(No Model.) 2 Sheets—Sheet 1.

T. S. HUNTINGTON.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 327,169. Patented Sept. 29, 1885.

Fig: 1.

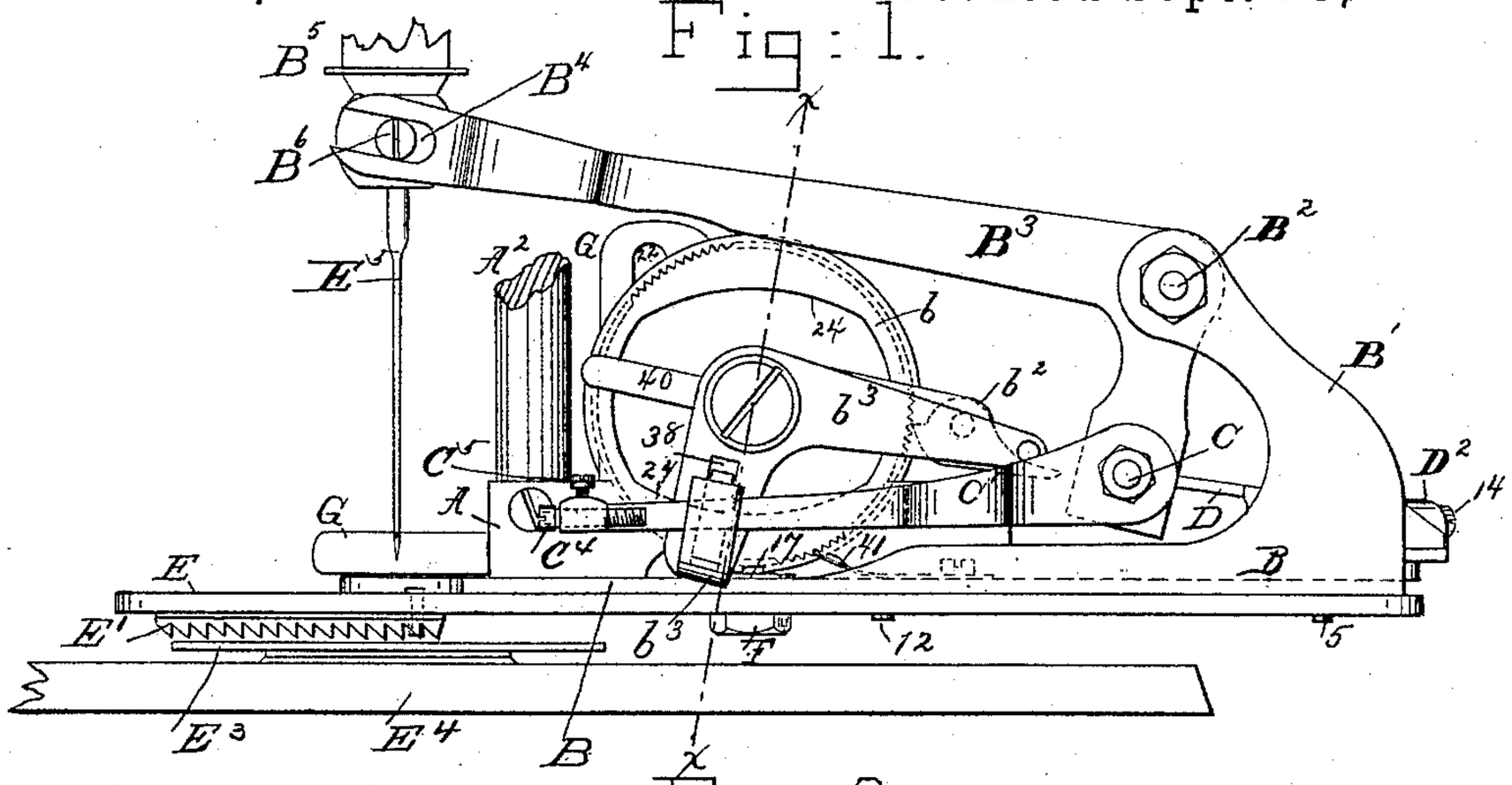


Fig: 2.

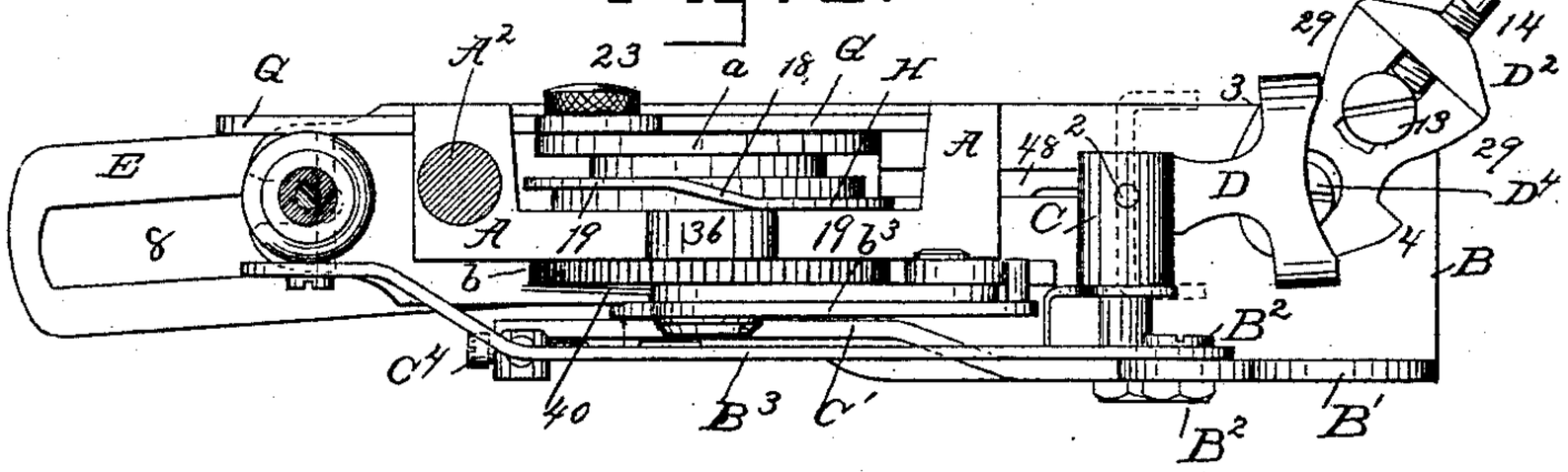


Fig: 3.

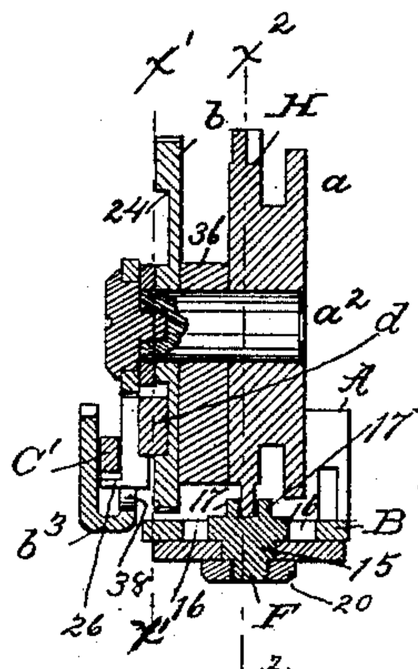


Fig: 4.

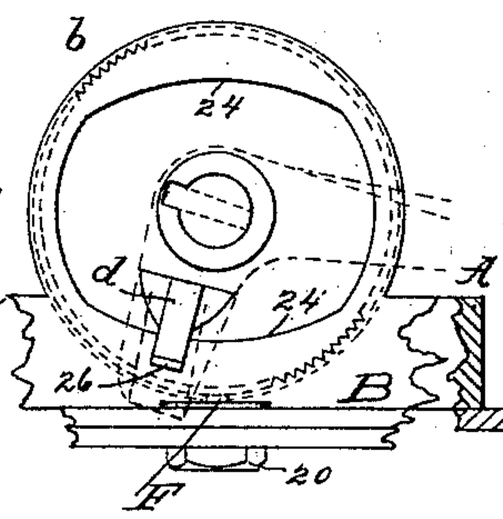


Fig: 5.

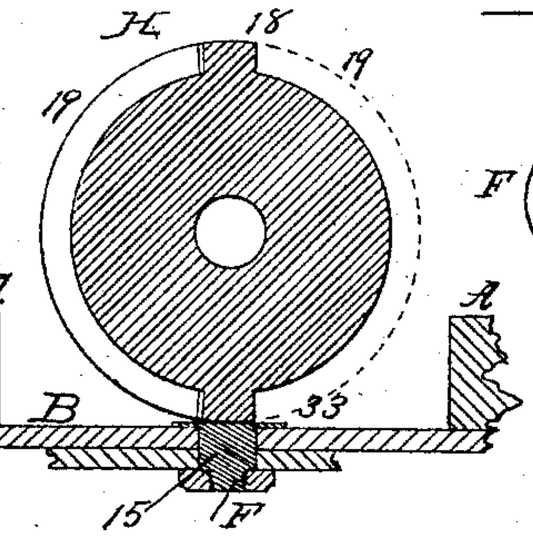
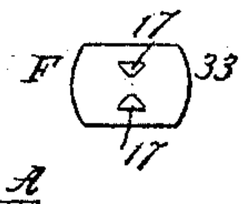


Fig: 6.



Witnesses.

Silas L. Emery.

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Inventor.

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attys.

(No Model.) 2 Sheets—Sheet 2.

T. S. HUNTINGTON.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 327,169. Patented Sept. 29, 1885.

Fig: 7.

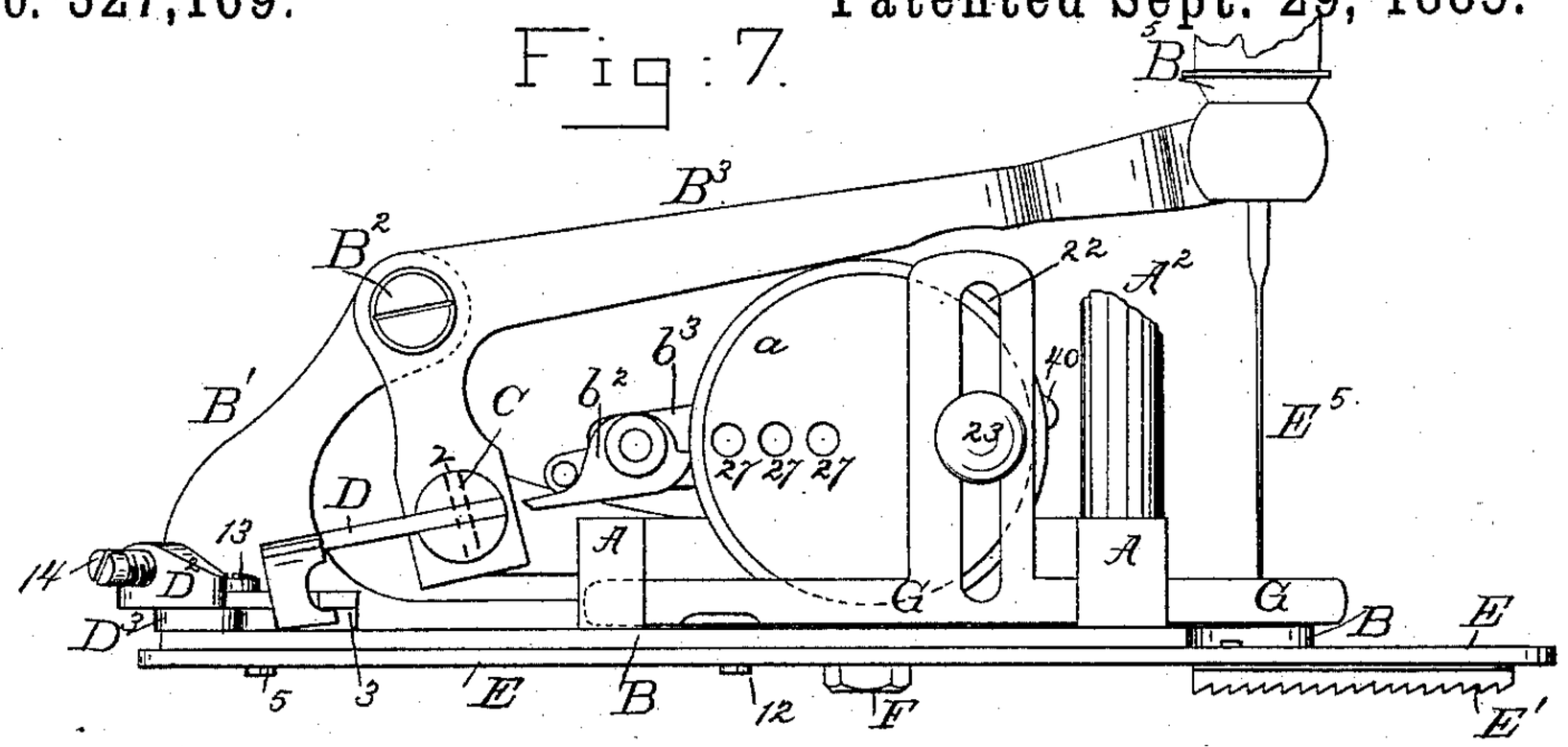


Fig: 8.

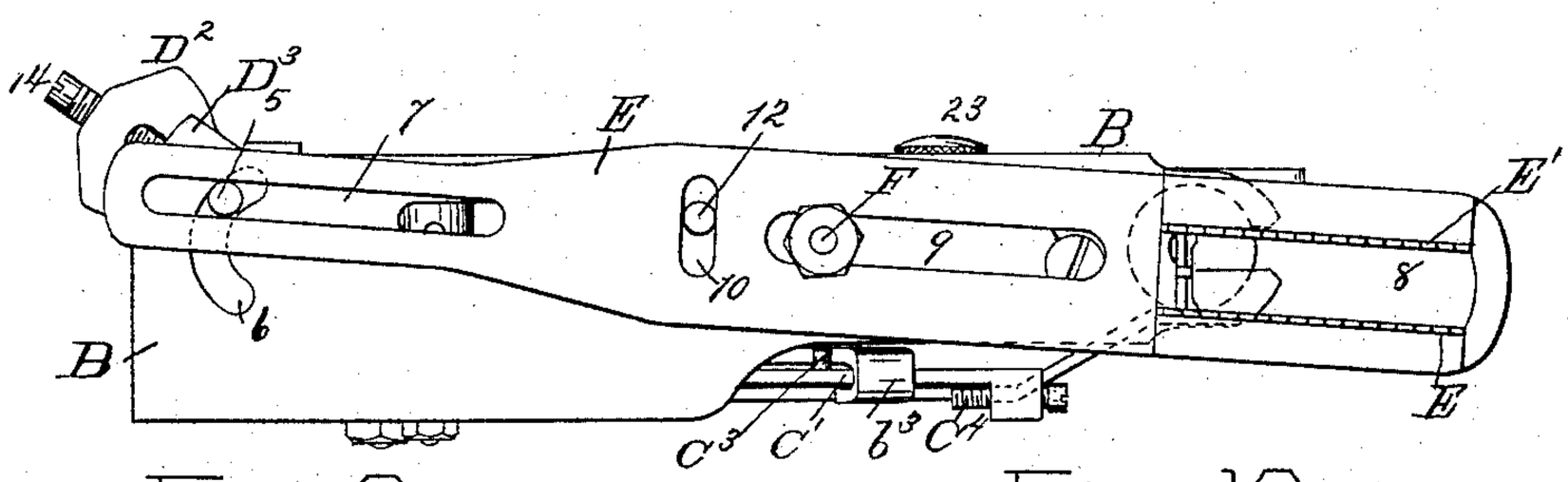


Fig: 9.

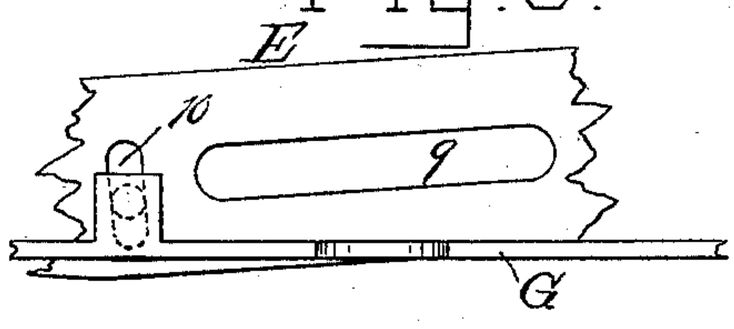


Fig: 10.

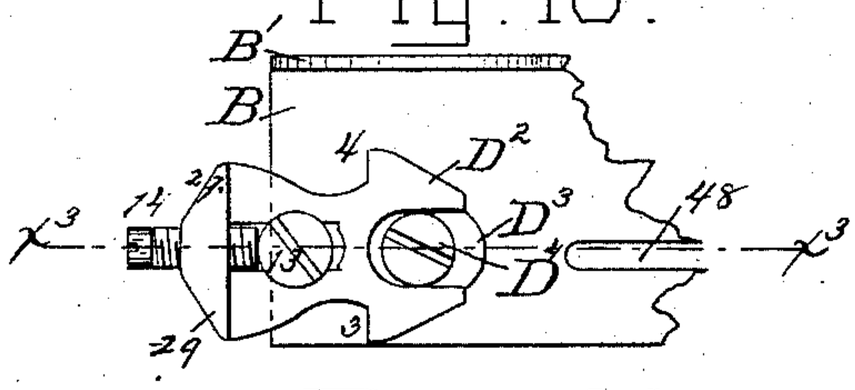


Fig: 12.

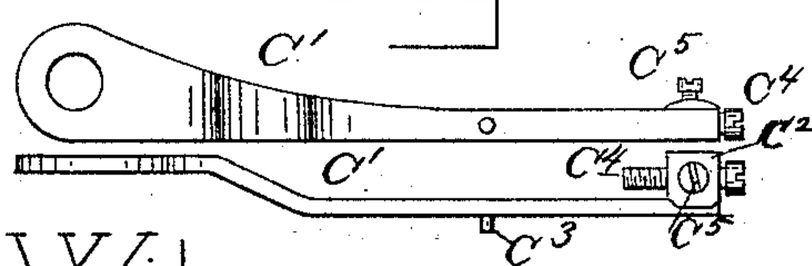


Fig: 11.

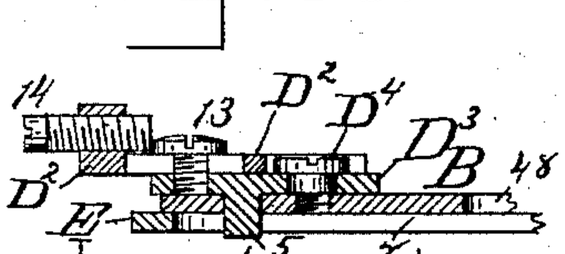
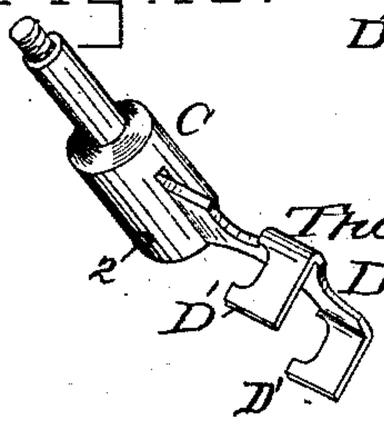


Fig: 13.



Witnesses.

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John F. C. Prentiss

Inventor.

Thomas S. Huntington.

by Crosby & Gregory

attys

UNITED STATES PATENT OFFICE.

THOMAS S. HUNTINGTON, OF NEW YORK, N. Y., ASSIGNOR TO THE NEW HOME SEWING MACHINE COMPANY, OF ORANGE, MASSACHUSETTS.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 327,169, dated September 29, 1885.

Application filed March 2, 1885. (No model.)

To all whom it may concern:

Be it known that I, THOMAS S. HUNTINGTON, of New York, county and State of New York, have invented an Improvement in Button-Hole Attachments for Sewing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention has for its object to produce an attachment readily applicable to any usual lock-stitch machine, the attachment being adapted to be secured to the usual presser-bar of the machine, the presser-foot being first removed.

The mechanism to be herein described is an improvement on that described in United States Patent No. 299,928, heretofore granted to me, the aim being to simplify the same and to provide the attachment with mechanism by which to automatically shift the cloth-feeding device when the needle reaches the end of each button-hole, to thus enable the material being stitched to be shifted under the needle so that the latter will enter the material at the opposite side of the slit, and also to provide mechanism whereby the longitudinal movement of the feeder will be uniform from end to end of the button-hole slit.

Figure 1 in elevation shows my improved attachment placed in operative position with relation to the presser-bar, needle-bar, and cloth-plate of a sewing-machine; Fig. 2, a top or plan view of Fig. 1; Fig. 3, a section of Fig. 1 in the dotted line *x x;* Fig. 4, a section of Fig. 3 in the dotted line $x' x'$, part of the pawl-carrier being shown by dotted lines; Fig. 5, a section of Fig. 3 in the dotted line $x^2 x^2$. Fig. 6 is a top view of the shifting-stud alone. Fig. 7 is a rear side elevation of Fig. 1; Fig. 8, an under side view of Fig. 7; Fig. 9, a detail showing part of the feeding-bar and its actuating cross-head or slide; Fig. 10, a detail showing the switch-block and its adjustable head; Fig. 11, a section of Fig. 10 in the dotted line $x^3 x^3$; Fig. 12, the pawl-moving arm detached; and Fig. 13, a detail of the switch-pawl alone.

The bed A of the attachment, having a hole for the reception of the lower end of the usual presser-bar, A^2, has a bottom plate, B, attached to its under side by suitable screws, and the said bottom plate near its rear end has an upwardly-extended bracket, B′, on which is pivoted, by screw B^2, the elbow-lever B^3, slotted at its front end, as shown at B^4, or otherwise shaped in usual manner to be engaged by or with a part of the needle-bar B^5, or the head of the needle-holding screw B^6, the needle-bar effecting the vibration of the said lever.

The downwardly-extended short arm of the said lever B^3 receives a pin, C, which serves as the pivot for the pawl-moving arm C′, (see Fig. 12,) having a projection, C^3, and an adjustable pawl-restoring projection, C^4, held on it by a screw, C^5.

The head of the loose pin or bolt C is slotted, and has pivoted to it by pin 2 the switch-pawl D, having preferably two hooks, D′, one of which in the movement of the said switch-pawl upon its pivot 2 catches upon either the horn 3 or 4 of the adjustable head D^2 of the switch-block D^3, pivoted to the bottom plate B by the screw D^4, the said switch-block having a pin, 5, which is extended down through a curved slot, 6, (see Fig. 8,) in the bottom plate B, and into a longitudinal slot, 7, of the feeding bar or device E, having teeth or serrations E′ at its front end to rest upon the surface of the cloth or other material containing the button hole which it is desired to edge-finish, the said material being supported, as in the patent referred to, by a pivoted equalizing-plate, E^3, (shown only in Fig. 1,) surrounding the usual needle-throat in the bed E^4 of the machine.

The feed-bar is slotted longitudinally at 8 for the passage of the usual needle, E^5, the slot being of sufficient width and length for the longest button-hole and to accommodate for the greatest width of overstitch. The feed-bar is also slotted longitudinally at 9 and transversely at 10, the slot 9 receiving the foot of the shifting-stud F, which serves as a fulcrum for the feeding-bar during its oscillations and also while the feed-bar is being moved backward and forward longitudinally, the slot 10 receiving a pin, 12, of a sliding cross-head, G, the said pin being extended downward through a slot, 48, in the bottom plate B. (See Figs. 9, 10, and 11, the plate B being omitted from the detail, Fig. 9.) The head D^2 of the switch-

block D^3 is slotted, and receives through its slot the screw 13, which confines the said switch-block in its adjusted position, the adjustment of the head D^2 on the block D^3 being made by the screw 14, carried in an ear of the said head and impinging by its point against the head of the said screw, turning the screw in, causing the movement of the horns 3 4 away from the center of motion of the switch-block and enabling the switch-pawl D to sooner catch upon and move the said horns and turn the switch-block for a greater distance, the greater the movement of the switch-block the greater the extent of vibration of the feed-bar, and consequently the greater the lateral movement of the material with relation to the center line of the button-hole on each side, the vibrations of the feed-bar when the latter is being moved longitudinally to stitch one side of the button-hole being from the center of the button-hole to one side only, the vibrations of the feed-bar when the other side of the button-hole is being stitched being in like manner from the center line of the button-hole in the opposite direction.

The vibrations of the feed-bar from the center line of the button-hole in each direction, as stated, is accomplished automatically through the shifting-stud F.

The shifting-stud F has a shank, 15, (see Fig. 3,) of a diameter to just fit the slot 9 (see Fig. 8) in the feed-bar E. The head 33 (see Fig. 5) of the said stud enters the transverse slot 16 (see Fig. 3) of the bottom plate B, the upper side of the said head having two projections, or they may be pins 17 17, between which enters the thin edge of the cam-disk H, the latter having two cam shaped portions, one of which is shown at 18, each cam-shaped portion as it comes between the said projections 17 17 (see Figs. 1, 3, and 6) causing the shifting-stud F to be moved laterally in the slot 16 of the said bottom plate, the straight portions 19 of the cam-disk at the sides of the cam portions 18 thereafter serving to hold the said shifting-stud in place in suitable position while each side of the button-hole is being stitched. The shifting-stud F is threaded at its lower end to receive a nut, 20, which is turned up against a shoulder on the shank 15, the nut just touching the under side of the feed bar and keeping it up against the under side of the bottom plate B.

The switch-pawl may be turned up, as in dotted lines Fig. 2, thus disengaging it from the head of the switch-block in case it is desired to simply stitch around the button-hole to be made prior to overstitching it, such line of stitching made near the edge of the slit prior to overstitching the same forming a stay for the material at the edge of the button-hole, and being especially desirable with thin or loosely-woven material.

The cross-head G referred to, it having its ends guided in slots of the bed A, so that the cross-head may slide longitudinally, is provided with a slot, 22, (see Fig. 7,) which receives a crank-pin, 23, attached to a disk, *a*, mounted on a short shaft, a^2, (see Fig. 3,) having its bearing in an upright, 36, (see Fig. 2,) of the bed A, the said shaft having connected with it not only the cam-disk H, referred to, but the ratchet-wheel *b*, the rotation of the said shaft intermittingly being controlled by a pawl, b^2, (see Fig. 1,) on the pawl-carrier b^3, mounted on the said shaft loosely.

The lower end of the pawl-carrier b^3 (see Figs. 1 and 8) is made U-shaped, (see Fig. 3,) to receive the pawl-moving arm C′ (see Figs. 1 and 8) in the space so formed, the projection C^3 on one side and the end of the screw C^4 in the collar C^2 on the other side of the U-shaped end of the pawl-carrier being the means which are employed to strike against the pawl-carrier b^3 and vibrate the pawl b^2 the desired distance.

The crank-pin 23, (see Fig. 7,) entering the slot 22 of the cross-head, will, it is obvious, gradually approach two dead-points during each full rotation of the disk *a*, and, if other provisions now to be described were omitted, it is obvious that the extent of the longitudinal reciprocations of the feed-bar E would vary and the stitches would be gradually shortened as the said crank-pin approaches the dead-point.

To obviate the shortening of the stitch, I have provided the ratchet-wheel *b* with cam-surfaces 24, (see Figs. 1, 3, and 4,) two such surfaces being herein employed, because the ratchet-wheel is placed on the shaft a^2, which carries the crank-disk *a*.

The pawl-carrier b^3, at its inner side, is provided with a slot, 38, (see Figs. 1 and 3,) which receives the pin 26 of the equalizer *d*, made as a plate, (see Figs. 3 and 4,) interposed between the face of the ratchet-wheel *b* and the rear side of the pawl-carrier b^3, the under side of the said equalizer resting by gravity against the cam-surface 24 of the ratchet-wheel under it, the said cam-surface, during the rotation of the said ratchet-wheel, acting to raise and lower the equalizer *d*, and cause its pin 26, extended under the pawl-moving arm C′, to lift the latter, so that its projection C^3 and the screw C^4 in the collar C^2 act against the U-shaped end of the pawl-carrier b^3 at a greater or less distance from its center of motion, which is the shaft a^2, the nearer the equalizer to the said shaft a^2 the greater the stroke of the pawl b^2, the excess of stroke taking place gradually, as indicated by the cam-surface 24, to thus make up for the lost movement of the cross-head due to the approach of the crank-pin to its dead-center, the cam-surface 24, the equalizer, and the arm C′ and pawl co-operating together in such order as to result in obtaining a step-by-step motion of equal length for the cross-head moved by the crank-pin, and consequently for the feed-bar connected with it, thus insuring equal spacing of the stitches from end to end of the button-hole, and that automatically.

To alter the length of stitch, it is only nec-

essary to adjust the screw C^4 in the collar C^2 of the arm C', securing the screw C^4 in position by means of the set-screw C^5.

Button-holes vary in length, and provision has to be made for moving the feed-bar E a greater or less distance in one and then in the opposite direction with relation to the length of the button-hole, and to do this I have provided the disk *a* with a series of holes, 27, arranged in a diametrical line, each hole being tapped to receive the crank-pin 23 in that one of them which is located at the proper distance from the center of the shaft a^2, the farther the crank-pin from the center of the said shaft the longer the button-hole.

The series of holes 27 are in a diametrical line at right angles to a line drawn across the disk *a* through the center of the cam-surfaces 24, such position being thereby insured for the crank-pin with relation to the said cam-surfaces of the cam-disk H as to compel the lateral movement of the shifting-stud F at each extreme of the stroke of the said crank-pin, and consequently at the end of each button-hole.

The head D^2 of the switch-block (see Fig. 2) has two cam-projections, 29 29, at the rear of the horns 3 and 4, so that the hooked projections of the switch-pawl are struck by one or the other of the said hooked projections, to thus swing the head and the switch-block in one or the other direction, a reverse movement being given to the switch-block by that one of the hooked projections of the pawl D which is at the opposite side of the center of the head D^2, as the said hooked projection in the upward movement of the long arm of the lever B^3 is drawn against that one of the horns 3 or 4 which is farthest from the pivotal point of switch-pawl.

I do not desire to limit my invention to the employment of a ratchet-wheel having teeth, and a pawl having a point to engage the said teeth, and instead I may use any usual substitute—such, for instance, as a friction-clamp, as is used in feed-wheels of sewing-machines. The spring 40 (see Figs. 1 and 2) acts as a detent for the wheel *b*, and the spring 41 keeps the pawl b^2 in engagement with the wheel *b*.

Button-holes vary in shape or have eyes more or less round at each end. This variation in shape may be provided for in my attachment by varying the shape of the cam portion of the cam-disk H, as by making a more or less abrupt bend in the said portion at the point where it controls the movement of the clamp while the needle is stitching at the end or round part of the hole or slit.

I claim—

1. In a button-hole attachment for sewing-machines, a bed, a bottom plate provided with a bracket, a lever pivoted thereon, a loosely-connected switch-pawl having two hooked projections, and the switch-block having a pin, and the head of the switch-block provided with two horns and cam projections, combined with the pivoted feed-bar to vibrate the latter, substantially as described.

2. In a button-hole attachment for sewing-machines, the combination, with a feeding-mechanism and a switch-block, D^3, having an attached head, D^2, a horizontal adjusting-screw, 14, arranged in an ear of the head, and the attaching and connecting screw 13, substantially as described.

3. The feed-bar E, having the slots 10, and cross-head G, connected to said feed-bar by a pin engaging the slot therein and extending thence into the bottom plate, the slotted bed in which the cross-head is guided, and the bottom plate, combined with the disk *a*, having a crank-pin, 23, engaging a slot in said cross-head, a shaft for said disk, and means to rotate it, substantially as described.

4. The bed, the bottom plate, the shaft a^2 and its attached cam-disk, and the feed bar, combined with the shifting-stud engaging with and moved by the said cam-disk, substantially as described.

5. The bed, the bottom plate, the shaft a^2 and its attached cam-disk, and the feed-bar, combined with the shifting-stud engaging with and moved by the said cam-disk, and with the switch-block to vibrate the said feed-bar on the shifting-stud as a fulcrum, substantially as described.

6. The bed, the bottom plate, the shaft a^2 and its attached cam-disk, and the feed-bar, combined with the shifting-stud engaging with and moved by the said cam-disk, and with the switch-block to vibrate the said feed-bar on the shifting-stud as a fulcrum, and with the slotted cross-head disk and crank-pin to move the feed-bar longitudinally, substantially as described.

7. In a button-hole-stitching attachment, the feeding bar or device, the sliding cross-head connected therewith, the crank and crank-pin to move the cross-head, shaft a^2, a connected ratchet-wheel, a pawl to engage and rotate the said wheel, and a pawl-carrier and pawl-carrier actuating-arm provided with projections, combined with a cam and equalizer to vary the effective stroke of the pawl and the extent of rotation of the wheel *b* and equalize the feed-stroke, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

THOS. S. HUNTINGTON.

Witnesses:
WILLIAM H. HICKS,
E. T. THOMAS.