

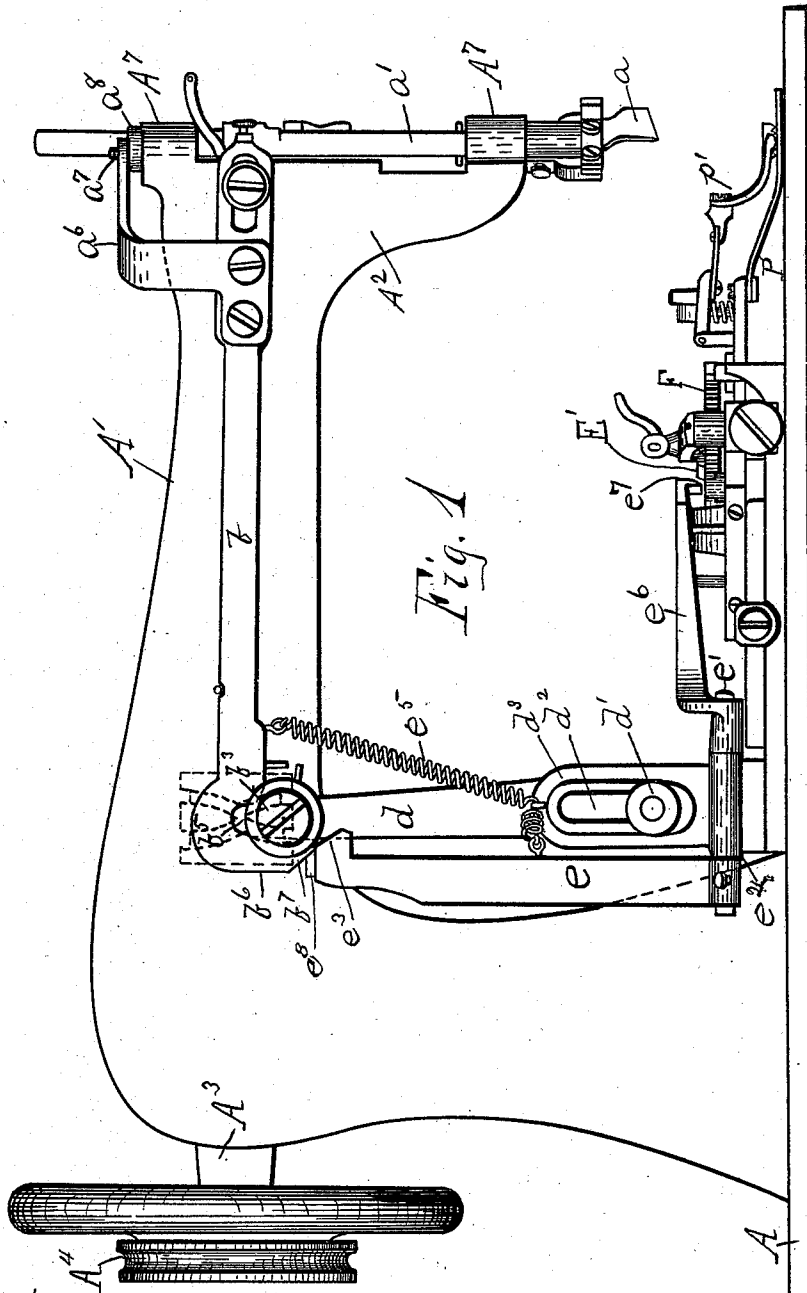
(No Model.)

5 Sheets—Sheet 1.

J. A. OSTERHOUT & J. P. HALLENBECK.  
CUTTING DEVICE FOR BUTTON HOLE SEWING MACHINES.

No. 402,610.

Patented May 7, 1889.



WITNESSES  
 Geo. A. Carby.  
 Frank C. Curtis.

INVENTOR  
 James A. Osterhout &  
 Joseph P. Hallenbeck  
 by Geo. Amosher  
 atty.



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5 Sheets—Sheet 3.

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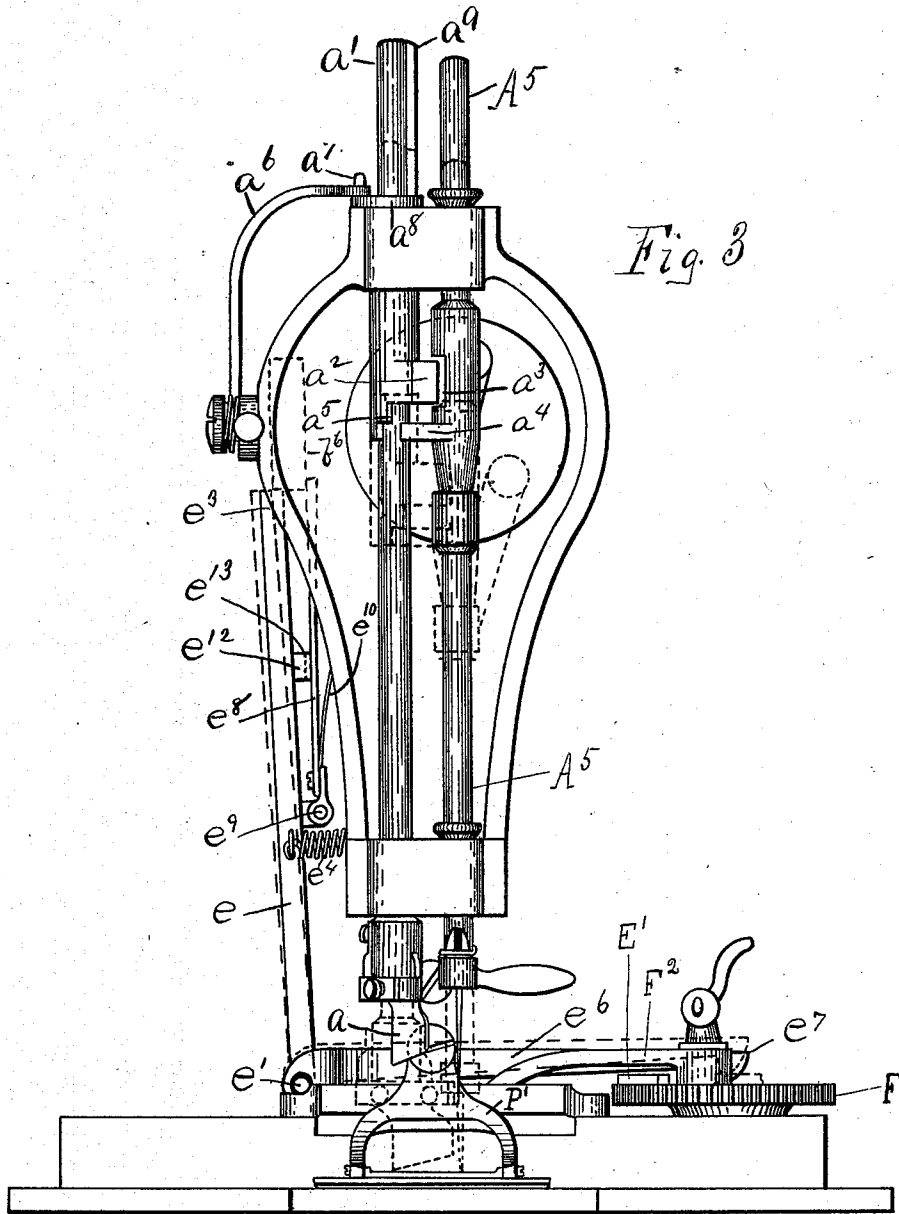


Fig. 3

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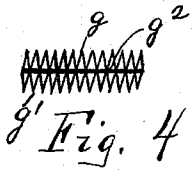
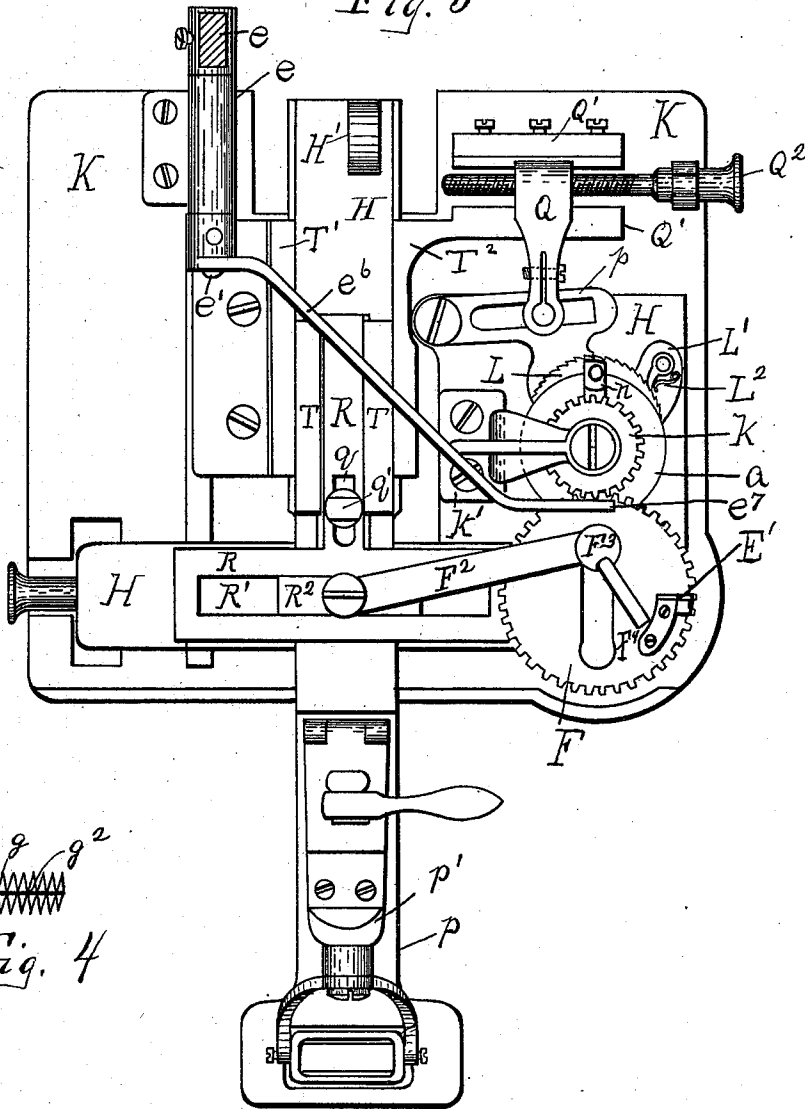
James A. Osterhout &  
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Fig. 5



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# UNITED STATES PATENT OFFICE.

JAMES A. OSTERHOUT, OF TROY, AND JOSEPH P. HALLENBECK, OF NEW YORK, ASSIGNORS TO THE NATIONAL MACHINE COMPANY, OF TROY, NEW YORK.

## CUTTING DEVICE FOR BUTTON-HOLE SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 402,610, dated May 7, 1889.

Application filed July 3, 1888. Serial No. 278,984. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES A. OSTERHOUT, of the city of Troy, county of Rensselaer, and State of New York, and JOSEPH B. HALLENBECK, of the city, county, and State of New York, have invented certain new and useful Improvements in Button-Hole Sewing-Machine Attachments; and we do hereby declare that the following is a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

Our invention relates to improvements in button-hole sewing-machine attachments for cutting button-holes; and it consists of the novel construction and combination of parts hereinafter described, and pointed out in the claims.

The objects of the invention will be made to appear in connection with the following description.

Figure 1 of the drawings is a side elevation of a button-hole sewing-machine provided with our improved attachments. Fig. 2 is a similar view illustrating the movements of parts of the attachment and machine. Fig. 3 is a front elevation of the machine and attachments shown in Figs. 1 and 2, having the front plate of the machine-head removed. Fig. 4 is a plan view of a portion of fabric, showing a finished button-hole. Fig. 5 is a plan view of a preferred form of button-holing attachment for sewing-machines, which we employ in connection with our improved attachments for cutting the button-holes. Fig. 6 represents a section taken on a vertical line passing through the center of the post  $e$ , as seen when looking toward the front end of the machine with the intersected portion of the bracket-supporting standard removed and representing the slide-bar and bar-detaching posts in the relative positions shown in Fig. 2. Fig. 7 is a similar view of some of

the parts shown in Fig. 6, showing the slide-bar supported by the auxiliary post  $e^8$  after the bar has been detached thereby from the screw  $b^3$ . Fig. 8 is a side elevation of the parts shown in Fig. 7. Fig. 9 is a side elevation of the slide-bar  $b$  detached.

We have shown some of the well-known parts of a sewing-machine, as bed-plate A, bracket-arm  $A^1$ , head  $A^2$ , supported thereby, driving-shaft  $A^3$ , drive-wheel  $A^4$ , needle-bar  $A^5$ , and needle  $A^6$ ; also in Fig. 5 most of the mechanism shown and described in United States Patent No. 252,052, dated January 10, 1882, forming a preferred button-holing attachment for sewing-machines and employed by us in connection with our improved attachment.

The preferred method of making button-holes with button-hole sewing-machines is to first insert two parallel rows of zigzag stitches of the length and form desired for the button-hole, and afterward cut a slit in the fabric between the rows of stitching, as shown in Fig. 4,  $g$  and  $g'$  being the rows of stitching, and the line  $g^2$  representing the slit cut through the fabric between the rows. The slit is generally cut by a chisel-shaped cutter forced down through the fabric, and such cutters have been heretofore applied to button-hole sewing-machines and adapted to be actuated thereby when placed in engagement therewith.

One of the objects of this invention is to provide for the automatic engagement and disengagement of a button-hole cutter with actuating button-hole sewing-machine mechanisms.

We provide the machine-head with a vertically-vibratory cutter-bar,  $a'$ , rotary in the slideways  $A^7$  and provided with the cutter  $a$ , adapted to cut the required slit in the fabric. A rotary movement of the cutter-bar in one direction will cause it to engage with the needle-bar, and a similar movement in the opposite direction will disengage the two bars from each other. When in engagement, the lug  $a^2$ , projecting laterally from the cutter-bar, rests in the receiving-slot  $a^3$  in the needle-bar, and

the cutter-bar is forced thereby to partake of the vertical movements of the pitman-actuated needle-bar.

The cutter is shown by the solid lines in the respective figures at its limit of upward vibration and by the dotted lines in Fig. 3 near its limit of downward vibration, and in the position occupied when about to enter the fabric. The limits of rotary movements are shown by the solid and dotted lines in Fig. 2, as will be more fully explained hereinafter.

As a preferred means for communicating to the cutter-bar a reciprocatory rotary movement to cause its engagement and disengagement with the needle-bar at the proper times and in the proper position to slit the fabric, we provide the reciprocatory slide-bar  $b$ , slotted at its forward end at  $b'$  to slide upon screw  $b^2$ , fixed upon the machine-head, the other end of the slide-bar being supported by the cam-follower screw  $b^3$ , fixed upon the lever  $d$ . The forward end of the slide-bar is provided with an arm,  $a^6$ , which is pivoted by pin  $a^7$  to one edge of the rock-lever plate  $a^8$ , slotted to receive the feather  $a^9$  on the cutter-bar, whereby the reciprocatory slide movements of the bar communicate to the cutter-bar rotary movements, and the vertical movements of the needle-bar communicate vertical movements to the cutter-bar, the latter sliding in the lever-plate, which retains the cutter at the right angle of rotation to enter the fabric on a line parallel with the rows of stitching. The slide-bar  $b$  is reciprocated with lever  $d$  by screw  $b^3$ , which is actuated by a switch-cam fixed upon the driving-shaft and indicated by dotted lines in Fig. 1. The slide-bar is provided with an open-ended slot,  $b^5$ , adapted to receive the screw  $b^3$ , secured to the lever, also with the downwardly-projecting head  $b^6$ , having the beveled or inclined face  $b^7$ . The lever  $d$  is pivoted intermediately of its ends upon the pivot  $d'$ , vertically adjustable in slots  $d^2$  in a pair of ears,  $d^3$ , fixed upon or forming a part of the bed-plate A. The lever is pivotally connected at its lower end with the vibratory plate which imparts the to-and-fro movements to the cloth-clamp.

When the stem of screw  $b^3$  is seated in the slot  $b^5$ , the slide-bar partakes of the vibratory movements of the lever and imparts to the cutter-bar a reciprocatory rotary movement; but when the slide-bar is lifted to the position shown in Fig. 1 the screw  $b^3$  does not engage with the slide-bar, and the latter, as well as the cutter-bar, remains inactive. It is evident that the bar may be lifted by hand and dropped into engagement with the screw again when it is desired to cut the slit; but we have provided mechanism for automatically effecting the engagement and disengagement of the bar with the screw, whereby the cutter is brought into action just as the stitching for the button-hole is complete. As a part of such mechanism we make use of a rock-lever post,  $e$ , adjustably fixed at its lower end, as by a set-screw,  $e^{15}$ , upon a pivot,  $e'$ , rotary in

a fixed bearing,  $e^2$ . The upper end or head of the post is provided with a beveled or inclined face adapted to engage with the similarly-beveled face of the slide-bar. The post is connected with a fixed portion of the machine, as ear  $d^3$ , by means of a spring,  $e^4$ , Fig. 3. The slide-bar is similarly connected by a spring,  $e^5$ . When the lever  $d$ , through the screw  $b^3$ , engages with the slide-bar to impart to it reciprocatory movements, the movement to the left, as viewed in Figs. 1 and 2, causes the two beveled surfaces of the bar and post to engage each other, and the bar slides up onto the top of the post, as shown in Fig. 1, which lifts the bar to a height sufficient to effect its disengagement from the lever, so that during the next vibratory movement of the lever to the right the screw  $b^3$  will slide along on the lower side of the bar and back again without communicating any movement to the bar. To effect the engagement of the bar with the lever, it is only necessary to rotate the post on its pivot to force it outward until its upper end passes from under the beveled projection of the bar, whereupon the spring  $e^5$  forces the bar down into engagement with the lever, the screw  $b^3$  entering the slot  $b^5$  and the parts occupying the position shown by the solid lines in Figs. 2 and 6. The bar immediately partakes of the movements of the actuating-lever, and the parts travel to the position shown by the dotted lines in Fig. 2. It is only necessary, therefore, to provide some tripping device for pushing the post out from under the bar at the time it is desired to cut the button-hole slit to render the engagement of the cutter automatic. We provide for this purpose the crank-lever  $e^6$ , fixed upon the pivot  $e'$ , and having a bevel-faced head,  $e^7$ , adapted to engage a similarly-beveled trip,  $E'$ , fixed upon the crank-wheel F, which forms a part of the mechanism constituting a preferred button-hole attachment for sewing-machines, fully shown and described in said Patent No. 252,052, the principal parts of which only we have shown in Fig. 5, wherein it will be seen that the plate H is adapted to slide to and fro between the ways T' and T<sup>2</sup> on the bed-plate K, which rests when in use upon the bed-plate of the main plate A. (Not shown in Fig. 4.) The slide-plate H is provided with an upwardly-projecting lug, H', to which the lower end of the actuating-lever  $d$  is pivoted. The plate R, provided with the slot  $g$ , is adjustably secured to the plate H by the adjusting-screw  $q'$ , passing through said slot, being guided by the ways T, secured to or forming part of plate H. The plate R is also provided with transverse guideways R', to which the feed-bar P is attached, whereby the bar, partaking of the vibratory movements of the plate H, can also be given a relatively transverse step-by-step movement by means of the pitman F<sup>2</sup>, connecting the follower R<sup>2</sup>, secured to the feed-bar, with crank-pin F<sup>3</sup>, radially adjustable on the rotary crank-wheel

F, and provided with a handle, F<sup>4</sup>, by which the crank-wheel may be rotated by hand when desired.

Regular step-by-step rotary movements may be imparted to the crank-wheel by the hand or by some known mechanism connected with plate H—such as that shown and described in said Patent No. 252,052 and partly shown in Fig. 6.

During one half of the period of revolution of the crank-wheel F step-by-step progressive movements in one direction are communicated to the cloth-clamp P P' to stitch one side of the button-hole, and during the remaining half period of revolution a similar retrogressive movement in the opposite direction is communicated to the cloth-clamp to stitch the opposite side of the button-hole, from which it is apparent that the crank-wheel makes just one revolution during the entire operation of inserting the stitches for each button-hole. By securing the trip E' to the crank-wheel in a position such that it will engage with and lift the lever e<sup>6</sup> when the last retrogressive step-by-step movement is given the cloth-clamp, the cutter will be forced down through the fabric simultaneously with the final downward thrust of the needle, thereby simultaneously cutting the slit and completing the insertion of the two lines of stitching and finishing the button-hole. After the trip passes beneath the lever-head e<sup>7</sup> to lift it, it must remain there until the succeeding step-by-step movement or movements of the crank-wheel carry it past the lever-head and permit the latter to drop and the spring e<sup>4</sup> to bring the beveled post e back in line with the bar b. It is necessary, therefore, either to impart to the crank-wheel by hand, after the button-hole is completed with the slit, such a rotary movement as will release the lever-head e<sup>7</sup> from trip E' or to provide some substitute for the beveled post to lift the bar b up from engagement with the lever d or its projecting screw b<sup>3</sup>, while the trip holds the lever-head in an elevated position, to prevent the bar from forcing the cutter-bar into engagement with the needle-bar during two or more successive downward vibrations of the latter. We provide for this purpose an auxiliary beveled post, e<sup>8</sup>, pivoted at its lower end upon the post e at e<sup>9</sup>, and provided with a spring, e<sup>10</sup>, which, bearing against some fixed stop, as the bracket-arm of the machine, forces the auxiliary post against the stop e<sup>12</sup> on the post e. The auxiliary post is a trifle higher than the post e, and bears against the contiguous side of the head b<sup>6</sup> of the bar, while the latter rests upon the top of the post e, as shown by dotted lines in Fig. 3. When the post e is forced out from under the bar or head b<sup>6</sup> by the engagement of lever e<sup>6</sup> with the trip, the bar falls into engagement with lever d and is forced forward, as before explained, and the stop e<sup>12</sup> is forced out from the auxiliary post, as shown by the dotted line e<sup>13</sup> in Fig. 3 and by solid lines in

Fig. 6. In its forward movement the bar is carried past the auxiliary post, thereby releasing the latter, so that its spring e<sup>10</sup> forces it out against the stop e<sup>12</sup> and in line with the bar, and when the bar returns in its backward vibratory movement it is forced up the beveled surface upon the top of the auxiliary post, which disengages the bar from the lever d in the same manner that it was disengaged by the post e, the parts then occupying the position shown in Figs. 7 and 8. The bar remains out of disengagement upon the auxiliary post until the trip is carried past the lever-head e<sup>7</sup>, whereupon the spring e<sup>4</sup> forces both posts back to the position shown by the solid lines in Fig. 3, the stop e<sup>12</sup> forcing the auxiliary post out from beneath the bar and permitting the latter to fall upon the top of post e in the position shown by the dotted lines in Fig. 3, where it remains until another button-hole is stitched and another revolution of the crank-wheel brings the trip into engagement with the lever-head e<sup>7</sup>, the operation being automatically repeated as often as button-holes are stitched.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a button-hole sewing-machine, of a button-hole rotary and vertically-reciprocatory cutter-bar, means for communicating to such bar rocking and vertically-reciprocating movements consisting of the slide-bar b, connected at one end with the arm a<sup>8</sup>, which arm is splined to the cutter-bar, and detachably connected at the other end with the sewing-machine driving mechanism, the vertically-reciprocating needle-bar, and means for engaging and disengaging the cutter-bar therewith, substantially as described.

2. The combination, with a button-hole sewing-machine, of a button-hole rotary and vertically-reciprocatory cutter-bar, means for communicating to such bar rocking and vertically-reciprocating movements, consisting of the slide-bar b, connected at one end with the arm a<sup>8</sup>, which arm is splined to the cutter-bar, and at the other end with the sewing-machine driving mechanism, the vertically-reciprocating needle-bar, and means for engaging and disengaging the cutter-bar therewith, a spring-controlled slide-bar-detaching post, e, provided at its upper end with a beveled head adapted to engage said slide-bar and fixed at its lower end upon a rock-shaft, said rock-shaft, trip-lever e<sup>6</sup>, fixed upon said rock-shaft, and a trip, E', fixed upon the feed-wheel of the clamp-moving mechanism, substantially as described.

3. The combination, with a button-hole sewing-machine, of a button-hole rotary and vertically-reciprocatory cutter-bar, means for communicating to such bar rocking and vertically-reciprocating movements, consisting of the slide-bar b, connected at one end with the arm a<sup>8</sup>, which arm is splined to the cutter-bar, and at the other end with the sew-



ing-machine driving mechanism, the vertically-reciprocating needle-bar and means for engaging and disengaging the cutter-bar therewith, a spring-controlled slide-bar-detaching post,  $e$ , provided at its upper end with a beveled head adapted to engage said slide-bar and fixed at its lower end upon a rock-shaft, said rock-shaft, trip-lever  $e^6$ , fixed upon said rock-shaft, a trip,  $E'$ , fixed upon the feed-wheel of the clamp-moving mechanism, auxiliary detaching-post  $e^8$ , provided at its upper end with a beveled head adapted to engage said slide-bar and pivoted at the lower end upon post  $e$ , auxiliary post-actuating spring

$e^{10}$ , and stop  $e^{12}$ , secured to one post and adapted to engage with the other, substantially as described.

In testimony whereof we have hereunto set our hands this 21st day of June, 1888.

JAMES A. OSTERHOUT.  
JOSEPH P. HALLENBECK.

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