



W. W. ABBOTT.

BUTTON HOLE SEWING MACHINE.

No. 252,984.

Patented Jan. 31, 1882.

FIG. 2.

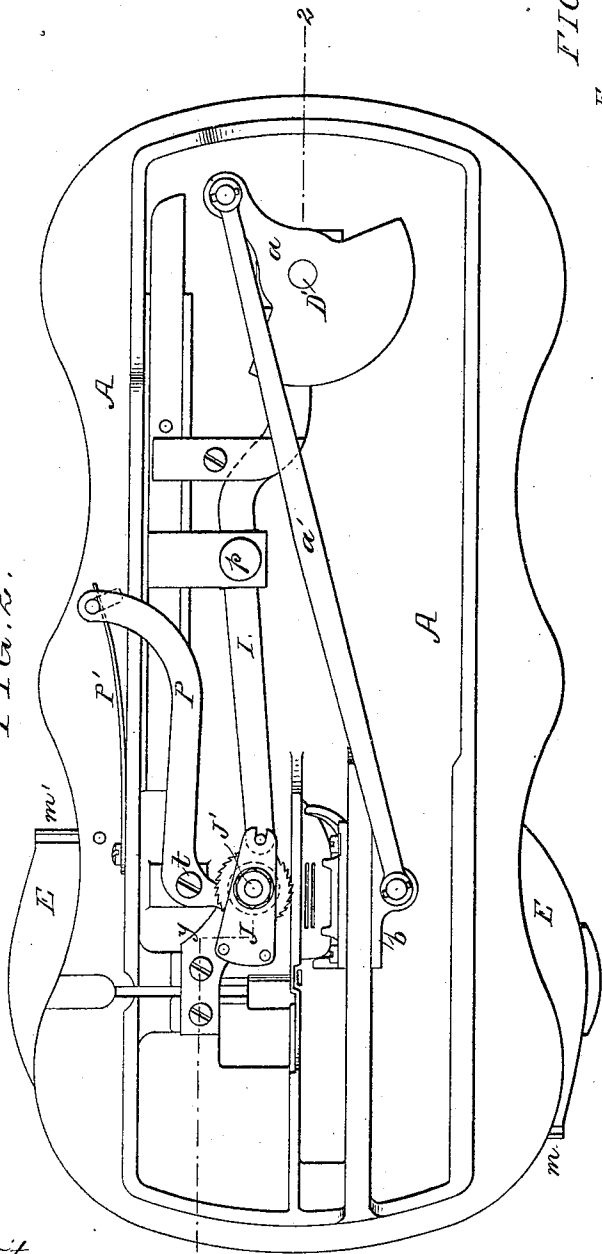
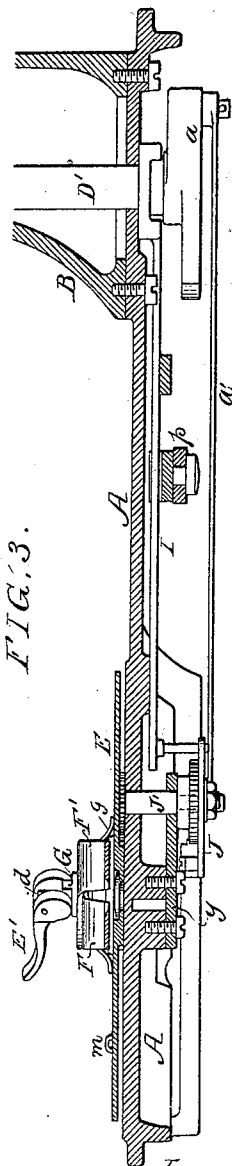


FIG. 11.



FIG. 3.



Witnesses:

Harry Drury  
James F. Tobin

Inventor:

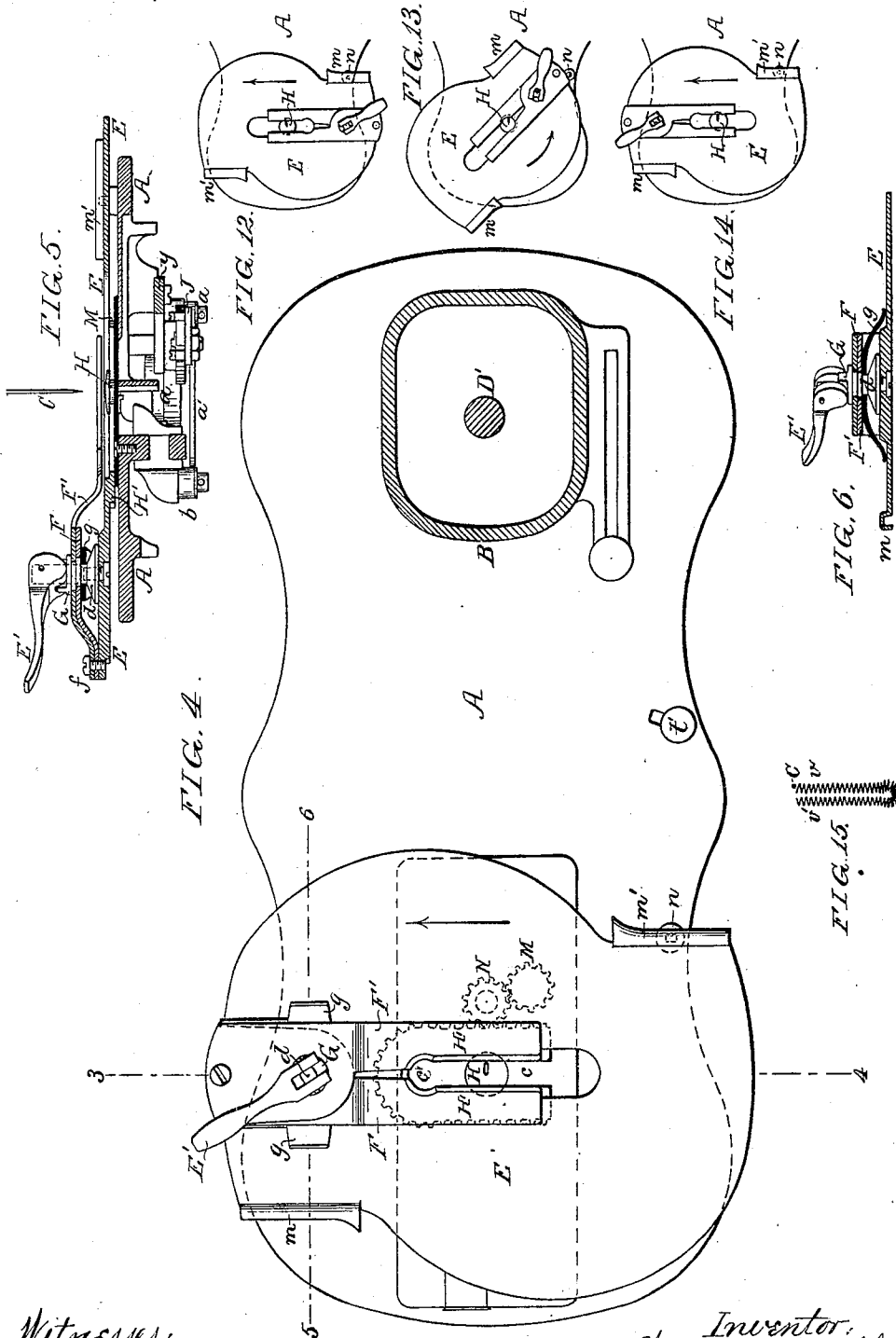
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# UNITED STATES PATENT OFFICE.

WILLIAM W. ABBOTT, OF PHILADELPHIA, PA., ASSIGNOR TO THE NATIONAL SEWING MACHINE COMPANY, (LIMITED,) OF SAME PLACE.

## BUTTON-HOLE SEWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 252,984, dated January 31, 1882.

Application filed September 27, 1881. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ABBOTT, 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 consists of certain mechanism to be used in connection with a sewing-machine for stitching button-holes, the said mechanism being too fully described hereinafter to need preliminary explanation.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of a sewing-machine with my improved mechanism for stitching button-holes; Fig. 2, Sheet 2, an inverted plan view of the machine; Fig. 3, a vertical section on the line 1 2, Fig. 2; Fig. 4, Sheet 3, a plan view of the bed-plate, with the stationary arm in section; Fig. 5, a vertical section on the line 3 4, Fig. 4; Fig. 6, a vertical section on the line 5 6, Fig. 4; Fig. 7, Sheet 4, a perspective view of the plate and clamp for holding the fabric; Fig. 8, detached perspective views of the parts appertaining to Fig. 7; Fig. 9, a perspective view of the device for operating the cloth-holding plate; Fig. 10, detached perspective views of the parts appertaining to Fig. 9; Fig. 11, Sheet 2, an enlarged view of part of Fig. 3; Figs. 12, 13, and 14, Sheet 3, diagrams illustrating the operation of the cloth-plate; and Fig. 15, an enlarged view of a button-hole, illustrating the operation of my improvements.

A is the bed-plate of the machine; B, the stationary arm; D, the driving-shaft; and C, the reciprocating eye-pointed needle, which is mounted on a slide carried by the needle-bar, the said slide being combined with and actuated by a device for which Letters Patent No. 222,089 were granted to the assignee of this invention November 25, 1879. This mechanism forms no part of my present invention; hence it will suffice to remark that the needle, independently of its vertical reciprocating movement, has an intermittent horizontal reciprocating motion, so as to make what is known as the "glove-stitch." To the lower end of the shaft D', geared by bevel-wheels to the main driving-shaft D, is secured the crank a,

the pin of which is connected by a rod, a', to the reciprocating and guided shuttle-driver b, as in an ordinary Singer sewing-machine.

In describing my improvements it will be best in the first instance to explain the cloth holding and traversing mechanism illustrated in Figs. 7 and 8, Sheet 4.

The plate E has an elongated slot, c, with rounded ends, one of these ends, c', being larger than the slot is wide. A pin, d, is secured to the plate E at d', where the said plate is re-enforced in thickness, and to the upper end of this pin is hinged a cam-lever, E', for depressing and releasing the two clamping-arms, F F' pivoted at f to the plate E, as well as toward each other, as explained hereinafter.

A sleeve, G, fits loosely on the pin d, and this sleeve has two cam-like projections, i i', one being contained within an opening in one clamping-arm and the other within a similar opening in the other clamping-arm. This sleeve is under the control of the cam-lever E', two projections, j j, on the sleeve fitting between the cheek-pieces k k of the lever where the latter is jointed to the pin d, and the cam-shaped edges of these cheek-pieces being arranged to bear on the sleeve. A spring, g, is interposed between the lowest of the two clamping-arms and the plate E, the spring having a tendency to raise the arms when they are released from the pressure of the cam-lever. When the fabric in which the button-hole stitches have to be made is to be clamped, the cam-lever E' is so adjusted that the spring g will raise the clamping-arms F F', after which the fabric is introduced beneath the said arms, and the latter are then depressed by the cam-lever. The fabric, however, on being thus clamped by the arms F F' to the plate E, frequently becomes crumpled or puckered; but by turning the cam-lever E' laterally the sleeve G will also be turned, and its cam-like projections i i' will move the two clamping-arms slightly apart from each other and simultaneously stretch the fabric and reduce it to the best condition for being stitched—that is to say, so that there will be no likelihood of one row of stitches on one side of the button-

hole overlapping the row of stitches on the opposite side.

From the bed-plate A of the machine, immediately below the needle-bar, projects a fixed button, H, (best observed in the exaggerated sectional view, Fig. 11,) the head of this button being contained within a recess, *c*, in the plate E, and overlapping a slotted rack-plate, H', secured to the under side of the said plate E, the button serving as a guide for the latter both when it traverses in straight lines and when it turns to form the rounded end of the button-hole, as explained hereinafter. The rack-plate H' can be best observed by reference to the dotted lines in Fig. 4, where it will be seen that there is a toothed rack on each edge of the plate, and that the two racks are united by the segment of a toothed wheel formed on one end of the plate.

It may be remarked here that a cloth-plate with a rack-plate beneath it like that described is shown in Singer's English-Patent, No. 132 of 1863, for button-hole-feed mechanism.

At opposite edges of the plate E are parallel grooved projections *m m'*, one near each end of the plate, and a guide-pin, *n*, projecting upward from the bed-plate of the machine, is adapted to the grooves.

A lever, I, is pivoted at *p*, Fig. 2, to the under side of the bed-plate A, and this lever is vibrated by a cam or eccentric on the vertical shaft D' precisely as the feed-lever of an ordinary Singer sewing-machine is operated. A pin on the outer end of this lever enters a slot in the rocking plate J, which is pivoted to a spindle, J', on the under side of the bed-plate. A detached view of this rocking plate is shown in Figs. 9 and 10, where it will be observed that it has two pins, one carrying a pawl, *q*, adapted to the teeth of the ratchet-wheel K, and the other carrying a spring, *q'*, for acting on the pawl.

The ratchet-wheel is fast on the spindle J' and bears against a shoulder, *l*, on the same, Fig. 10, the said ratchet-wheel and rocking plate and a washer, *s*, between the two being confined to the spindle between said shoulder *l* and a nut at the end of the spindle, which carries a cog-wheel, M, gearing into a similar wheel, N, the latter turning on a pin on the bed-plate and gearing into the teeth on the edge of the rack-plate H'.

A lever, P, Figs. 2 and 10, is pivoted to the under side of the bed-plate by a pin, *t*, a spring, P', tending to force the short arm of this lever against the periphery of the hub K' of the ratchet-wheel K, Fig. 10, thereby causing on the said wheel a friction, which will be referred to hereinafter. The end of the long arm of the lever P is provided with a knob, *v*, projecting above the base-plate A, so as to be within easy reach of the operator, the pin on the lever to which the knob is attached passing through a slot in the said bed-plate. The short arm of the lever P is thickened, as shown in Fig. 10, so that when the said arm is moved

from frictional contact with the hub of the ratchet-wheel it will throw the pawl out of gear with the teeth of the said wheel.

The spindle J' has its bearings in the bed-plate of the machine, and in a plate, *y*, secured to the said bed-plate, as shown in Fig. 3.

The readiest way of describing the operation of the cloth-plate E in forming the stitch will be by reference to the diagrams Figs. 12, 13, 14, and 15.

In Fig. 12 the cloth-plate, guided by the central button, H, and by the pin *n*, which is in the groove of the guide *m* of the plate, is moving in the direction of the arrow, and the needle is making a row, *v*, Fig. 15, of zigzag stitches on the fabric, the movement of the plate being effected by the vibrating lever I through the medium of the rocking plate, pawl, ratchet-wheel, and cog-wheels M and N, the latter wheel acting on the straight rack on one edge of the rack-plate. When the straight row *v* of stitches has been completed the cloth-plate E is free from the control of the guiding-pin *n*, the grooved edge *m* of the plate having been moved clear of the said guiding-pin, so that the plate E will now be under the sole control of the central button, H, and of the cog-wheel N, which, acting on the segmental portion of the rack-plate, must gradually turn the cloth-plate E round, as shown in Fig. 13, stitches meanwhile being formed on the rounded end of the button-hole. As soon as these stitches have been completed and the plate E is in the position Fig. 14, the wheel N commencing to act on the side of the rack opposite that on which it previously acted, the end of the groove in the edge *m'* of the plate E will be directly opposite the guide-pin *n*, which will control the plate and direct it in a straight course while the row *v'*, Fig. 15, of stitches opposite the row previously made is being completed. When the button-hole stitching has been completed the fabric is severed between the straight rows of stitches and perforated within the segmental row, when the button-hole will be finished.

In order that the two straight rows of stitches may be at a suitable distance apart, the center of the button on which the plate turns must be so situated in respect to the course of the needle that this proper distance will be assured.

Button-holes of different lengths can be stitched by the above-described device, the length of the straight rows of stitches depending upon the preliminary adjustment of the cloth-plate on the bed-plate of the machine, for it should be understood that the plate is detachable from the machine. Before the plate can be moved to its place, however, the wheel N must be loose, and this is effected by so operating the lever P that the pawl will be moved out of gear with the ratchet-wheel and friction removed from the hub of the same.

The length of the straight rows of stitches will depend upon the distance of the point where the wheel N commences to act on the

teeth of the rack-plate from the rounded or segmental portion of said plate.

It will be understood that when the feed commences to act on the plate E the pin *n* occupies a position more or less remote from the front end of the slot *m*, depending upon the extent of the preliminary adjustment of the plate.

In some cases the button H may be so shaped in respect to the size of the slot in the cloth-plate that the latter can only be removed when it occupies a certain relation in respect to the button, the slot in this case, however, being preferably enlarged at both ends, in order that the plate can, after the completion of one set of stitches be reversed for the commencement of another set without the necessity of removing it from the button H.

The gage of the stitches may be changed by simply adjusting the slide which carries the fulcrum of the lever P, as in an ordinary Singer sewing-machine. By this means the stitches may be arranged closely together around the eye of the button-hole, as shown in Fig. 15, this closer arrangement of the stitches being necessary, owing to the fact that the fabric at this point moves at a much slower rate than during the formation of the straight rows of stitches *v v'*, owing to the contracted radius of the portion *e'* of the slot as compared with the radius of the segmental portion of the rack-plate.

I claim as my invention—

1. The combination of the cloth-plate, two clamping-arms, F F', pivoted to the said plate, the pin *d*, a sleeve, G, adapted to the pin and having projections for acting on the arms, with the cam-lever E', pivoted to the said pin and

constructed for operating on the arms, substantially as set forth.

2. The combination of the cloth-plate having at its opposite edges straight parallel grooves *m m'*, open at both ends, the rack-plate, operating-gearing adapted to said plate, and a guide-pin, *n*, on the upper surface of the bed-plate or frame of the machine, all substantially as set forth.

3. The combination of the cloth-plate, its rack-plate, and a wheel gearing into the same, with a ratchet-wheel, mechanism for operating the same, and a spring-lever under the control of the operator for imparting friction to the ratchet-wheel, substantially as and for the purpose set forth.

4. The combination of the spindle J', carrying the wheel M, the ratchet-wheel K, the vibrating plate J and its pawl, with the spring-lever P, adapted for acting on the pawl, all substantially as specified.

5. The combination of the slotted cloth-holding plate having a rack-plate with opposite straight sides and segmental end, the operating-pinion therefor, ratchet mechanism connected with said pinion, and a ratchet-operating lever having a shifting fulcrum, whereby the gage of the stitches can be altered in forming the eye of the button-hole, as set forth.

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

W. W. ABBOTT.

Witnesses:

HARRY DRURY,  
HARRY SMITH.