(No Model.) 5 Sheets—Sheet 1.

F. H. RICHARDS.

BUTTON SETTING MACHINE.

No. 403,611. Patented May 21, 1889.

Fig. 1.

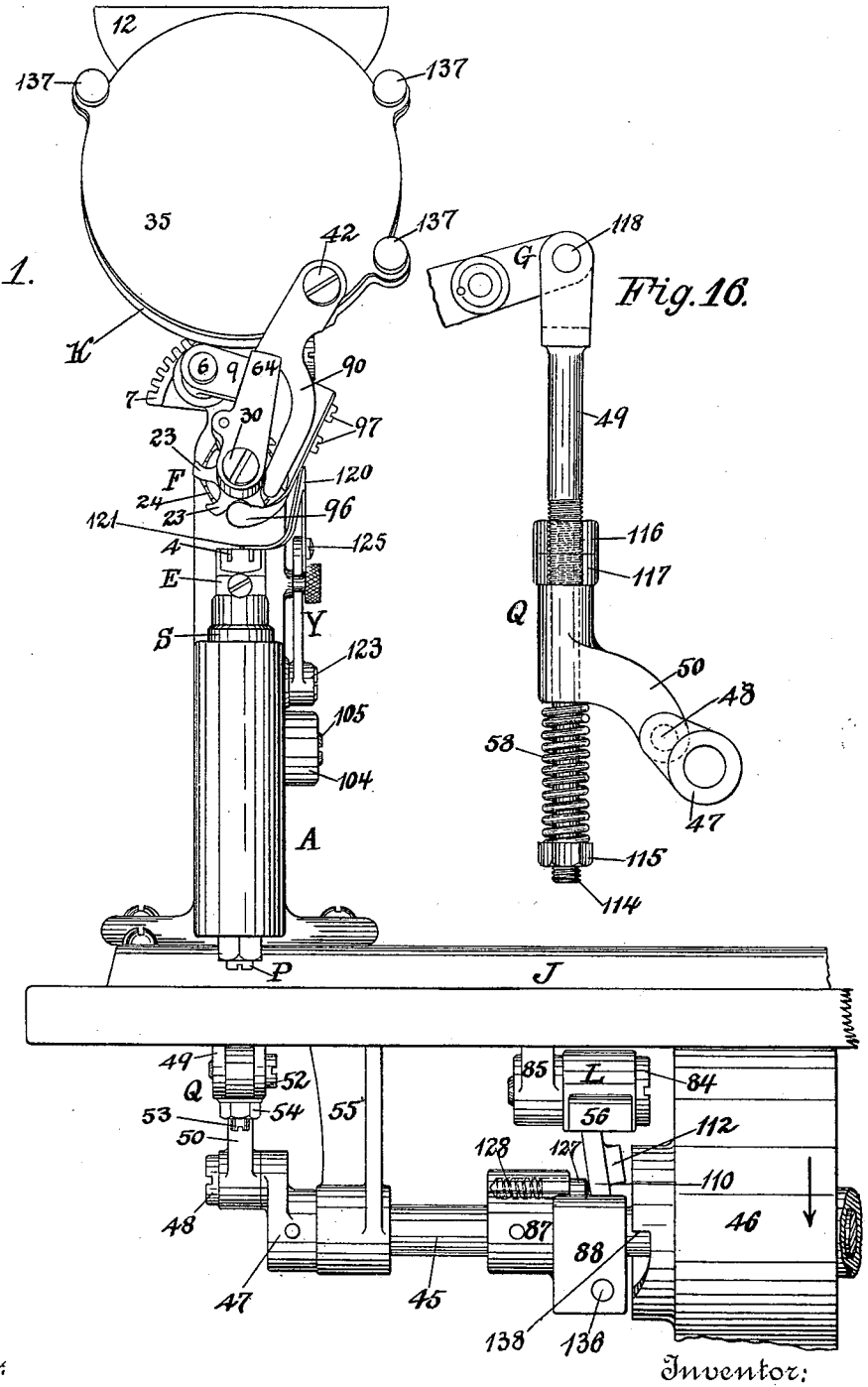


Fig. 16.

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(No Model.) 5 Sheets—Sheet 2.

F. H. RICHARDS.

BUTTON SETTING MACHINE.

No. 403,611. Patented May 21, 1889.

Fig. 2.

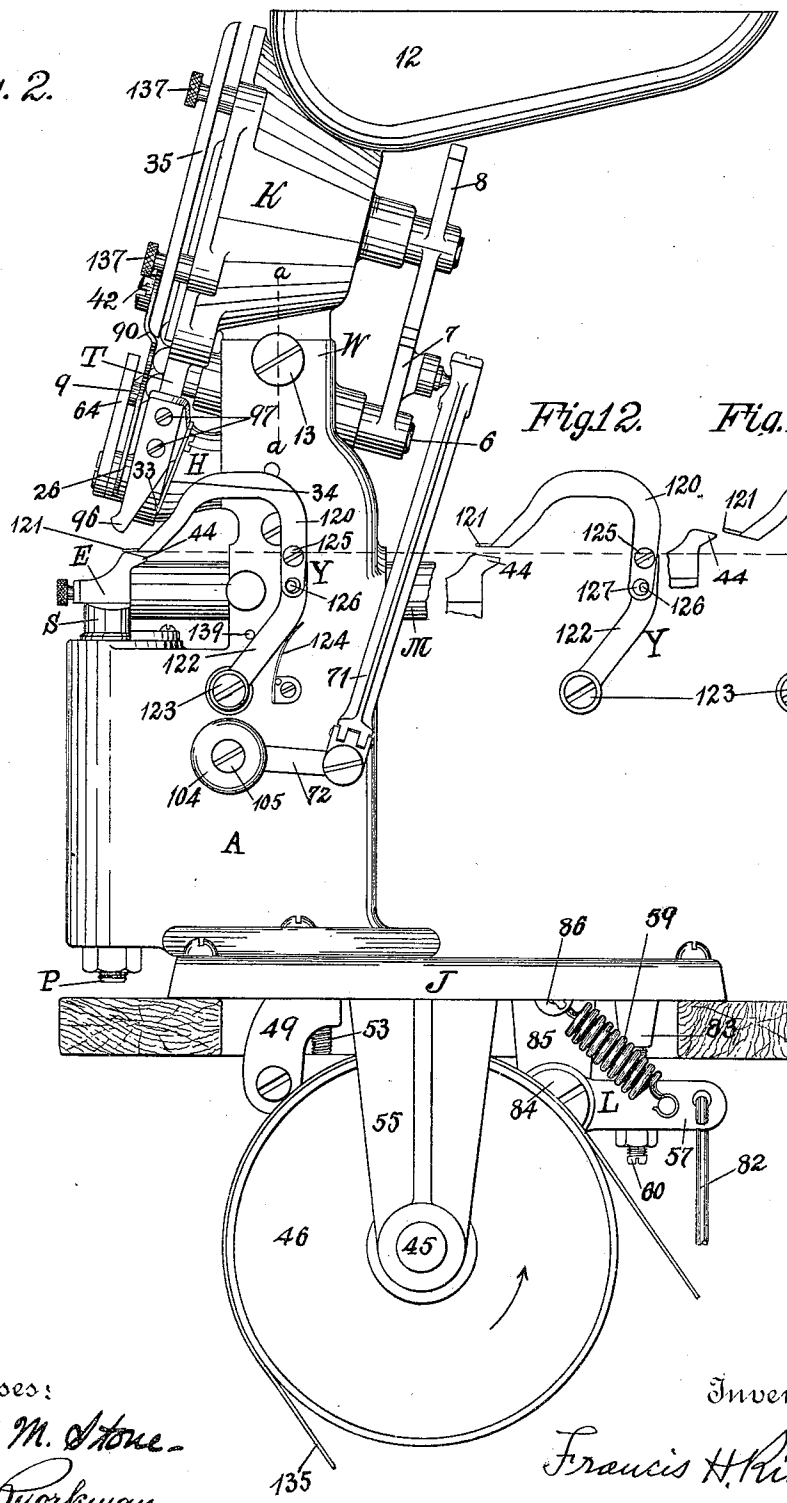


Fig. 12.

Fig. 13.

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(No Model.) 5 Sheets—Sheet 3.

F. H. RICHARDS.

BUTTON SETTING MACHINE.

No. 403,611. Patented May 21, 1889.

Fig. 3.

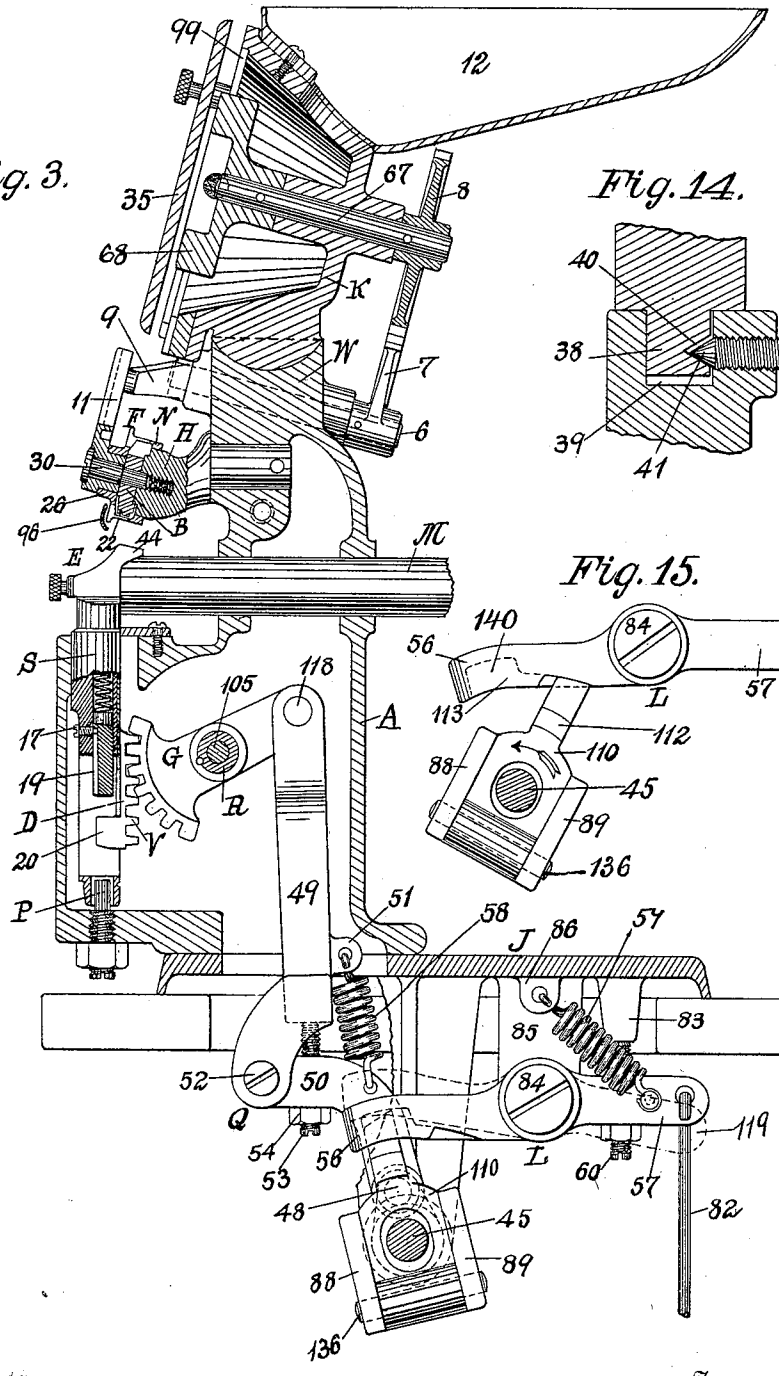


Fig. 14.

Fig. 15.

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(No Model.) 5 Sheets—Sheet 4.

F. H. RICHARDS.

BUTTON SETTING MACHINE.

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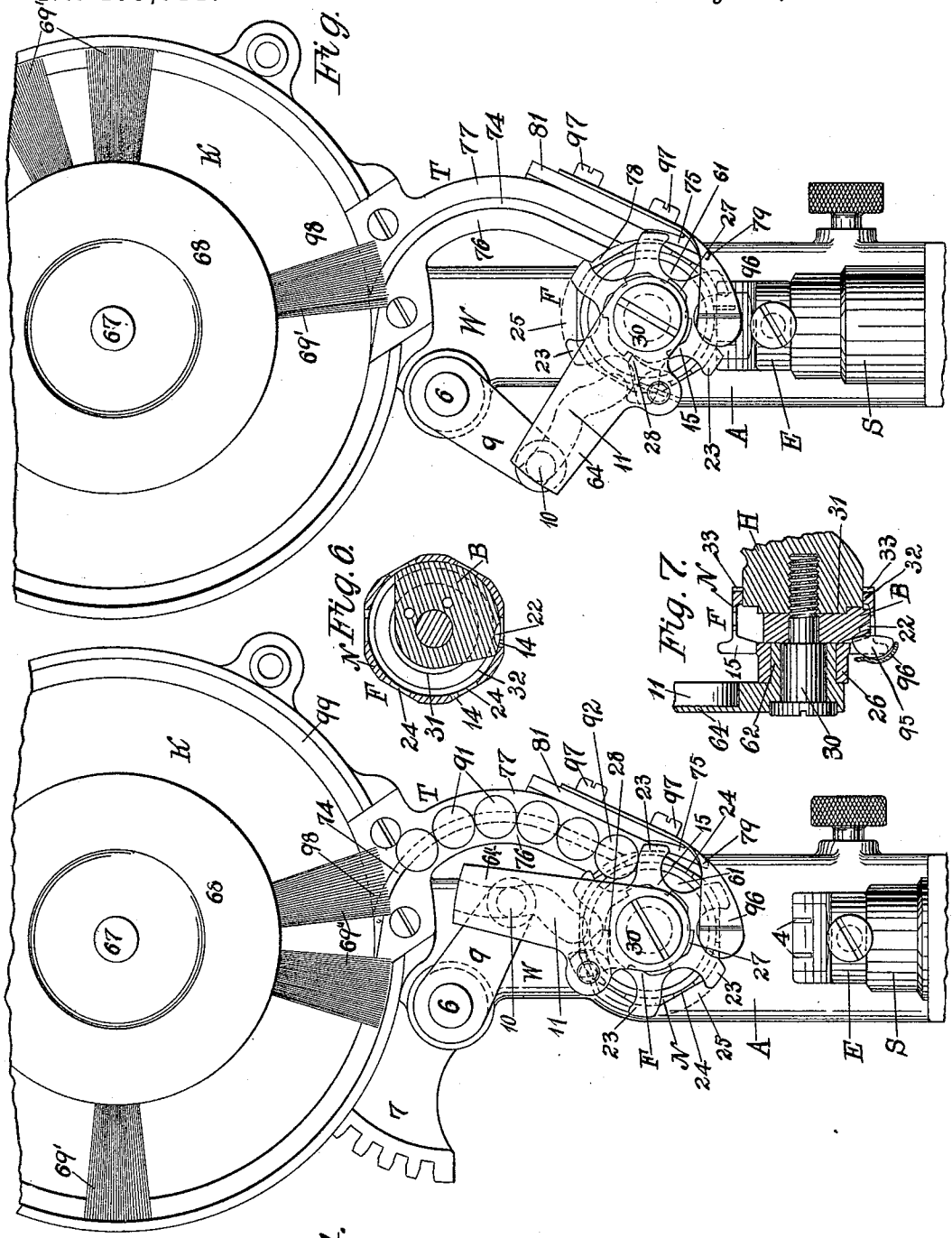


Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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F. H. RICHARDS.

BUTTON SETTING MACHINE.

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Fig. 10.

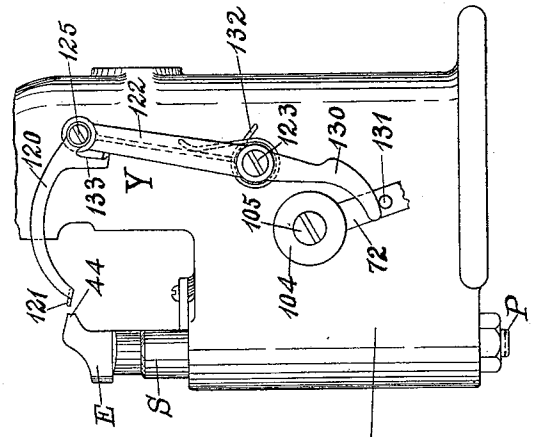


Fig. 17.

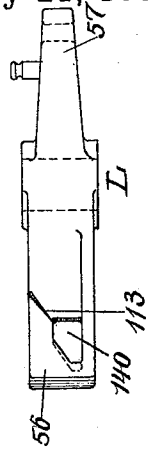


Fig. 9.

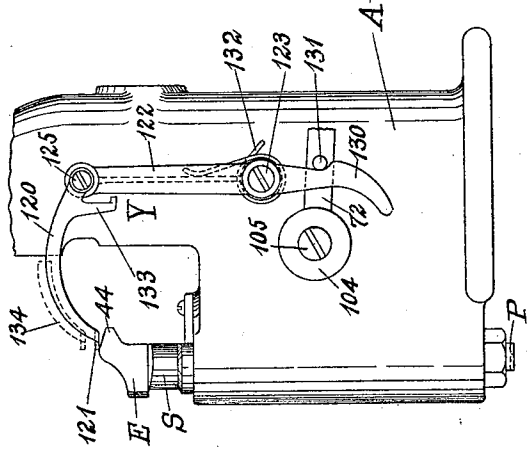


Fig. 11.

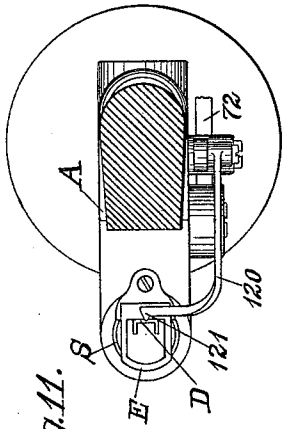
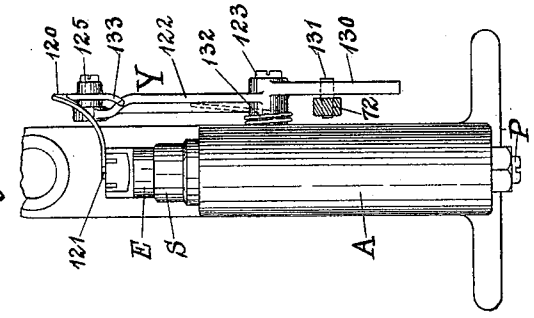


Fig. 8.



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UNITED STATES PATENT OFFICE.

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BUTTON-SETTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 403,611, dated May 21, 1889.

Application filed April 16, 1888. Serial No. 270,863. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS H. RICHARDS, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Button-Setting Machines, of which the following is a specification.

This invention relates to machinery for attaching shank-buttons to shoes or fabrics by means of malleable metallic fasteners.

The invention has for its object to furnish an improved automatic machine of that class provided with improved button-feeding apparatus for presenting buttons to the fastener-setting mechanism. For the attainment of this object the invention consists in certain improvements on the button-setting machine described in my application for Letters Patent of the United States, Serial No. 248,982, and in the combinations hereinafter more fully set forth.

In the drawings accompanying and forming a part of this specification, Figure 1 is a front elevation of a button-setting machine embodying my improvements. Fig. 2 is a side elevation of same as seen from the right hand in Fig. 1. Fig. 3 is a vertical sectional elevation of the machine with the various parts thereof in the same positions as in Fig. 1. Figs. 4 and 5 are enlarged front elevations of that part of the machine carrying the button-feeding mechanisms, and show said mechanism in two different positions. Fig. 6 is a vertical section of the feed-wheel and setting-die. Fig. 7 is a vertical section through the feed-wheel and die, taken at ninety degrees from the section-line in Fig. 6 and corresponding to a part of Fig. 3. Figs. 8, 9, 10, and 11 show the construction and illustrate the operation of the indicator when constructed to be automatically withdrawn prior to setting the button. Figs. 12 and 13 show the construction and illustrate the operation of a simpler form of indicator. Fig. 14 is a vertical section of a part of Fig. 2, showing a means for removably holding in place the button-reservoir. Fig. 15 shows a portion of the driving mechanism in Fig. 3, but with the parts in a different position. Fig. 16 illustrates an alternate construction of the connecting-rod 49, Fig. 3. Fig. 17 is a view of the lower side of clutch lever or arm L, Fig. 15.

Similar characters designate like parts in all the figures.

The frame of the machine, designated in a general way by A, consists or may consist of a hollow casting, substantially as shown, adapted to be supported on a table, J, or otherwise, and to carry the several parts of the respective mechanisms. Said frame has bearings for a vertical presser-slide, S, for the magazine M and for the rock-shaft R. It is also constructed to rigidly hold the frame H of the button-feeding apparatus, which frame serves also as a head to carry the die-block B; or the concave setting-die may be formed in the head H if this is made of proper material.

The presser-slide S is grooved on its rear face to receive the driver D, which is supposed to be the same as the driver described in my aforesaid application. The upper end of said slide is formed to receive the cap E, whose back cross-bar, 44, forms the rearward wall of the driver-channel 4, as more fully described in United States Patent No. 369,260, granted to me August 30, 1887. Said slide has its lower bearing on the stud P, fixed in the frame A, and may be depressed by the driver D.

The driver D is formed at its upper end to pass through the usual driver-channel, as 4, and may be operated by any suitable means, as the teeth of gear G, engaging with the teeth of rack V, which is fixed on the driver. Power may be applied to the oscillating segment G through a connecting-rod from the ordinary treadle mechanism, as described in United States Patent No. 311,033, granted to me January 20, 1885; but I have herein shown an improved automatic mechanism for operating said segment. This mechanism consists or may consist of a shaft, 45, on which is fixed the crank 47, and on which pulley 46 turns freely, to which pulley power is applied by the usual belt, 135. Power is communicated from the pulley to the shaft by means of the clutch mechanism shown in Figs. 1, 3, 15, and 17, which consists or may consist of a dog or collar, 87, fixed to shaft 45, a clutch-arm, 110,

pivoted at 136 between ears 88 and 89 of said dog, and whose outer end is constructed to engage with the socket 140 of the arm 56 of oscillating clutch-lever L. Said lever L is or may be actuated by the well-known treadle through the rod 82, pivoted in arm 57 thereof. Lever L is returned from the dotted position shown at 119, Fig. 3, to its normal position, there shown in solid lines, by some suitable spring, as 59, and may be limited in its movement by a stop-screw, 60, coming in contact with post 83 of base J. The connecting-rod Q is yielding and is provided with the following means for adjusting its length: The parts 49 and 50 thereof are joined together outside of a direct line between the centers 48 and 118, as at 52. The part 50 is provided with an adjusting-screw, 53, and check-nut 54, by which the distance between the centers 48 and 118 may be increased or diminished. The screw 53 is held against the foot of 49 by a stout spring, as 58, and power is communicated to the driver D through said spring. The presence of an imperfect fastener in the driver-channel, or of any other similar obstruction, will cause said spring to yield, thus avoiding any undue strains or liability to breakage. In Fig. 16 the part 50 of connecting-rod Q is constructed to allow the part 49 to pass through it. Adjustment between the points 48 and 118 is made by means of the nuts 116 and 117 turning upon a threaded portion of 49. Said nuts are held in contact with the upper part of 50 by the spring 58 and nut 115.

The presser-slide S is moved up by the driver acting through some spring suitably arranged therefor. A preferred construction and arrangement of this feature is as follows: The slide is formed hollow to receive a push-spring and a sliding plug, 19, (as shown in my said application,) and has a stop-screw, 17, whose point stands in a groove (not shown) formed in said plug 19. On the upward movement of the driver its projecting part 20 strikes the lower end of plug 19, which pushes up on the spring and thus lifts the slide S up against the button-carrier or against the fabric or material laid thereunder. In practice these several parts should be so proportioned and adjusted that the driver carries a fastener about to the top of the driver-channel before the slide is lifted.

Fixed in or to the upper part of frame A there is a head or bracket, H, to which the die-block B is attached, and which is provided with a stud, 30, for carrying the feed-wheel. This die-block has formed therein the usual concave setting-die, 22, whose position is immediately over the driver-channel 4.

For presenting the buttons to the setting-die in proper position to be attached to the fabric, I employ a revolving carrier or feed-wheel, F, which is an improvement on that described and claimed in United States Patent No. 319,507, granted to me June 9, 1885. This carrier consists or may consist of a disk, 15, (formed either conical, as shown, or flat,) provided with teeth 23 and having a hub, 26, provided with a ratchet, 27. Said disk serves also as a stop-plate to prevent the buttons being pushed up too far by the fabric on the presser-slide during the operation of the machine. Upon the rearward face of carrier F there is a flange or guide, N, which lies close to and extends under the lower side of the die B. In this flange or rim there are formed suitable spaces, openings, or pockets, as 24, for receiving the shanks of buttons whose heads lie in the pockets 25, that are formed in disk 15, between the teeth 23, which teeth, in the preferred form of wheel F, extend outside of rim N. Said shank-receiving spaces or cavities 24 serve the purpose of the cavity of similar outline which in my aforesaid patent, No. 369,260, is shown formed in the setting-die itself. By this means the button-shanks are carried to position under and away from the setting-die in a very regular and certain manner. At one side of space 24 there is a lateral cut or slot, 14, through which the fastener-point passes after it turns downward during the setting operation. Without the cut 14 it would be necessary for the opening 24 to be wider on that side. This would be objectionable, because it would take away to some extent that part of the rim N which guides the button shank or eye, and also because such enlargement would allow the leather or fabric to be pushed up therein, so the point of the fastener could re-enter the same. On its rear edge the rim N has some suitable detent-notches, as 33, formed therein, and an ordinary detent-spring, 34, Fig. 2, is constructed and arranged to bear in said notches for properly holding the wheel F in place during the fastener-setting operation.

The conically-formed button-reservoir K is supported on a bracket, W, on the main frame, and has at its large end the usual front plate, 35, suitably secured thereto by screws 137. The reservoir is provided with an ordinary button-chute, T, leading therefrom, and within has the usual means (as, for instance, the oscillating brush 68, provided with bunches of bristles 69′ 69″, or other devices for like purposes) for directing the buttons into said chute. This device may be carried or actuated by an oscillating shaft, 67, extending through the reservoir and having suitably affixed thereon a toothed segment, 8, engaging with the toothed segment 7, which latter is connected by a rod, 71, to the arm 72 of the rock-shaft R. By means of this or other ordinary arrangement of connections the brush has or may have imparted thereto a rotary reciprocating movement corresponding to the vertically-reciprocating movement of the driver D. The hopper being conical, as shown, the movement of the brush in stirring up the buttons naturally drives them forward toward the cover 35, after a well-known principle.

For the purpose of actuating the feed-wheel

F the following preferred arrangement of connections may be employed: The shaft 6, having the segment 7 affixed to its rear end, carries on the front end thereof an arm, 9, said arm having at its outer extremity a cam-roll, 10, working in the cam-groove 11 of arm 64. The feed-wheel has thereon suitable ratchet-notches, as 27, and the arm 64, pivotally supported in front of said wheel, carries the pawl 28, which engages with said notches. By this means the rotary reciprocating movement of shaft 6 imparts an intermittent rotary movement to the feed-wheel in a well-known manner. The shape of groove 11 is made suitable, substantially as shown, to modify the movement of arm 64 to properly conform in time to the movement of the driver and presser slide, for it is found that the normal movement of said arm when said groove is a straight one does not so conform.

The button-chute T, (having the usual groove, 74,) leads downward and laterally, (unless the reservoir be located otherwise than as shown,) and terminates adjacent to the setting-die in a curved part, 75, conforming to the button-carrier described above. In Figs. 4 and 5 this arrangement is the more clearly shown. The groove 74 is a channel formed between the two ribs or sides 76 77 of the chute T. The rib 76 terminates adjacent to the upper part of frame H, leaving space enough at 78 for the passage therein of the rim N of the button-carrier F. The inner wall of space or channel 75 is formed by the curved button-guiding edge 61 of the part 14. The rib 77 extends farther downward and terminates in a curved guide or button-guiding finger, 79, which forms the outer wall of the curved space 75, which space should in practice and as shown in Fig. 4 be wider than groove 74, so that a button-shank may lie therein outside of the rim N. This arrangement is found to give the best results, and ordinarily avoids the clogging of the feed-wheel by slightly imperfect buttons. Usually a short guard, 81, is formed on rib 77 at the point where the buttons are entering the feed-wheel, for the purpose of steadying the buttons and to assist in properly guiding their shanks into the spaces 24. A suitable guard or chute-cover, as 90, is provided and properly arranged for holding the buttons 91 92 from being thrown out of the chute. Before arriving at position in readiness for attaching to a fabric the button is carried by the feed-wheel under a spring-guide, 96, which I ordinarily attach to the machine by screws 97. This guide serves to retain the button in the feed-wheel at and bears firmly on the button at 95. The particular manner in which such bearing should be made is well shown in Fig. 7. The end of spring 96 is here shown concaved and arranged to bear backward and upward on the head of button 95, below the center thereof, thereby holding the head up into pocket 25 and the shank firmly up into space 24 and against the underside of the setting-die B.

The button-chute groove 74, as will be seen in Fig. 4, leads out of the reservoir K at an angle, the wedge 98 lying between said groove and the circumferential channel 99. By this arrangement the brush 69 is the feeding-brush and 69′ are the retracting-brushes.

In Figs. 2, 12, and 13 the operation of the indicator is illustrated. This device consists of an arm, 122, pivoted at 123 and normally held against stop-pin 139 by the usual flat spring, 124. On said arm at 125 is pivoted an arm, 120, which terminates at 121 in a point directly under the setting-die. The movement of arm 120 on stud 125 is limited by the pin 126, fixed in arm 122 and working in the hole or slot 127 in the lower end of arm 120. The operation of this device is as follows: The shoe or fabric being properly marked to indicate the positions where the buttons are to be set, the arm 120 is lifted from the position shown in Fig. 2 to that shown in Fig. 12 when the fabric is placed under point 121 thereof, one of the marks on said fabric being made to coincide with said point. If now slide S be moved up, point 121 of indicator Y will swing back and up and out of the path of the fastener to the position shown in Fig. 13.

Figs. 8, 9, 10, and 11 illustrate an indicator arranged to operate automatically by means of a pin, 131, on arm 72, engaging with the depending end 130 of lever Y. The arm 120 is here provided with a projection, 133, which stops against arm 122. The spring 132 is here shown as a spiral one laid about the hub of Y. When arm 72 moves down, forcing up slide S, point 121 is moved back by pin 131, working on cam 130, as shown in Fig. 10.

The flange N has at its rear edge an internal enlargement or re-entrant rim, 32, which takes its bearing on head H, (or on the die,) and serves to strengthen the said flange, which flange is necessarily thin, and is much weakened by the cutting through it of the button-receiving pockets. The die B fits about the stud 30, which holds said die against the head H and in engagement with the shoulder 31 thereof. This shoulder then receives the pressure due to the upward thrust of the driver. The arm 64 has, preferably, a hub, 62, extending within wheel F, whereby sufficient steadiness is secured without too close fitting; also, said arm rests against the die and cannot cramp the feed-wheel between it and the die. In practice this precaution is of considerable importance.

The operation of the machine is as follows: The usual button-fastener magazine, M, and the reservoir K being properly supplied and buttons fed down in the chute to the setting-die, and the pulley 46 being set in motion in the direction shown by the arrow in Fig. 1, the rod 82 is drawn down by any suitable means, as by the treadle aforesaid, thus lift-

ing end 56 of lever L and liberating arm 110, which arm is moved laterally by pin 127 and spring 128, the ear 112 being thereby engaged with notch 138 in the hub of pulley 46. Shaft 45 is thereby set in motion. Then through the crank 47, connecting-rod Q, and lever G the usual vertical reciprocating movement is imparted to the driver D. If the rod 82 be now released, the lever L will be returned by spring 59 to its original position, with stop-screw 60 against post 83, and arm 110 will enter camway 113 of lever L, as shown in Fig. 15, and, continuing its rotation, the ear 112 will be withdrawn from notch 138 and shaft 45 will come to rest, with the end of arm 110 resting and locked in socket 140.

The button-fastener magazine M is not shown in detail in this application, since it may be any magazine ordinarily used for the like purpose. It may, for instance, be the same as that designated by "M" in my United States Patents No. 311,033, dated January 20, 1885, No. 319,507, dated June 9, 1885, No. 341,053, dated May 4, 1886, No. 341,054, dated May 4, 1886, or No. 369,260, dated August 30, 1887. Any of these several forms or constructions of the magazine are readily adaptable to use in connection with my present improvements.

Having thus described my invention, I claim—

1. In a button-setting machine, the fixed setting-die, the presser-slide, the driver, the driving-crank having a fixed throw or stroke, and mechanism, substantially as described, connecting said crank and driver, said connecting mechanism having therein a spring arranged to yield on the fastener meeting obstructions, all substantially as described.

2. In a button-setting machine, the combination of the fixed setting-die, the driver, the revolving driving-crank, and mechanism, substantially as described, connecting said crank and driver, said connecting mechanism having therein a spring arranged to yield, as set forth, and having an adjustable stop regulating the normal relative positions of the crank and driver, all substantially as described.

3. In a button-setting machine, the combination of the head H, the feed-wheel F, having flange N and having the re-entrant rim 32, and the die B, set on said head and standing within said wheel and rim, substantially as described.

4. The combination, with the feed-wheel F and the setting-die, of the stud 30, and the feed-arm having a hub turning on said stud and within said feed-wheel, the hub extending within said wheel to said die to serve as a stop, all substantially as described.

5. The combination of head H, having shoulder 31, the die B, engaging said shoulder, stud 30, wheel F, and arm 64, substantially as set forth.

6. The combination, with the feed-wheel and die, of the arm 64, fitted to turn said wheel relative to said die, and the oscillating arm 9, said arm 64 having a cam-shaped groove, whereby the movement thereof by said arm 9 is timed to conform to the movement of the driver and presser-slide, all substantially as described.

7. The combination, in a machine of the class specified, of the feed-wheel actuated by arm 64, shaft 6, having arm 9, actuating arm 64, the hopper having a chute leading to said wheel, and having a rotary reciprocating brush delivering buttons to said chute, and gears 7 and 8, said hopper being removably attached to the machine, and the whole organized and coacting substantially as set forth, all substantially as described.

8. In a button-setting machine, the combination, with the presser-slide, of the indicator Y, as set forth.

9. In a button-setting machine, the combination, with presser-slide, of the indicator Y, formed in two parts pivoted together, substantially as set forth.

10. In a button-setting machine, the combination, with the presser-slide, of the indicator 120, lever 122, and a cam operating said lever, all substantially as set forth.

11. In a button-setting machine, the combination, with the presser-slide, of indicator-arm 120, having stop 133, lever 122, a cam whereby said lever is moved back, and a spring to throw the same forward, all substantially as described.

12. The combination, with the presser-slide and driver, of the rock-shaft operatively connected to actuate said driver and having arm 72, the indicator pivoted substantially as described, said arm and indicator having one of them a cam and the other resting against said cam, all substantially as described.

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