from the connecting-rod F. In the return movement, the pawl works idly over the pinion. The yoke 124 is equipped with a short arm in which is journaled a cam-roller 126 adapted to engage a semi-circular cam-recess 127 formed in the outer side of the connecting-rod F. The rear end of the shaft 115 is equipped with a coil-spring 124^a, one end of which is secured to the shaft and the other end of which is connected, by a screw 124^b, to the yoke 124. The shaft 115 has a threaded portion equipped with a lock-nut 128 between which and the shoulder on the shaft 115 is confined a lug of the bracket 121 through which the shaft 115 extends. The shaft 115 may be turned to adjust the tension of the spring 124^a and then secured in adjusted position by the lock-nut 128. The spring 124^a tends to return the feed-roll actuating-yoke 124 to the position shown in Fig 10, in which the cam-roll 126 engages the cam-recess 127. When the plunger F starts on the down stroke, the cam recess 127 causes the member 124 to swing outwardly, thereby actuating the feed-rolls through the medium of the pawl 125. After the wire is fed, the cam-roll 127 works on the outer vertical surface of the connecting-rod F above the recess 127. Thus, the member 124 is held in the outwardly-swung position until the connecting-rod F rises, when the spring 124^a forces the cam-roller into engagement with the cam-recess 127. This operation is effected notwithstanding the fact that the upper end of the connecting-rod F is swung forwardly and rearwardly somewhat, owing to its connection with the rock-lever G which turns about the pivot 74. In the wire-feeding operation, the movement of the rock-member, or yoke, 124, is sufficient to feed the wire somewhat more than the required distance, it being understood that the feed-rolls will slip on the wire after the end of the wire encounters the stop 58 shown in Fig. 14.

The operation is as follows:

The operator places the leather or fabric 129 (Fig. 16) back of the anvil A^4, and depresses the treadle F', thereby lowering the connecting-rod F. During the initial movement of the connecting-rod, the wire-feeding mechanism L is actuated through the medium of the cam-roller 126, which is normally in engagement with the recess 127, as shown in Fig. 3. At the beginning of the cycle of operations, a button is in the wire-feeding position shown in Figs. 11 and 17, having been allowed to descend to that position, owing to the lifting of the lower escapement-finger 31^a during the return stroke of the staple-forming plunger B. After the wire-feeding operation, the upper end of the slot in the connecting-rod F (pin-and-slot connection 3) engages the pin carried by the extremity of the arm 2, thereby actuating the rock-lever G, which, through the medium of the cam-arm 5, actuates the rock-lever I by engagement with the cam-arm 15, thereby actuating the wire-severing and staple-bending plunger B. After the wire is severed, the link 8 is actuated through the medium of the arm 6 of the rock-lever G, thereby turning the rock-lever, composed of the rock-shaft H and the arms which are fixedly mounted, thereon, thus carrying the cam-roller 14 against the rear end of the staple-driving plunger C and actuating the plunger C, as will be understood from a comparison of Figs. 7 and 9. As the plunger C descends, the tension on the spring 41 (Fig. 11) increases, and the plunger B is thus "picked up" and actuated by the plunger C during the remainder of the working stroke, the rock-lever I being carried along by the link 17, it being noted that the cam-arm 5 ceases to engage the cam-arm 15. As the plunger B descends, it bends the wire about the extension 47^a of the staple-former, the crown of the staple remaining in engagement with the eye of the button, while the legs of the staple are held in the grooves 35^b of the furcations 35. The slotted front portion of the disk 37 carried by the furcations of the plunger B passes beneath the button as the plunger B descends, and the beveled surfaces 55 of the plunger engage the beveled surface 54 of the former 47, thus depressing the former. The plunger C gains upon the plunger B during the descent of the plungers and drives and clenches the staple in the manner shown in Fig. 16.

When the pressure upon the foot-lever is relieved, the foot-lever is returned by the spring 73, and the parts are returned to their normal position. During both the working stroke and the return stroke of the plungers B and C, the shaft 86 of the button-feeding

mechanism J′ is rotated in the direction indicated by the arrow in Fig. 1, the link H^3 and clutch-ring 92^b serving in the actuation of the shaft during the working stroke of the plungers B and C, and the link H^4 and the clutch-ring 91^a serving in such actuation during the return stroke of the plungers. The buttons are lifted to the button-runway of the hopper by the wheel 90, and such buttons as are properly lodged in the runway are carried forward by the endless button-conveyer 87, being discharged from the front end 102 of the run-way of the hopper into the upper end of the inclined button-chute E, which, it will be understood, is kept filled, or partially filled, with buttons by the operation of the button-feeding mechanism J′. During the working stroke of the plunger B, said plunger lifts the upper escapement-finger 30^a, thus permitting a button to descend into engagement with the lower escapement-finger 31^a. In the return stroke of the plunger B, the finger 31^a is lifted through the medium of said plunger, thereby permitting the lowermost button to descend to the wire-feeding position shown in Fig. 17.

It will be noted that the escapement-fingers are associated with the permanently-attached, though removable, button-chute section 25, so that the button-chute E can be removed without disturbing the escapement; also, that the buttons descend by gravity directly to the wire-feeding position, the passage of the buttons being controlled by the escapement; also that the staple-former 47 is normally in the elevated position which corresponds with the wire-feeding position, so that the button is held by the staple-former during the wire-feeding operation, the button being also steadied or prevented from toppling over by the gravity pawl, or button-presser 62, from beneath which the button will slide freely, nevertheless, when the button starts to move to the anvil.

When desired, the hopper J may be swung to the intermediate position shown in full lines in Fig. 2, and the button-chute and magazine E′ may be substituted for the button-chute and magazine E. In such position of the hopper, the button-feeding mechanism will be locked against operation by the pawl 96, which is thrown into engagement with the gear 93 through the medium of the link K′ when the hopper is swung to the intermediate position. In such position of the hopper, the machine may be operated in the manner already described, except that the button-feeding mechanism of the hopper remains in disuse. When desired, the hopper J may be thrown to the position indicated by the dotted lines in Fig. 2 to enable the contents to be discharged.

The machine described is simple and may be cheaply manufactured, notwithstanding it is somewhat difficult of illustration. It possesses great certainty of operation, due largely to the improved manner in which the staple-bending plunger, the staple-former, and the staple-driving plunger co-act and are related to the button-chute. Moreover, the manner in which the parts are actuated contributes to the improved operation of the machine and the cheapness of construction.

The foregoing detailed description has been given for clearness of understanding only, and no unnecessary limitation should be understood therefrom, but the appended claims should be construed as broadly as permissible in view of the prior art.

What I regard as new and desire to secure by Letters Patent is—

1. In a machine of the character set forth, the combination of a reciprocable staple-former provided with a button-socket and normally occupying the wire-feeding position, wire-feeding means, means for delivering a button to said socket, a wire-severing and staple-forming plunger equipped with means for depressing said staple-former, a staple-driving plunger slidably connected with said first-named plunger, a rock-lever serving to actuate said first-named plunger, a rock-lever serving to actuate said staple-driving plunger, and means for actuating said rock-levers.

2. In a machine of the character set forth, the combination of a reciprocable forwardly and upwardly inclined staple-former provided with a button-socket and normally occupying a wire-feeding position, wire-feeding means, means for delivering a button to said socket, a wire-severing and staple-forming plunger equipped with means for depressing said staple-former, a staple-driving plunger slidably connected with said first-named plunger, a rock-lever including a rock-shaft adapted to actuate said staple-driving plunger, a rock-lever mounted on said rock-shaft and adapted to actuate said first-named plunger, a third rock-lever adapted to actuate said rock-shaft and having lost-motion connections therewith and equipped also with means for actuating the rock-lever which actuates the staple-forming plunger, and a foot-lever and connecting-rod serving to actuate said third-named rock-lever.

3. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket, means for delivering a button to said former while it occupies the wire-feeding position, wire-feeding means, a wire-severing staple-forming plunger, a rock-lever linked to the rear end thereof, a staple-driving plunger slidably connected with the staple-forming plunger, spring connections between the staple-forming plunger and the staple-driv-

ing plunger, a rock-lever equipped with a cam serving to actuate the staple-driving plunger, a rock-lever linked to said last-named rock-lever and equipped with cam means serving to actuate said first-named rock-lever, a connecting-rod joined to said third-named rock-lever, and means for actuating said connecting-rod.

4. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket, means for delivering a button to said former while it occupies the wire-feeding position, wire-feeding means, a wire-severing staple-forming plunger, a rock-lever linked to the rear end thereof, a staple-driving plunger slidably connected with the staple-forming plunger, spring connections between the staple-forming plunger and the staple-driving plunger, a rock-lever equipped with a cam serving to actuate the staple-driving plunger, a rock-lever linked to said last-named rock-lever and equipped with cam means serving to actuate said first-named rock-lever, a connecting-rod having lost-motion connection with said third-named rock-lever, and means carried by said connecting-rod adapted to actuate the wire-feeding means during the first portion of the working stroke.

5. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket normally occupying the wire-feeding position, wire-feeding means, a wire-severing and staple-forming plunger provided with means for depressing said former, a staple-driving plunger slidably connected with the staple-forming plunger, spring connections between said plungers whereby the staple-driving plunger will yieldingly hold the staple-forming plunger during the clenching operation, a rock-lever connected with the rear end of the staple-forming plunger, a rock-lever adapted to actuate the staple-driving plunger after the initial movement of the staple-forming plunger, and means for actuating the wire-feeding means and said rock-levers.

6. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket normally occupying the wire-feeding position, wire-feeding means, a wire-severing and staple-forming plunger provided with means for depressing said former, a staple-driving plunger slidably connected with the staple-forming plunger, spring connections between said plungers whereby the staple-driving plunger will yieldingly hold the staple-forming plunger during the clenching operation, a rock-lever connected with the rear end of the staple-forming plunger, a rock-lever adapted to actuate the staple-driving plunger after the initial movement of the staple-forming plunger, a connecting-rod equipped with means for actuating the wire-feeding means during the initial portion of the working stroke, and means having lost-motion connection with said connecting-rod and adapted to actuate said rock-levers.

7. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket and normally occupying the wire-feeding position, wire-feeding means, means for delivering a button to said former, a wire-severing and staple-forming plunger, a staple-driving plunger slidably connected therewith, a connecting-rod and actuating means therefor, said connecting-rod equipped with means for actuating the wire-feeding means during the initial portion of the working stroke, and means for acuating the staple-forming and staple-driving plungers, including a member having lost-motion connection with said connecting-rod.

8. In a machine of the character set forth, the combination of a depressible staple-former normally occupying the wire-feeding position, wire-feeding mechanism, a wire-severing and staple-forming plunger, a staple-driving plunger slidably and yieldingly connected therewith, a foot-lever and a connecting rod actuated thereby, means on the upper portion of the connecting-rod adapted to actuate the wire-feeding mechanism during the initial portion of the working stroke, a rock-lever having lost-motion connection with the upper portion of the connecting-rod and equipped with a cam-arm, a rock-lever equipped with a cam-arm and adapted to actuate the staple-driving plunger and having lost-motion connection with said first-named rock-lever, and a rock-lever linked to the staple-forming plunger and equipped with a cam adapted to be actuated by the cam-arm of said first-named rock-lever.

9. In a machine of the character set forth, the combination of a depressible staple-former, a wire-severing and staple-forming plunger, a staple-driving plunger slidably connected therewith, a rock-lever equipped with a cam-arm adapted to actuate the staple-driving plunger and including a rock-shaft, a rock-lever pivoted on said rock-shaft and linked to the staple-forming plunger and equipped with a cam-arm, means on said first-named rock-lever adapted to return said second-named rock-lever to its normal position after the working stroke, a third rock-lever equipped with a cam-arm and linked to the first-named rock-lever, wire-feeding means, a connecting-rod equipped with means for actuating the wire-feeding means during the initial portion of the working stroke, and lost-motion connections between said connecting-rod and said third-named rock-lever.

10. In a machine of the character set forth, the combination of a depressible staple-former normally occupying the wire-feeding position, means for delivering a button to said former, wire-feeding mechanism including a rock-member and pawl, said rock-member equipped with a cam-arm, a connecting-rod having its upper portion provided with a cam recess adapted to actuate said cam-arm, a wire-severing and staple-forming plunger equipped with means for depressing the staple-former, a staple-driving plunger slidably connected with the wire-bending plunger, a rock-lever having lost-motion connections with the upper portion of said connecting-rod, and levers actuated thereby and serving to actuate the wire-bending plunger and the staple-driving plunger.

11. In a machine of the character set forth, the combination of a depressible staple-former normally occupying the wire-feeding position, wire-feeding mechanism including an actuating rock-member equipped with a cam-arm, a connecting-rod having its upper portion provided with cam means for actuating said cam-arm, a wire-severing and staple-bending plunger having means for depressing the staple-former, a staple-driving plunger, yielding connections between the wire-bending plunger and the staple-driving plunger, a rock-lever equipped with a cam-arm adapted to actuate the staple-driving plunger, a rock-lever linked to the wire-bending plunger and equipped with a cam-arm, and a rock-lever having lost-motion connection with the connecting-rod and lost-motion connection with the rock-lever which actuates the staple-driving plunger and equipped also with a cam-arm adapted to actuate the wire-bending plunger.

12. In a machine of the character set forth, the combination with a wire-severing and bending plunger and a staple-driving plunger slidably and yieldingly connected therewith, of a rock-lever serving to actuate said plungers, a connecting-rod having lost-motion connection with said rock-lever, wire-feeding mechanism including an actuating-member, and means carried by the connecting-rod for actuating the actuating-member of the wire-feeding mechanism.

13. In a machine of the character set forth, the combination of a forwardly and upwardly inclined plunger having its upper end provided with a member about which the staple is formed and having a button-socket, said plunger normally occupying the wire-feeding position, a wire-severing and bending plunger equipped with means for depressing said first-named plunger, a staple-driving plunger slidably connected with said wire-bending plunger, means for actuating the wire-bending and staple-driving plungers, wire-feeding mechanism timed to operate during the initial portion of the working stroke, and a gravity-feed button-chute leading to said button-socket and equipped with an escapement-device.

14. In a machine of the character set forth, the combination of a forwardly and upwardly inclined plunger having its upper end provided with a member about which the staple is formed and having a button-socket, said plunger normally occupying the wire-feeding position, a wire-severing and bending plunger equipped with means for depressing said first-named plunger, a staple-driving plunger slidably connected with said wire-bending plunger, means for actuating the wire-bending and staple-driving plungers, wire-feeding mechanism timed to operate during the initial portion of the working stroke, and a gravity-feed button-chute leading to said button-socket and equipped with an escapement-device actuated by the wire-bending plunger.

15. In a machine of the character set forth, the combination of a depressible spring-held former equipped with a recess for receiving the eye of a button, said former normally occupying the wire-feeding position, wire-feeding means, a wire-severing and bending plunger equipped with means for depressing said former, a staple-driving plunger slidably and yieldingly connected with the wire-bending plunger, means for actuating the wire-bending plunger and staple-driving plunger, a gravity feed-chute adapted to deliver a button to the former and equipped with an escapement controlling the passage of the buttons, and actuating mechanism serving to actuate the wire-feeding means during the initial portion of the working stroke and then to actuate the wire-severing and bending plunger and the staple-driving plunger.

16. In a machine of the character set forth, the combination of a frame-member provided with a forwardly and downwardly inclined guide having a top-portion provided with an integral chute-section and perpendicular guides, escapement-plungers mounted in said perpendicular guides and equipped with fingers projecting over the channel of said chute-section, a button-chute and magazine detachably mounted to register with said chute-section, a depressible staple-former, wire-feeding means, a wire-severing and bending plunger mounted in the guide mentioned and equipped with means for depressing said former and equipped also with escapement actuating means, a staple-driving plunger slidably connected therewith, and means for actuating the wire-feeding means and plungers.

17. In a machine of the character set forth, the combination of a frame-member having a forwardly and downwardly inclined guide provided with an integral top-

portion equipped with a feed-chute section and escapement guides and equipped also with a supporting-member, a button-chute and magazine detachably connected with said chute-section and having a bearing on said support, a wire-severing and bending plunger mounted in said guide and provided with escapement-actuating cams, a staple-driving plunger slidably connected with said first-named plunger, escapement-plungers in said escapement-guides and resting on said wire bending and severing plunger, a depressible staple-former provided with a socket for a button-eye registering with the lower end of said chute-section, wire-feeding means, and means for actuating the wire-feeding means and the wire-bending and staple-driving plungers.

18. In a machine of the character set forth, the combination with button-setting mechanism provided with a button-chute, of a swingingly-mounted button-hopper equipped with button-feeding mechanism actuated from the button-setting mechanism, and automatic means for preventing the operation of the button-feeding mechanism when the button-hopper is swung rearwardly from the normal upright position, the construction and arrangement being such as to permit the operation of the button-setting mechanism when the button-hopper is in an abnormal position.

19. In a machine of the character set forth, the combination with button-setting devices and actuating mechanism therefor, of a swingingly-mounted button-hopper equipped with button-feeding mechanism and adapted to be swung rearwardly from the normal upright position, means operated by the actuating mechanism of the button-setting devices and serving to actuate the button feeding mechanism, automatic means for stopping the operation of the button-feeding mechanism when the button-hopper is swung rearwardly from its normal position, and a detachable button-chute and magazine interposed between the button-hopper and the button-setting mechanism.

20. In a machine of the character set forth, the combination of a frame-member equipped with a forwardly and downwardly inclined guide, a chute-section mounted thereon, a button-escapement associated with said chute-section, a staple-former, a wire-severing and bending plunger movable in said guide, a staple-driving plunger slidably connected with said wire-bending plunger, wire-feeding means, actuating mechanism for the wire-feeding means and said plungers, a swingingly mounted button-hopper, button-feeding mechanism mounted therein, a detachable button-chute and magazine interposed between the hopper and said chute-section, and button-feeding mechanism actuating means connected with and actuated by said first-named actuating mechanism, said button-feeding mechanism actuating means being constructed and arranged to permit operation of said first-named actuating mechanism when the button-hopper is in an abnormal position.

21. In a machine of the character set forth, the combination of a frame-member provided with an inclined guide, a superposed chute-section equipped with a button-escapement, a staple-forming plunger mounted in said guide, a staple-driving plunger slidably connected with said first-named plunger, actuating mechanism therefor, a swingingly mounted hopper equipped with button-feeding mechanism, actuating means therefor actuated by said first-named actuating mechanism, and a detachable button-chute and magazine interposed between the hopper and said chute-section, said magazine equipped with a detent adapted to engage the lowermost button of the magazine.

22. In a machine of the character set forth, the combination of a frame-member provided with an inclined guide, a staple-forming plunger movable therein, a staple-driving plunger slidably connected with said staple-forming plunger, actuating mechanism for said plungers, a swingingly-mounted hopper equipped with button-feeding mechanism, actuating means therefor connected with and actuated by said first-named actuating mechanism, the hopper being adjustable into two or more positions without interfering with the operation of said first-named actuating mechanism, an inclined button-chute having its rear end detachably connected with the front end of said hopper, and a stop-device which is automatically operated to prevent operation of the button-feeding mechanism when the hopper is moved to a rearwardly-tilted position.

23. In a machine of the character set forth, the combination of a frame-member provided with an inclined guide, a staple-forming plunger mounted therein, a staple-driving plunger associated therewith, actuating mechanism for said plungers, a swingingly-mounted hopper equipped with button-feeding mechanism provided with an actuating-shaft, and actuating means for the button-feeding mechanism comprising links actuated by said first-named actuating mechanism and ratchet-devices actuated by said links and having friction connection with the actuating shaft of the button-feeding mechanism to permit slippage, for the purpose set forth.

24. In a machine of the character set forth, the combination of a frame-member provided with an inclined guide, a staple-forming plunger mounted therein, a staple-driving plunger associated therewith, actu-

ating mechanism for said plungers, including a rock-shaft, a button-hopper pivotally mounted on said rock-shaft and equipped with button-feeding mechanism, and actuating means for the button-feeding mechanism, including a link connected with said first-named actuating mechanism and a clutch actuated by said link.

25. In a machine of the character set forth, the combination of a depressible staple-former provided with a button-socket, a wire-bending plunger, a staple-driving plunger associated therewith, a superposed inclined chute-section equipped with a button-escapement actuated by said first-named plunger, and a detachable button-chute and magazine equipped with a button-controller adapted to engage a button when it is delivered to the former.

26. In a machine of the character set forth, the combination of a frame-member provided with an inclined guide, a surmounting inclined chute-section equipped with an escapement-device including escapement-fingers and plungers depending into said guide, a staple-forming plunger equipped with cams for actuating the plungers of the escapement-device, a staple-driving plunger slidably connected with the staple-forming plunger, a staple-former provided with a button-socket and adapted to be depressed by the staple-forming plunger, wire-feeding means, and means for yieldingly engaging the top of a button as the button is delivered to the former.

27. In a machine of the character set forth, the combination of a depressible staple-former normally occupying the wire-feeding position, a staple-forming plunger equipped with means for depressing said former, a staple-driving plunger associated therewith, an inclined button-chute leading to the upper end of the former, a button-escapement associated therewith, wire-feeding means, and button-supporting means carried by the staple-forming plunger and adapted to be interposed between the wire and the head of the button as the staple-forming plunger descends.

28. In a machine of the character set forth, the combination of a frame-member provided with a forwardly and downwardly inclined guide and below the front end thereof with a forwardly and upwardly inclined guide, a removable top-plate for said first-named guide having an inclined button-slot in its upper surface and equipped at its lower surface with a thin insert-member provided with a button-slot leading to the recess of the staple-former, a depressible staple-former working in said second-named guide and provided at its upper end with a recess for the eye of a button, said staple-former normally occupying the wire-feeding position, wire-feeding mechanism, a wire-severing and bending plunger in said first-named guide provided with furcations grooved on their inner sides and having means for depressing said staple-former, a thin insert-member bridging said furcations and provided at the front portion with a slot for the button-shank, a staple-driving plunger slidably connected with the staple-forming plunger and having its operative end adapted to work beneath said second-named insert-member, an escapement-device mounted on said first-named guide and actuated by said staple-forming plunger, and actuating mechanism serving to actuate the wire-feeding mechanism and the wire-bending and staple-driving plungers.

29. In a machine of the character set forth, the combination of a frame-member provided with a forwardly and downwardly inclined guide equipped at its upper side with a chute-section having an inclined button-slot through which the button moves by gravity, an escapement-device associated with said chute-section, a depressible staple-former having a button-socket and normally occupying the wire-feeding position, wire-feeding means, a wire-severing and bending plunger working in said guide and having means for depressing the staple-former, a staple-driving plunger slidably connected therewith, a detachable button-chute and magazine provided with an inclined button-slot registering with said first-named button-slot and equipped with an overhanging guard-member beneath which the heads of the buttons slide, and means for actuating the wire-feeding means and the wire-bending plunger and staple-driving plunger.

30. In a machine of the character set forth, the combination of a frame-member provided with a forwardly and downwardly inclined guide equipped at its upper side with a chute-section having an inclined button-slot through which the button moves by gravity, an escapement-device associated with said chute-section, a depressible staple-former having a button-socket and normally occupying the wire-feeding position, wire-feeding means, a wire-severing and bending plunger working in said guide and having means for depressing the staple-former, a staple-driving plunger slidably connected therewith, a detachable button-chute and magazine provided with an inclined button-slot registering with said first-named button-slot and equipped with an overhanging guard-member beneath which the heads of the buttons slide, a movably-mounted button-controller carried by said guard and adapted to overlie the button when it is delivered to the staple-former, and means for actuating the wire-feeding means and the wire-bending plunger and staple-driving plunger.

31. In a machine of the character set

forth, the combination of a depressible staple-former, a wire-severing and bending plunger, a staple-driving plunger having spring connection with the wire-bending plunger, means for delivering a button to the staple-former, wire-feeding means, a pair of relatively movable rock-levers having a common axis and serving, respectively, to actuate said wire-severing and bending plunger and said staple-driving plunger, and actuating means for the wire-feeding means and said rock-levers.

32. In a machine of the character set forth, the combination of a staple-former, a co-acting staple-forming plunger having means for depressing the staple-former, a staple-driving plunger, means for delivering a button to the staple-former, wire-feeding means, a hopper equipped with button-feeding mechanism, a rock-lever including a rock-shaft through the medium of which the staple-driving plunger is actuated, a co-axial rock-lever through the medium of which the staple-forming plunger is actuated, an arm carried by said rock-shaft through the medium of which the button-feeding mechanism is actuated, means for actuating said rock-shaft and the rock-lever which actuates the staple-forming plunger in proper sequence, and a connecting-rod serving to actuate said last-named means and the wire-feeding means.

33. In a machine of the character set forth, the combination of an upwardly and forwardly inclined spring-held plunger having its upper end provided with a button-socket and adapted to serve as a staple-former, a forwardly and downwardly inclined staple-forming plunger having means for depressing said first-named plunger, a staple-driving plunger slidably connected with the staple-forming plunger, button-feeding means, wire-feeding means, and actuating mechanism for the staple-forming plunger and staple-driving plunger equipped with an arm engaging the lower end of said first-named plunger in completing the cycle of operations.

34. In a machine of the character set forth, the combination of an anvil, a depressible staple-former having a socket for a button-shank, a staple-forming plunger, a staple-driving plunger, a gravity-feed button-chute leading to said socket, an escapement-device associated therewith equipped with a lower finger and an upper finger disposed above the button-chute passage, and means for lifting the lower finger during the return stroke of the staple-forming plunger and for lifting the upper finger during the final portion of the working stroke of the staple-forming plunger.

35. In a machine of the character set forth, the combination with button-setting mechanism and actuating mechanism therefor, including a rock-member equipped with an actuating arm, of a reciprocating connecting-rod having lost-motion connection with said actuating arm, wire-feeding mechanism comprising a frame-member, a rock-member mounted thereon and equipped with a cam-arm adapted to be engaged by cam means with which said connecting-rod is provided, a pair of wire-feeding rolls mounted on said frame-member, and means carried by said second-named rock-member for actuating said wire-feeding rolls.

36. In a machine of the character set forth, the combination with button-setting mechanism and a connecting-rod through the medium of which the button-setting mechanism is actuated, said connecting-rod equipped with a cam-device, of wire-feeding mechanism comprising a frame-member, a shaft supported thereby, a feed-roll journaled on said shaft and equipped with a pinion, a companion feed-roll equipped with a pinion engaging said first-named pinion, a rock-member mounted on said shaft and equipped with a cam-arm co-acting with said connecting-rod, and a pawl carried by said rock-member adapted to actuate said first-named pinion in one direction.

IVERT LARSEN.

In the presence of—
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."