

(Model.)

4 Sheets—Sheet 1.

D. MILLS.

BUTTON HOLE SEWING MECHANISM.

No. 313,359.

Patented Mar. 3, 1885.

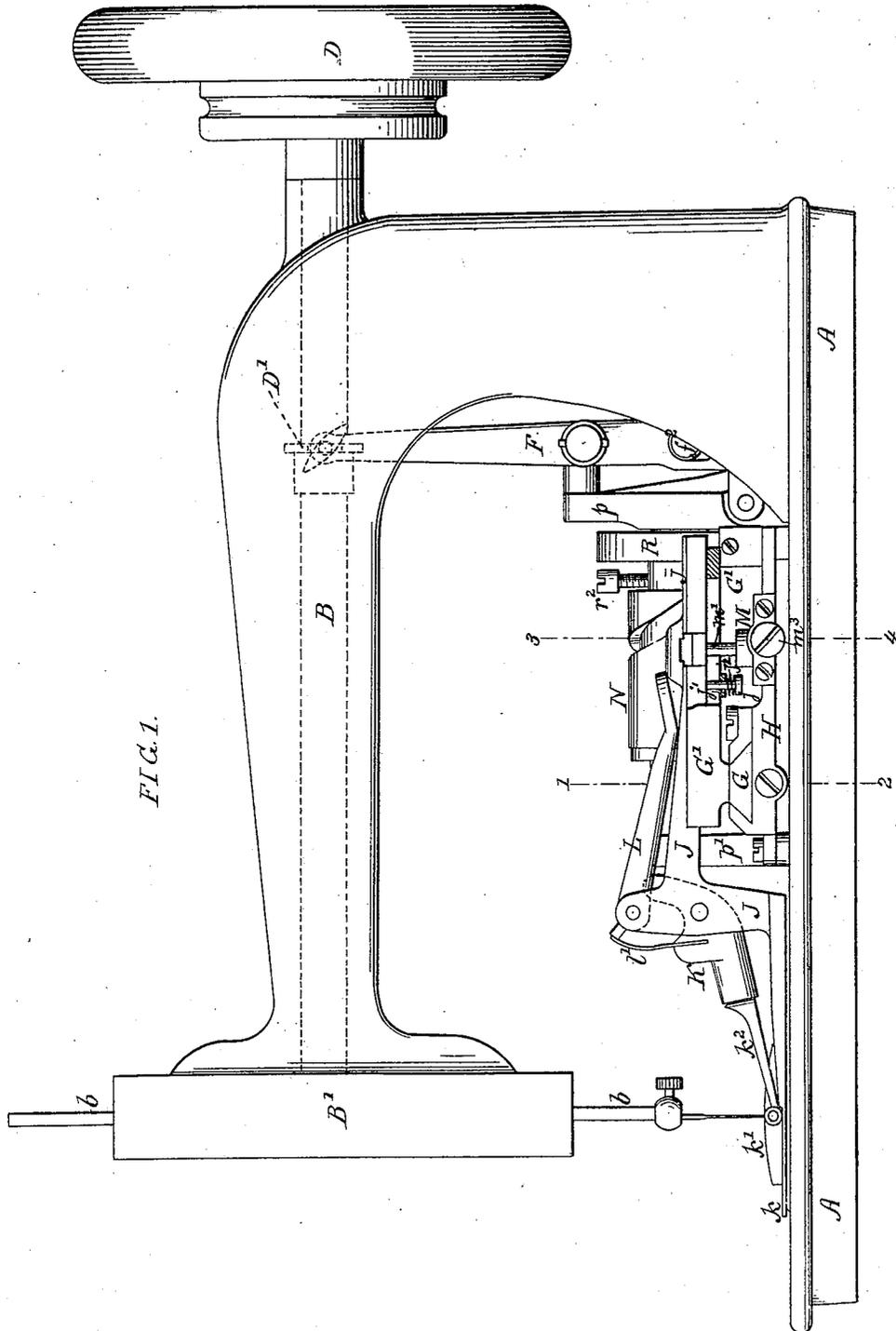


FIG. 1.

WITNESSES:

Harry Drury  
Hamilton D. Turner.

INVENTOR:

Daniel Mills  
By his Attorneys  
Howson and Jay

(Model.)

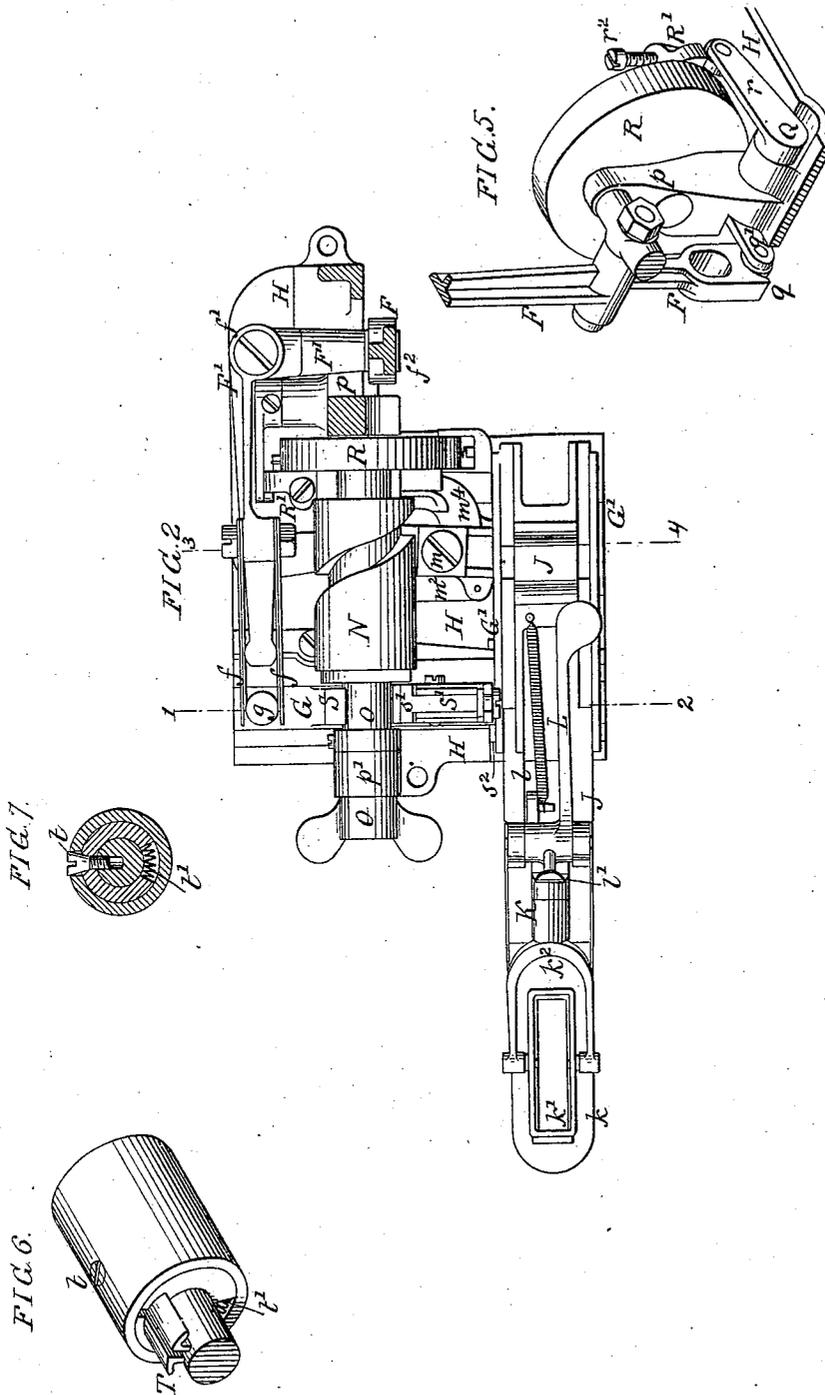
4 Sheets—Sheet 2.

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WITNESSES:

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FIG. 3.

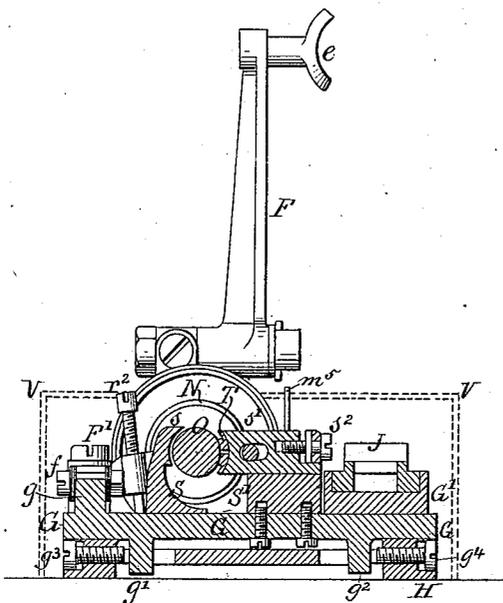
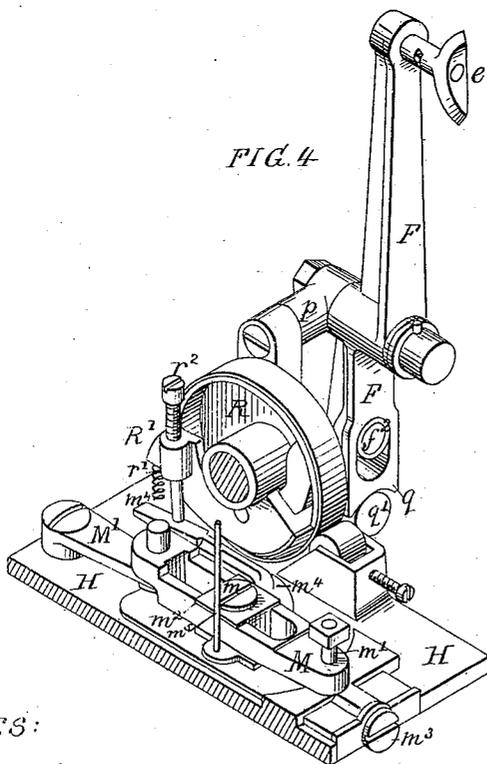


FIG. 4.



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(Model.)

4 Sheets—Sheet 4.

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FIG. 8.

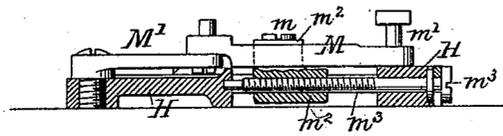
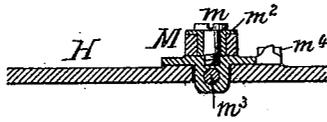


FIG. 9.



WITNESSES:

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Hubert Howson

INVENTOR:

Daniel Mills  
by his Attorneys  
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# UNITED STATES PATENT OFFICE.

DANIEL MILLS, OF PHILADELPHIA, PENNSYLVANIA.

## BUTTON-HOLE-SEWING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 313,359, dated March 3, 1885.

Application filed March 5, 1883. Renewed November 8, 1883. Again renewed June 17, 1884. (Model.)

*To all whom it may concern:*

Be it known that I, DANIEL MILLS, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Button-Hole-Sewing Mechanism, of which the following is a specification.

My invention relates to that class of button-hole mechanisms for sewing-machines in which the material is held between a pair of clamps having an automatic lateral reciprocating motion and an intermittent feed motion imparted to them, so that the sewing mechanism may stitch the sides and bar the ends of the button-hole.

My present invention relates to certain improvements in the details of the button-hole mechanism, the general principle of which is the same as in the machines described and claimed in the following Letters Patent: Re-issue No. 9,962, dated December 6, 1881, No. 249,411, dated November 8, 1881, both granted to F. Simmons; and No. 265,850, dated October 10, 1882, No. 266,044, dated October 17, 1882, and No. 266,181, dated October 17, 1882, granted to myself.

As in my last-mentioned patent, my present improvements are shown as applied to a button-hole mechanism in the form of an attachment which can be applied to an ordinary sewing-machine when it is desired to use the latter for stitching button-holes, and may be as readily removed when it is desired to use the machine for other work.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of an attachment with my improvements applied to a sewing-machine. Fig. 2, Sheet 2, is a plan view of the attachment; Fig. 3, Sheet 3, a sectional view on the line 1 2, Figs. 1 and 2; Fig. 4, a perspective view of a portion of the apparatus with parts removed; Fig. 5, a similar view of another part of the machine; Fig. 6, a perspective view of the adjustable cam, and Fig. 7 a transverse section of the same, showing the adjusting device. Fig. 8 is a section on the line 3 4, Figs. 1 and 2, and Fig. 9 is a sectional view at right angles thereto.

Referring to Fig. 1, A is the ordinary bed-plate of the sewing-machine proper; B, the

arm; B', the head, and *b* the needle bar, to which motion is imparted by the usual horizontal shaft carrying the fly-wheel D. This shaft also imparts motion to the operative parts of the button-hole feed mechanism through the medium of a suitable cam, D', (indicated by dotted lines in Fig. 1,) the cam preferably being a switch-cam of the construction described by me in a separate application for a patent filed of even date herewith.

The entire button-holing attachment is carried by a base-plate, H, which is to be secured to the bed-plate of the sewing-machine in the position illustrated in Fig. 1, the parts being arranged in this case to sew the button-hole longitudinally of the bed-plate, as shown in Fig. 2, instead of transversely, as in my above-cited patents.

The primary slide G, which is in this instance a transverse dovetailed bar, is adapted to dovetailed guides on the base-plate, and has a stud, *g*, on which bear the springs *f f*, Fig. 2, carried by the bell-crank lever F', pivoted at *f'* to the base-plate. The short arm of this spring-lever is provided with an anti-friction roller, *f''*, adapted to an opening in the lower arm of a vertical lever, F, pivoted to an upright or standard, *p*, on the base-plate. The upper end of this lever F carries a shoe, *e*, Figs. 3 and 4, which is acted on by the above-mentioned cam D' on the horizontal shaft of the sewing-machine proper, so as to impart an intermittent oscillating motion to the said lever F and thence an intermittent reciprocating motion to the primary slide G through the medium of the spring-lever F'.

On the slide G are mounted the projections S S', Figs. 2 and 3, which together form the yoke referred to in my former patents, and which are arranged on opposite sides of the shaft O, this shaft O being mounted in bearings in the standards *p p'* on the base-plate H. These projections S S' are provided with the usual curved faces, *s s'*, which are to be acted on by the adjustable stop-cam T, Fig. 3, on the shaft O.

On the primary slide G are arranged at right angles thereto the ways G', Figs. 1 and 3, for the secondary slide J, Fig. 2, which carries the cloth-clamp at its outer end. The low-

er part of the cloth-clamp consists of a strip of sheet metal, *k*, secured to the pendent end of the slide J, and having the usual oblong slot. The upper slotted portion, *k'*, of the clamp is pivoted to the fork *k''*, Figs. 1 and 2, swiveled in the arm K, which is pivoted to the end of the slide J, and is acted on by a spiral spring, *l*, Fig. 2, which tends to swing the arm K on its pivot, and so raise the upper clamp.

Projecting from the arm K is a spring-finger, *l'*, which is acted on by the cam-lever L, Fig. 1, pivoted to lugs on the slide J, so that when the said lever is depressed into the position shown in Fig. 1 the portion *k'* of the clamp will have been forced down onto the lower half, *k*, with a yielding pressure. The slide J is held down onto its ways G' by means of a pin or bolt, *j*, Fig. 1, passing through a slot in the bottom of the said ways, and carrying a cross-piece, *j'*, bearing on the under side of the ways, while a small spiral spring, *j''*, interposed between the head of the pin *j* and the cross-piece, will allow the slide J to rise to a slight extent should any irregularity in the surface of the bed of the machine require it.

The required intermittent motion first in one direction and then in the other is imparted to the slide J and clamps by means substantially similar to those described in my former patent—that is, the shaft O carries a scroll-cam, N, forming a right and left hand screw, and acting on a pin on the end of a lever, M, pivoted at *m*, and having a pin, *m'*, with a swiveled square head adapted to a corresponding rectangular recess in the underside of the slide J. An intermittent rotary motion is imparted to the shaft O by means of the friction feed-wheel R, which may be of the construction described in my Patent No. 266,181; but is preferably of the form described and claimed in an application of even date herewith, this friction-feed receiving motion from the vibrating-lever F through the devices hereinafter referred to.

The devices which I have above described are, with the exception of the clamp and the devices for retaining the slide J, substantially similar to those set forth in my above-mentioned patents, and as they operate in substantially the same way it will not be necessary to describe their operation further; but I will now describe the detailed improvements of which my present invention consists.

First, with regard to the devices for imparting motion to the friction-feed: On the lower end of the vibrating lever F is formed a double cam or two cams, *q q*, Figs. 4 and 5, acting on the end of an arm, *q'*, carried by a rock-shaft, Q, the other arm, *r*, of this rock-shaft, Fig. 5, acting on the under side of the lever R' of the friction-wheel R. Thus, owing to the action of the cams on the vibrating lever F, the arm R' of the feed-wheel will be elevated through the medium of the said rock-shaft. A spring, *r'*, returns the arm R' of the feed-wheel after its release from each cam *q*,

and the usual adjustable stop-screw, *r''*, Figs. 3 and 4, regulates the extent of movement of the arm R', and consequently the extent of feed.

The pivot-pin *m* of the lever M passes through a block, *m''*, Figs. 2 and 4, adapted to be adjusted in a longitudinal slot in said lever, by means of a set-screw, *m'''*, in the base-plate H, so as to vary the leverage and consequently the extent of motion of the slide J, and thereby vary the length of the button-hole sewed; but as it is desirable, when a change is made in the size of the button-hole to preserve the same character of stitch, I combine with the adjustable pivot-block *m''* a wedge-shaped finger, *m'''*, Fig. 4, on which the lower end of the set-screw *r''* rests, so that when the block *m''* is adjusted in the slot of the lever M to vary the size of the button-hole, the wedge-piece *m'''* is simultaneously and correspondingly adjusted to make more or less stitches, according to the length of the button-hole. I prefer to combine with the lever M a guide-arm, M', pivoted to the base-plate. I also mount on the adjustable pivot-block *m''* a vertical index-finger, *m''''*, which projects through a slot in the top of the cover V for the attachment, (indicated by dotted lines in Fig. 3,) and which serves to approximately indicate to the operator the length of the button-hole being sewed.

In order to permit of variations being made in the distance or space left between the inner or adjacent edges of the lines of button-hole stitches, I make one or both of the projecting faces *s s'* adjustable by means of set-screws *s''* toward or from the stop-cam T, one face only being shown as adjustable in the present instance.

In my former Patent No. 266,044 I have shown and described certain devices for varying the depth of bight of the stitches, these devices consisting of a stop on the primary slide and adjusting-nuts carried by a right-and-left-handed screw-rod. In my present invention I provide for the independent variation in the bight on either side of the button-hole by providing the primary slide with two lugs, *g' g''*, Fig. 3, and two set-screw stops, *g'' g'''*, in the base-plate, so that one may be adjusted independently of the other.

With the view of simplifying the devices for expanding the two sections of the cam T against the action of the spring *t'*, Figs. 6 and 7, I make use of a radial taper screw, *t*, adapted to be screwed into the shaft at right angles thereto, as shown in Figs. 6 and 7, to separate the two halves of the cam T, as described in my former patents.

Some of the features described and claimed in this application, and more particularly covered by the first and second claims, are also shown and described, but not claimed, in other applications for patents filed by me—one dated August 6, 1883, Serial No. 102,914, and another dated April 5, 1884, Serial No. 126,756.

I claim as my invention—

1. In a button-hole-sewing mechanism, the

combination of a base-plate and primary slide carrying a cloth-clamp with a movable stop-cam and projections mounted on said slide, one or both of said projections having an adjustable face or faces, as and for the purpose set forth.

2. The combination of the base-plate of a button-hole-sewing mechanism, and a primary slide having lugs  $g'$   $g''$ , with independent set-screws  $g^3$   $g^4$ .

3. The combination of a feed wheel and arm,  $R'$ , with a two-armed rock-shaft,  $Q$ , and a vibrating lever,  $F$ , carrying cams acting on one of the arms of said shaft.

4. The combination of a cam-shaft, feed-wheel, and an arm,  $R'$ , having a stop-pin, with

a lever,  $M$ , and adjustable pivot-block therefor, carrying a wedge-piece on which said pin may rest, substantially as and for the purpose set forth.

5. The combination of a cam-shaft with a slide carrying a cloth-clamp, a slotted lever,  $M$ , and an adjustable pivot-block carrying an index-finger,  $m^5$ , substantially as specified.

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

DANL. MILLS.

Witnesses:

HARRY L. ASHENFELTER,  
HUBERT HOWSON.