

(No Model.)

5 Sheets—Sheet 1.

J. H. REED.

BUTTON HOLE STITCHING AND BARRING MACHINE.

No. 454,068.

Patented June 16, 1891.

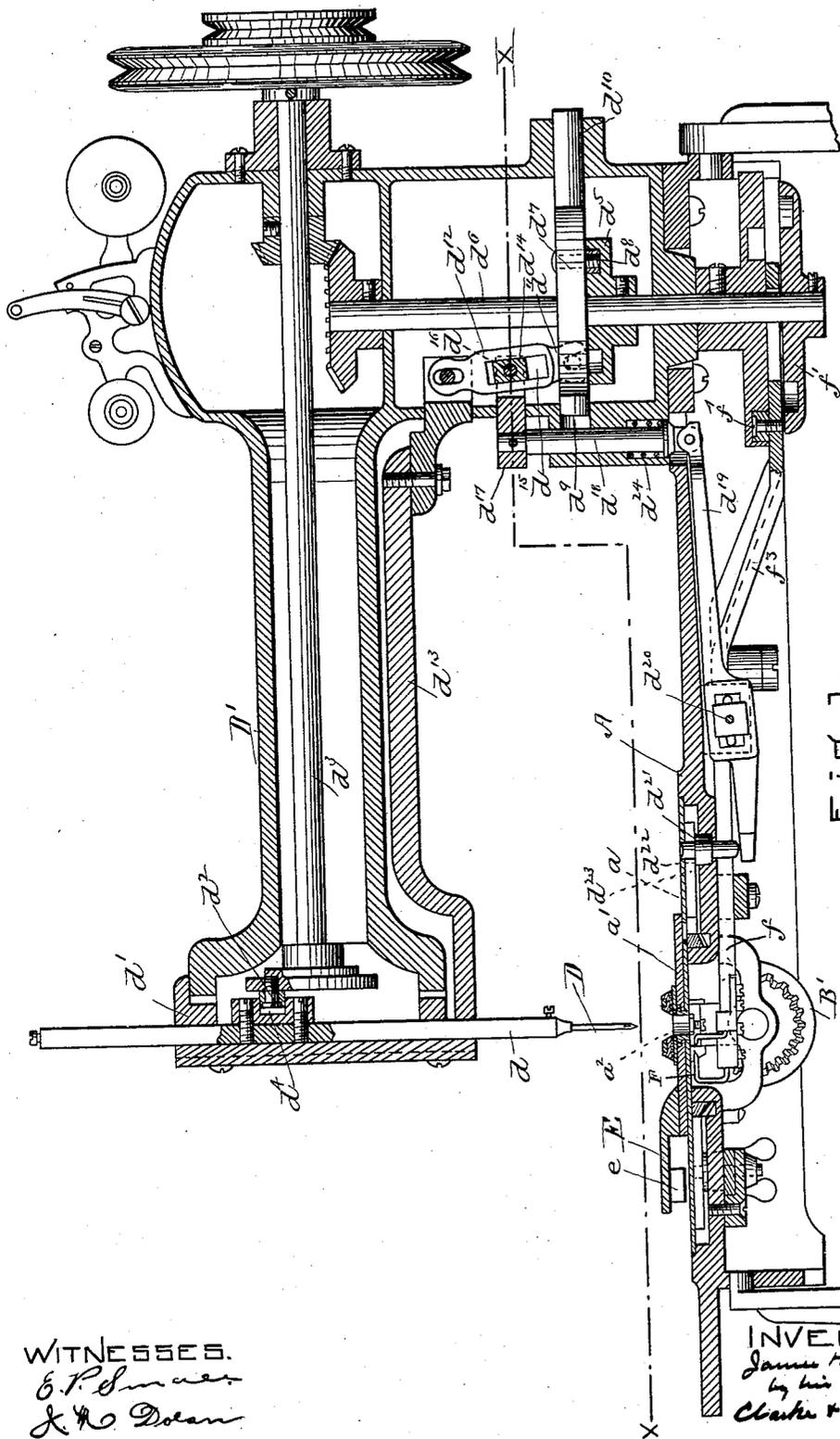


FIG. 1.

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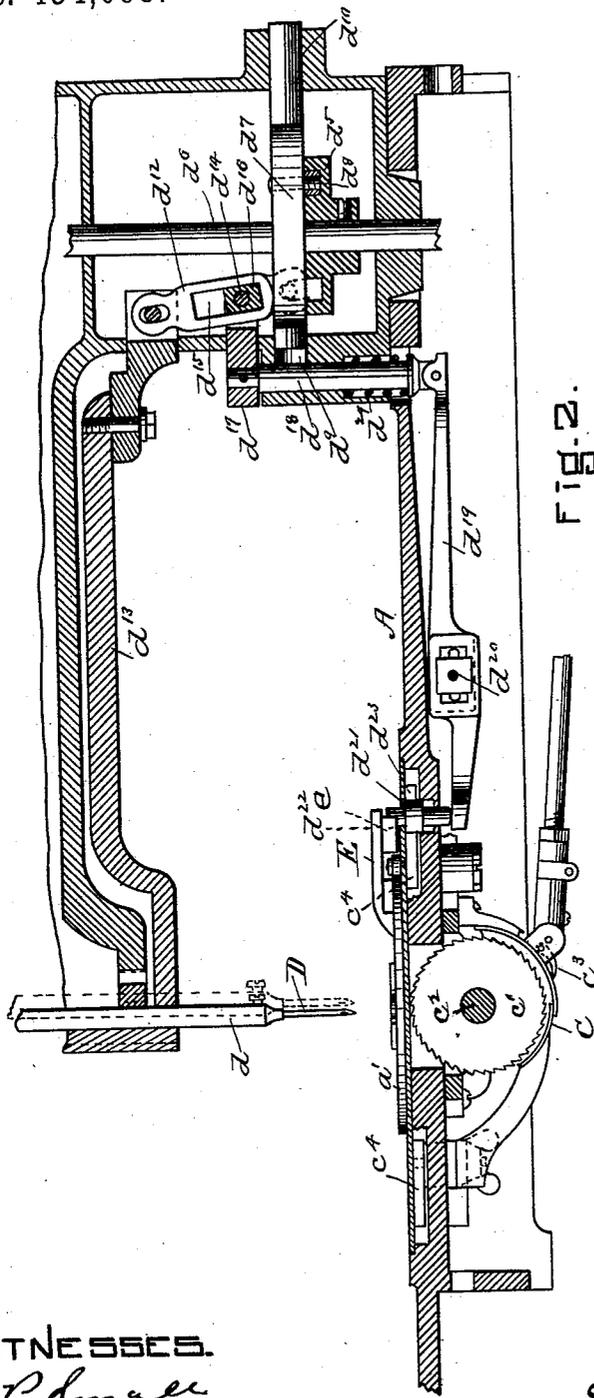


FIG. 2.

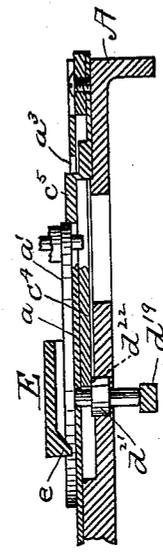


FIG. 3.

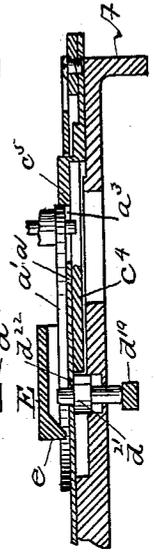


FIG. 4.

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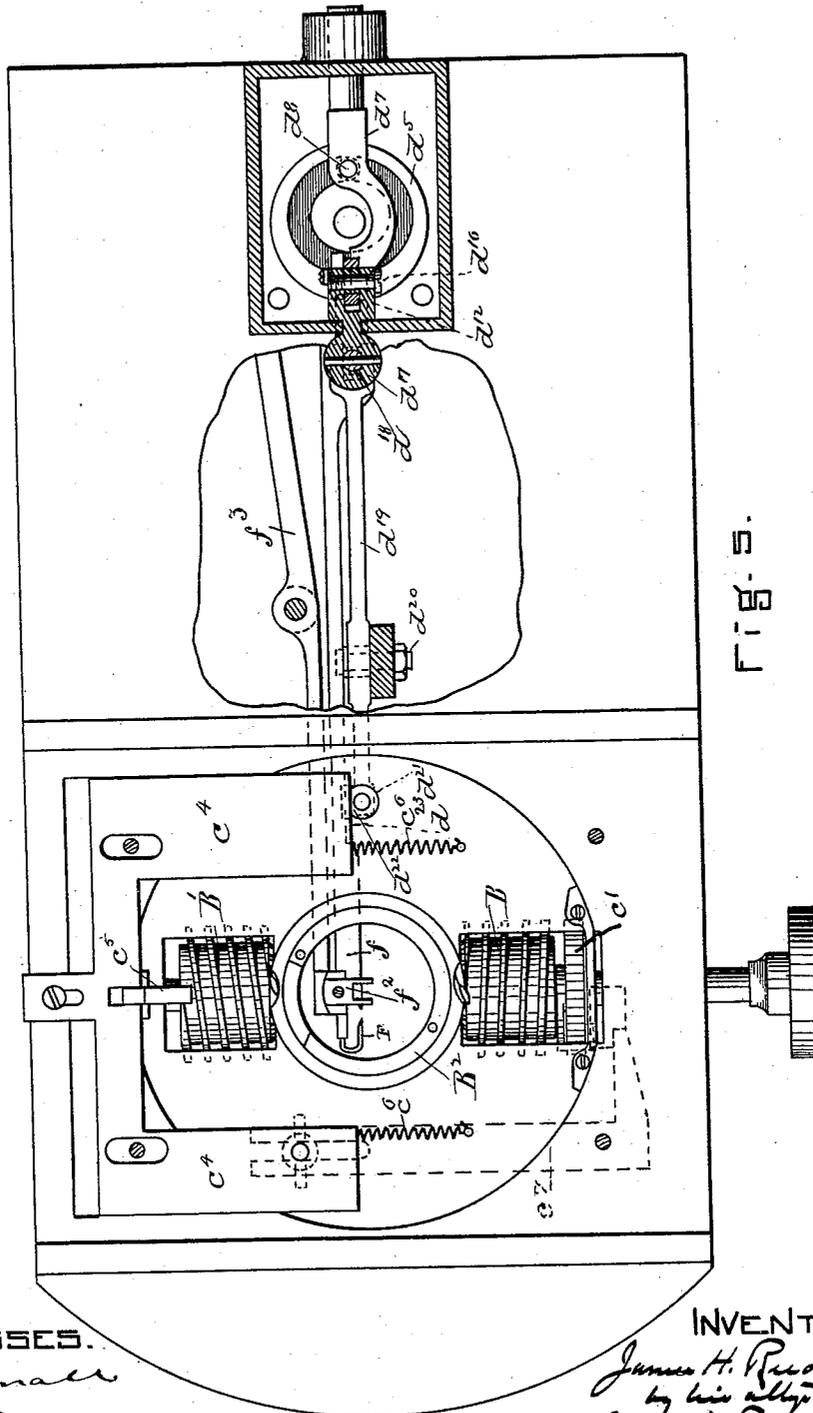


FIG. 5.

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(No Model.)

5 Sheets—Sheet 5.

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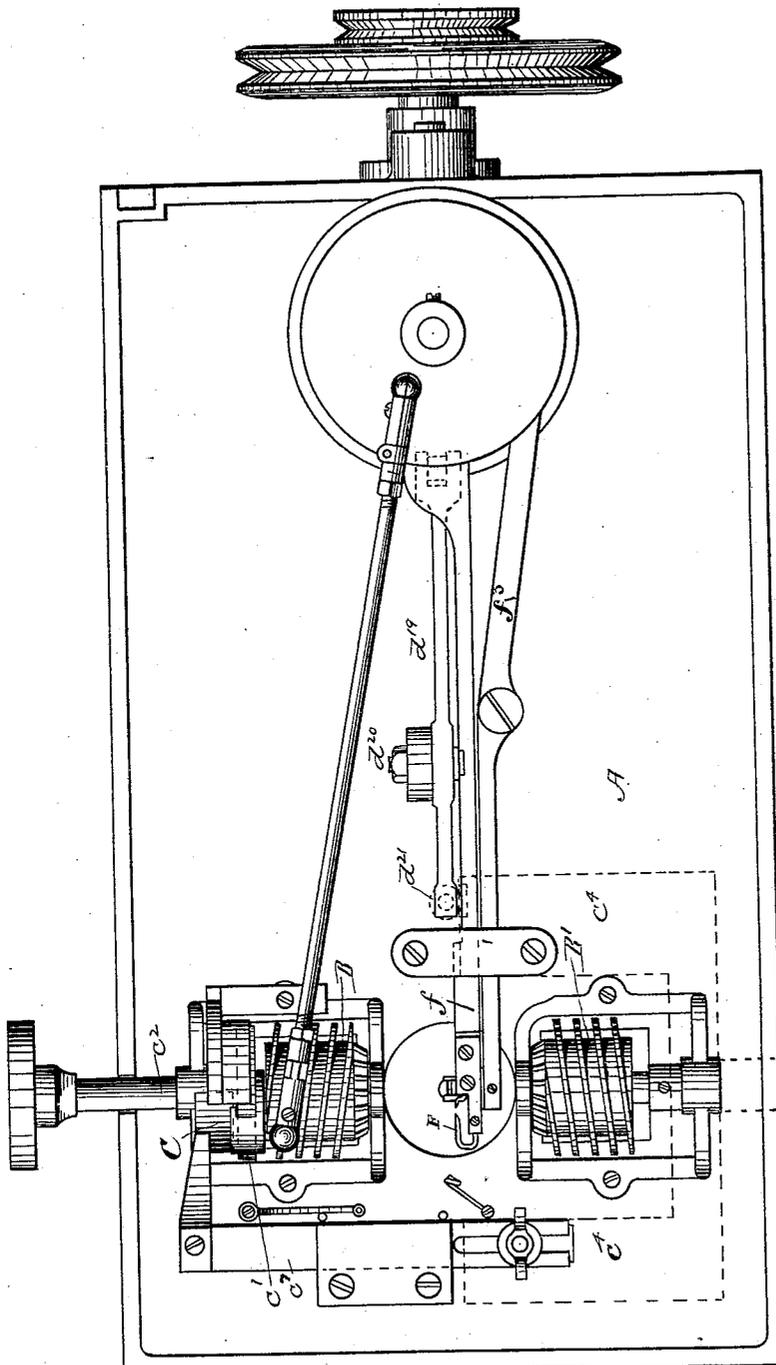


FIG. 5.

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# UNITED STATES PATENT OFFICE.

JAMES H. REED, OF LYNN, MASSACHUSETTS, ASSIGNOR TO THE GLOBE BUTTONHOLE MACHINE COMPANY, OF KITTERY, MAINE.

## BUTTON-HOLE STITCHING AND BARRING MACHINE.

SPECIFICATION forming part of Letters Patent No. 454,068, dated June 16, 1891.

Application filed May 5, 1888. Serial No. 272,960. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. REED, a citizen of the United States, residing at Lynn, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Button-Hole Stitching and Barring Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

The invention relates to a button-hole stitching and barring machine employing a single reciprocating needle, and it comprises means for presenting the button-hole and material in which the button-hole is formed to the stitch-forming devices and a reciprocating needle, which is caused, in connection with the other stitch-forming devices, to form an overlaid stitch by being moved on different vertical planes alternately to enter the button-hole slit and then the material at a uniform distance from the edge of the slit, and which movement continues during the stitching of one side, the eye, and the other side of the button-hole until the end of the button-hole slit is reached, when the needle is automatically caused to take a longer stitch between its alternate movements in different planes, whereby a barring-stitch is formed of about twice the length of the normal stitch.

The invention further relates to various details of construction and organization, all of which will hereinafter be described.

Referring to the drawings, Figure 1 is a view, principally in vertical central section, of the machine. Fig. 2 is a view upon the same section as that of Fig. 1, showing the parts in the position which they occupy in sewing the barring-stitches. Figs. 3 and 4 are detail views to which reference will hereinafter be made. Fig. 5 is a view in section and plan upon and below the line  $xx$  of Fig. 1. Fig. 6 is an inverted plan of a portion of the operative mechanism. Fig. 7 is a plan view of the top, representing the position of the parts at the beginning of the stitching of the bar. Fig. 8 is a plan view of the machine inverted.

A represents the bed of the machine, upon which is mounted the work-plate  $a$ , which carries the clamp-plate  $a'$ . The clamp-plate has suitable clamps for holding the material

upon the plate and spreading the button-hole, and it has a straightforward movement in relation to the button  $a^2$ , then a movement of a half a revolution about the button, and then a further forward movement upon a straight line imparted to it by means of the feed worm-wheels  $B B'$  and the connecting bevel-gear  $B^2$ , (see Fig. 5,) which connects the two worm-wheels  $B B'$ , meshing with bevel-gears formed thereon. The clamp-plate has a guiding-pin which enters the guiding-slot  $a^3$ , formed in the work-plate, and which is engaged by the thread of the worm-wheels in successive order and by carrying or transferring projections or fingers upon the bevel-wheel  $B^2$ . This form of mechanism for feeding the clamp-plate in relation to the button is old and need not be more fully described here.

The feeding of the clamp-plate is automatically stopped at the completion of the stitching of the last side of the button-hole by means of a pawl-covering plate  $C$ , which is caused to be moved by the clamp-plate between the ratchet-wheel  $c'$  on the shaft  $c^2$  of the worm-wheel  $B$  and the reciprocating pawl  $c^3$ , which engages the ratchet-wheel. This movement of the ratchet-covering plate is obtained by attaching the ratchet-covering plate to a slide-bar  $c^4$ , which is connected with or secured to the slide-plate  $c^4$ , (see Figs. 5 and 6,) and this slide-plate  $c^4$  is moved by the contact of the edge of the clamp-plate with a block or projection  $c^5$ , carried thereby, extending through the guide-slot  $a^3$  (see Fig. 7) into a position to be moved by the clamp-plate upon the coming in contact of its edge therewith. This construction, however, is also old, and is more fully described in Patent No. 355,028, dated December 28, 1886.

Before describing the mechanism by which the needle is caused to be automatically moved by the clamp-plate to increase the length of the stitch in barring I will first describe, briefly, the needle and manner of reciprocating it and imparting to it alternate movements upon different vertical planes.

$D$  is the needle. It is eye-pointed and carried by the needle-bar  $d$ . This needle-bar is supported in suitable bearings in a head  $d'$ , which is supported by the arm or bracket  $D'$  of the machine, and upon the end of which

it is free to be moved horizontally by mechanism hereinafter specified. The needle is reciprocated by means of a crank-pin  $d^2$  at the end of the horizontal shaft  $d^3$ , the crank-pin entering a slot  $d^4$  upon a block carried by the needle-bar, which slot is of sufficient depth to permit the needle-bar to be moved horizontally relatively to the crank-pin without disengaging the crank-pin from it. The head  $d'$  is given a horizontal movement toward and from the end of the bracket  $D'$  at stated intervals to permit the needle to make the reciprocation first upon one vertical plane and then upon another vertical plane by means of a cam  $d^5$  upon the vertical shaft  $d^6$ , which is geared to the shaft  $d^3$ . The slide-plate  $d^7$ , having a cam-pin  $d^8$ , which enters the cam-groove of the cam  $d^5$ , has bearings at  $d^9$   $d^{10}$  and engages or is connected with the lower end  $d^{11}$  of the lever  $d^{12}$ . This lever is connected at its upper end with an arm  $d^{13}$  extending to the head  $d'$ . Heretofore the movement of the lever  $d^{12}$  has been the same, imparting to the needle-bar a step of the same length during the stitching of the entire button-hole. To vary the length of this step, I have mounted the lever  $d^{12}$  upon a fulcrum  $d^{14}$ , which is adjustable lengthwise the lever, whereby the extent of its throw may be varied. I have represented the fulcrum as a block fitted in a long slot  $d^{15}$  in the lever, the block being pivoted by the pivot  $d^{16}$  to an arm or support  $d^{17}$ . This arm or support  $d^{17}$  is vertically movable. It is mounted upon the end of a guide-rod  $d^{18}$ , which is itself carried at the end of the lever  $d^{19}$ , (see Fig. 1,) which is pivoted at  $d^{20}$ , and which is adapted to be held in a certain or fixed position and then to be automatically released or moved to move the fulcrum  $d^{14}$  into another or new position. I have represented it as held in fixed position, or such position as the fulcrum  $d^{14}$  should occupy during the stitching of the sides and eye of the button-hole, by means of a latch block or pin  $d^{21}$ , (see Fig. 1,) comprising a stud having a vertical movement in the bed-plate  $A$  and provided with a shoulder  $d^{22}$ , upon which the end  $d^{23}$  of the slide-plate  $c^4$  is adapted to extend, this end forming in effect a latch. The lower end of the latch-block bears upon the upper surface of the front end of the lever  $d^{19}$  and serves to prevent it from being moved until the latch-block is released by the movement of the slide-plate  $c^4$ . This movement of the slide-plate  $c^4$  takes place at the end of the stitching of the last side of the button-hole and is caused by the contact of the edge of the clamp-plate with the block  $c^5$ , carried by said slide-plate, and this movement of the slide-plate  $c^4$  removes its end  $d^{23}$  from over the shoulder  $d^{22}$  and permits the spring  $d^{24}$  to move the post  $d^{18}$  and therefore the fulcrum  $d^{14}$  of the lever  $d^{12}$  downwardly in relation to the lever, thereby increasing the length of movement of its upper end. This causes the head  $d'$ , and consequently the

needle-bar and needle, to make a longer step, and the extent of the increase in length of this step depends upon the extent of movement of the fulcrum. The lever and fulcrum are so arranged in relation to each other that the increased length of the step of the needle is from one end of the shorter step, and preferably not from both ends thereof. The position of the parts when the fulcrum has thus been moved to lengthen the step of the needle is represented in Fig. 2. At the completion of the stitching of the bar it is desirable to return the parts to their original position in order that upon the starting of the machine in sewing a new button-hole the needle may make the shorter step, and I have represented this as accomplished by providing the clamp-plate  $a'$  with an arm  $E$ , extending laterally therefrom and having an inclined downwardly-extending projection  $e$ . This projection is so placed in relation to the clamp-plate that it is brought into a position adjacent to the latch-pin  $d^{21}$  at the completion of the stitching of the bar, and to turn the clamp-plate back to its original position preparatory to stitching a new button-hole it is necessary to move the arm  $E$  and incline  $e$  over the upper end of the stop-pin, (see Fig. 4,) and this brings the incline  $e$  in contact therewith and forces it downward. This movement of the clamp-plate also releases the slide-plate  $c^4$  and allows it to be moved backward to its original or normal position by the springs  $c^6$ , (see Fig. 5,) and consequently the latch end  $d^{23}$  is drawn against the latch-pin  $d^{21}$ , and when it has been pressed downward sufficiently shuts over the shoulder  $d^{22}$ , and serves to lock the latch-pin in a position to lock the lever, and also to compress the spring  $d^{24}$ —that is, the action of returning the clamp-plate to its normal position causes the fulcrum  $d^{14}$  to be returned to its normal or original position and compresses the spring  $d^{24}$  and locks the fulcrum in said position, and also the spring, by means of the lever  $d^{19}$ .

The stitch-forming devices, in addition to the needle  $D$ , comprise the reciprocating looper  $F$ , carried upon a slide-plate  $f$ , which is operated by a cam  $f^1$  on the vertical shaft  $d^6$ , and a looper opener or holder  $f^2$ , which is carried at the end of the lever  $f^3$ , also operated by the cam  $f^4$  on the shaft  $d^6$ . This form of looping mechanism is well known and need not be further described here.

In operation the material in which the button-hole is stitched is mounted upon the clamp-plate and is fed to the stitch-forming devices by the movement of the clamp-plate forward in relation to the button or throat, then upon an arc of the circle about the button or throat, and then forward again in a straight line, the movement of the clamp-plate being an intermittent one and the needle being operated to first enter the material and then the button-hole slit to make an overedge-stitch, the needle being reciprocated alternately upon planes which take it through the but-

ton-hole slit and then through the edge of the material parallel therewith. At the end of the stitching of the last side of the button-hole the clamp-plate causes the space between the two planes in which the needle reciprocates to be increased to about double its former length automatically, and this is accomplished by changing the fulcrum of the lever which operates the head carrying the needle-bar to provide it with a longer throw, and this change in fulcrum is accomplished by the contact of the edge of the clamp-plate with a block mounted upon a slide and adapted to permit movement to be communicated to the fulcrum of the lever upon its movement by the clamp-plate. As many barring-stitches may be taken as desired. Upon the completion of the button-hole and return of the clamp-plate to its original position the devices are operated for automatically returning the fulcrum to its original position.

I would say I do not confine the invention, so far as changing the length of the step of the needle to automatically form a barring-stitch is concerned, to a machine having the method of presenting the material herein indicated, as it may be employed with a machine having any form of feed mechanism for the presentation of work to the stitch-forming devices or of the stitch-forming devices to the work.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a button-hole stitching and barring machine, the combination, with the needle and looping devices and mechanism for operating said needle vertically, of a mechanism comprising a cam and lever and suitable connections for imparting horizontal movements to said needle, said lever having an adjustable fulcrum, a traveling work-clamp, and connections between said work-clamp and said fulcrum, whereby the latter will be shifted when the end of a button-hole is reached to increase the horizontal movements of the needle and form barring-stitches, substantially as set forth.

2. The combination, in a button-hole stitching and barring machine, of the work holding and presenting devices, suitable looping mechanism, the needle-bar supported or carried by a head, an eye-pointed needle attached thereto, a cam and lever for imparting to said head intermittent periods of travel and rest, a fulcrum-block for varying the throw of the lever, and the clamp-plate coacting with a lever and vertical rod for controlling or moving it, substantially as specified.

3. The combination, in a button-hole stitch-

ing and barring machine, of work holding and presenting devices, suitable looping mechanism, the head  $d'$ , the needle-bar  $d$ , the needle  $D$ , the bracket  $D'$ , a device for imparting a traversing movement to the head, the arm  $d^{13}$ , cam  $d^5$ , lever  $d^{12}$ , fulcrum-block  $d^{14}$ , post or support  $d^{18}$ , and devices for automatically moving the fulcrum-block, comprising the said post  $d^{18}$ , the spring  $d^{24}$ , and the clamp-plate connected with said post  $d^{18}$ , as specified, substantially as described.

4. The combination, in a button-hole stitching and barring machine, of the work holding and presenting devices, suitable looping mechanism, the bracket  $D'$ , the head  $d'$ , the reciprocating needle-bar  $d$ , the needle  $D$ , a cam and lever for moving the head  $d'$  to communicate a step or traversing movement to the needle, a fulcrum-block held in its normal position by a latch, a vertical rod attached to the arm carrying the fulcrum-block, a spring for moving said fulcrum-block in one direction, and a block on the slide-plate with which the clamp-plate engages to automatically release the latch at the end of the stitching of the last side of the button-hole, substantially as described.

5. The combination, in a button-hole stitching and barring machine, of work holding and presenting devices, suitable looping mechanism, the bracket or support  $D'$ , the head  $d'$ , needle-bar  $d$ , the needle  $D$ , a device for imparting a traversing movement to the head, substantially as specified, and mechanism for automatically increasing the length of said back-and-forth movement of the head, comprising a fulcrum-block, a vertical rod attached to the arm carrying the fulcrum-block, a spring for moving it in one direction, and the lever automatically actuated, as described, for moving it in a reverse direction, substantially as specified.

6. The combination, in a button-hole stitching and barring machine, of the work holding and presenting devices, suitable looping mechanism, the head  $d'$ , having a traversing movement upon the bracket  $D'$ , the needle-bar  $d$ , the needle  $D$ , and mechanism for providing the head, bar, and needle with the traversing movement, comprising the lever  $d^{12}$ , rod  $d^{13}$ , connecting one end of the lever with the head, a cam for operating the said lever, the fulcrum-block, a spring for moving said fulcrum-block in one direction, and the devices for moving it in the reverse direction, comprising the lever  $d^{19}$ , latch-block  $d^{21}$ , latch  $d^{23}$ , slide-plate  $c^4$ , and the clamp-plate  $a'$ , substantially as described.

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Witnesses:

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