(Model.) 3 Sheets—Sheet 1.

D. MILLS.

BUTTON HOLE SEWING MACHINE.

No. 265,850. Patented Oct. 10, 1882.

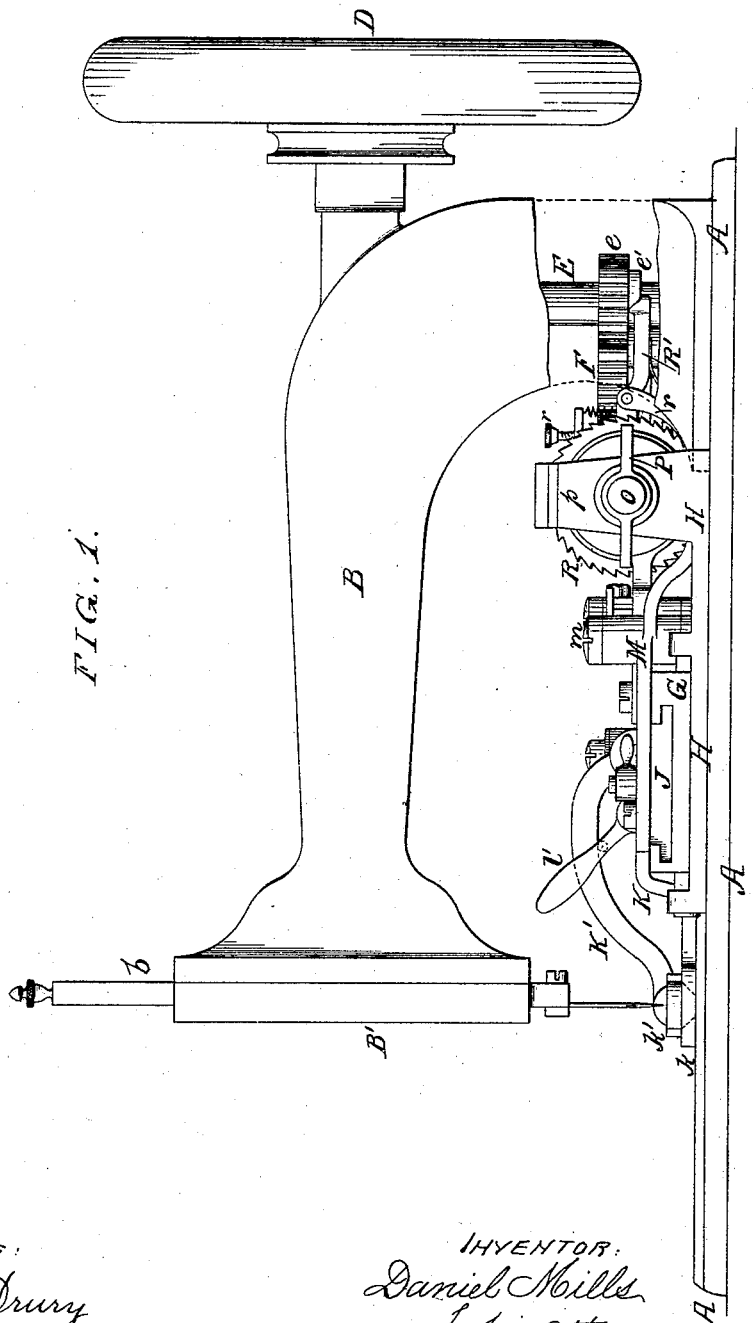

FIG. 1.

WITNESSES:
Harry Drury
Hubert Howson

INVENTOR:
Daniel Mills
by his attorneys
Howson and Sons

(Model.) 3 Sheets—Sheet 2.

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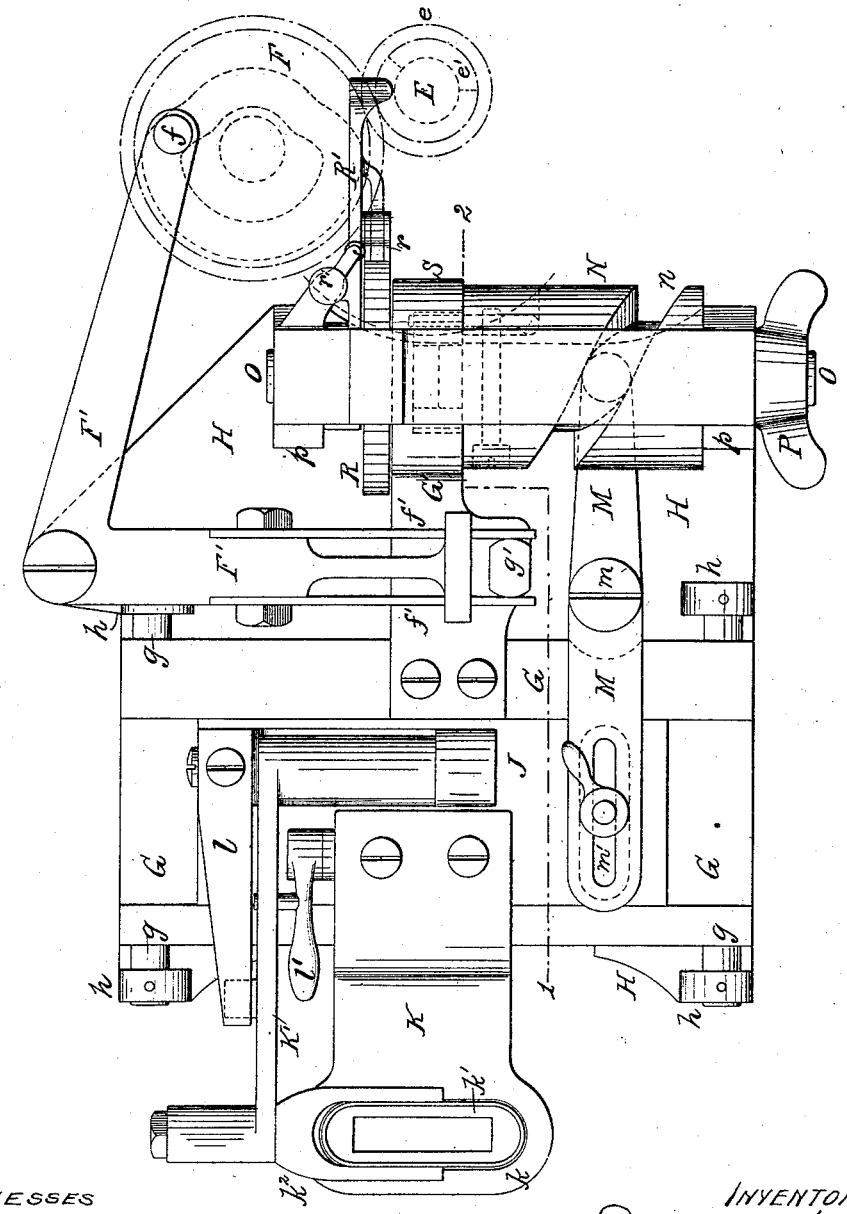

FIG. 2.

WITNESSES

Harry Drury

Hubert Howson

INVENTOR:

Daniel Mills

by his Attorneys

Howson and Sons

(Model.) 3 Sheets—Sheet 3

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FIG. 3.

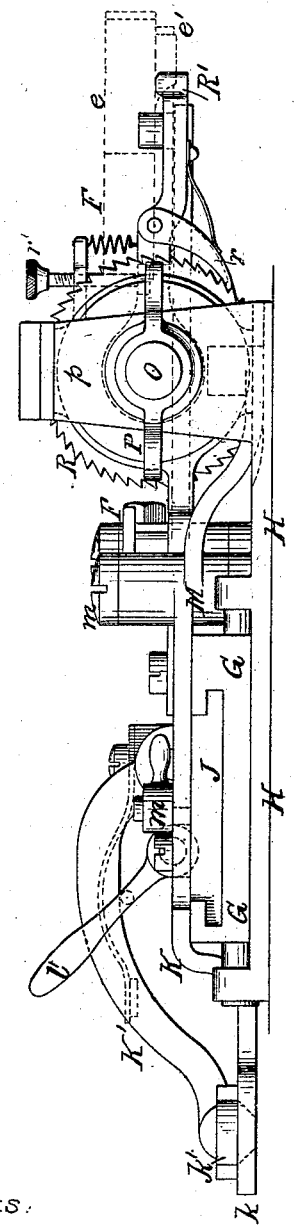


FIG. 4.

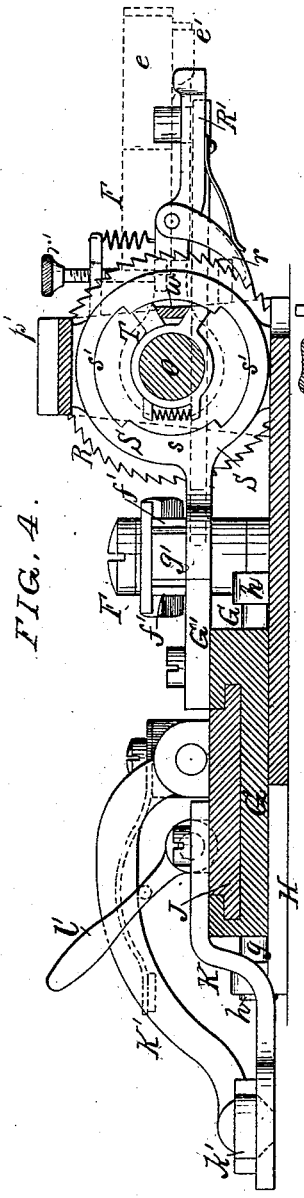
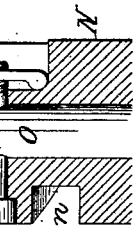


FIG. 5.



WITNESSES:

Harry Drury.

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UNITED STATES PATENT OFFICE.

DANIEL MILLS, OF PHILADELPHIA, PA., ASSIGNOR TO THE UNITED STATES BUTTON HOLE SEWING MACHINE COMPANY, OF CAMDEN, N. J.

BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 265,850, dated October 10, 1882.

Application filed August 22, 1881. (Model.)

To all whom it may concern:

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

My invention relates to improvements in that class of button-hole-feed 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-movement imparted to them, so that the needle may stitch the sides and "bar" the ends of the button-hole.

In my invention the button-hole-feed mechanism is made in the form of an attachment, which may 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 plain sewing. My invention relates to certain improvements in the construction of the details of the button-hole-feeding devices.

In the accompanying drawings, Figure 1, Sheet 1, is a side view, showing my button-hole attachment applied to a sewing-machine. Fig. 2, Sheet 2, is a plan view of the attachment, drawn to an enlarged scale; Fig. 3, Sheet 3, a side view of the attachment; Fig. 4, a section on the line 1 2, Fig. 2; and Fig. 5, a sectional view, showing the devices for adjusting the stop-cam.

Referring to Fig. 1, A is the ordinary bed-plate of the sewing-machine proper; B, the arm; B′, the head; *b*, the needle-bar, to which motion is imparted by the usual horizontal shaft having the fly-wheel D.

E is the usual vertical shaft, through which motion is transmitted to the ordinary feed and shuttle mechanism below the bed of the machine. It is from this vertical shaft that I impart motion to the improved button-hole mechanism, the general principle of which is the same as that for which Frederick Simmons obtained Letters Patent June 24, 1879, No. 216,902, and reissued December 6, 1881, and for improvements on which Simmons obtained Letters Patent November 8, 1881, No. 249,411. The entire button-holing attachment is carried on a base-plate, H, which is to be secured to the bed-plate of the sewing-machine in the position illustrated in Fig. 1. On the vertical shaft E is secured a pinion, *e*, gearing into a second larger pinion, F, Fig. 2, having its bearings in the frame. This latter pinion F has on its under side a cam-groove, to which is adapted a pin, *f*, on the bell-crank lever F′, pivoted to the base-plate H. This bell-crank lever imparts the necessary laterally-vibrating motion to the primary and secondary slides carrying the cloth-clamps, in order to enable the needle to form the button-hole stitch.

The primary slide G is mounted on the cylindrical rods *g*, secured in lugs *h* on the base-plate, and to the slide is secured an arm, G′, having a stud, *g′*, against which bear the two flat springs *f′ f′*, carried by the bell-crank lever F′. Hence the vibrating motion imparted to the lever F′ by the pinion F, with its cam-groove, will be imparted to the slide through the springs *f′ f′*, which yield, however, when the stop-cam T, as hereinafter described, is interposed to limit this lateral motion of the slide G. On this primary slide G is mounted the secondary slide J, which is adapted to undercut grooves in the former, as illustrated in Figs. 3 and 4. This slide J carries the two cloth-clamps, and has an intermittent feed-motion imparted to it in the direction of the length of the button-hole, first in one direction and then in the other, by means of a lever, M, pivoted at *m* to the base-plate, and operated by a scroll-cam, N, forming a right-and-left-hand screw on the shaft O, this shaft being adapted to bearings in the standards *p* on the base-plate, and having an intermittent rotary motion imparted to it in the manner described hereinafter. The length of movement of the slide J on the primary slide G can be varied by adjusting the connecting-pin *m′* in the slot in the lever M, as described in the above-mentioned patent of Simmons of November 8, 1881. To the slide J is secured the arm K, carrying at its projecting outer end the lower cloth-clamp, *k*, which, when the attachment is applied to the bed of the machine, will be immediately below the needle, as shown in Fig. 1. To the slide J is also pivoted the lever K′, as shown in Fig. 2, and in the outer end of this lever is swiveled the forked piece k^2, to which in turn is pivoted the upper cloth-clamp, *k′*,

the latter being thus practically mounted on a universal joint to adapt itself to any inequalities in the material being sewed. The lever K′ is acted on by a spring, *l*, bearing on a projection on the lever, so that the two clamps will be normally held together; but the upper clamp can be raised by a pivoted lever, *l′*, Fig. 3, having a pin bearing on the under side of the arm. An intermittent rotary motion is imparted to the shaft O by means of the ratchet-wheel R, secured thereon, and the spring-pawl *r*, carried by an arm, R′, fitted loosely on the shaft O, and acted on by a cam, *e′*, on the under side of the pinion *e*. The extent of movement of this lever is adjustable by means of a set-screw, *r′*, as in the machine described in the above-cited patent of Simmons.

The adjustable stop-cam for limiting the throw of the slides and clamps is substantially the same as that described in an application for Letters Patent filed by me March 28, 1881, Serial No. 29,448, except as to the particular devices employed for expanding and contracting the acting-face of the stop-cam.

The yoke S, with its segmental projections *s s* and intervening recesses *s′ s′*, is secured to or forms part of the arm G′, and embraces the adjustable stop-cam T, carried by the shaft O, Figs. 1, 2, and 4.

As described in my application above referred to, the cam is made in two parts, each provided with a socket adapted to be fitted on the shaft and acted on by a spring, *t*, which tends to force the two parts forming the acting-face of the cam together. Instead of expanding this cam by means of a taper-screw, as in my described application, I employ in this case a wedge on an arm, *w*, adapted to a slotted recess in the cam N, Fig. 5, the wedge-arm being under the control of a screw, *w′*, passing at right angles through the shaft O, and having its threaded end adapted to a threaded opening in the said arm *w*. Thus by turning this screw the arms forming the working-face of the cam may be caused to separate or allowed to approach each other to increase or diminish the size of the working-face of the cam.

The operation of the above-described mechanism is substantially the same as that described in the above-cited patent of Simmons and my application before referred to, and will be readily understood without further explanation.

The shaft O is provided with a thumb-nut, P, or other handle, as in the Simmons patent, in order that by turning the cam N with the shaft, and so operating the lever M and slide J, the cloth-clamps *k k′* may be moved to any desired position to begin or resume the stitching of the button-hole without moving or operating any other part of the mechanism.

It will be understood that the button-hole attachment may be applied to other constructions of sewing-machines than that shown in the drawings, and that motion may be imparted to the shaft O and lever F′ in any other convenient way than that shown without departing from my invention.

I claim as my invention—

1. In a button-hole-feed mechanism for sewing-machines, the combination of the primary slide carrying a stud with a pivoted operating-lever, F′, having springs *f′ f′* bearing on said studs, as and for the purpose set forth.

2. The combination of the base-plate of a button-hole-sewing-machine attachment, having lugs *h* and cylindrical rods *g*, with a primary slide mounted on said rods, and a yielding operating-lever, F′, all substantially as described.

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

DANL. MILLS.

Witnesses:
HARRY DRURY,
HARRY SMITH.