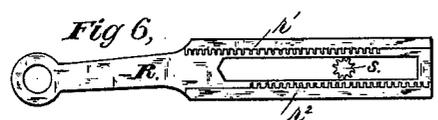
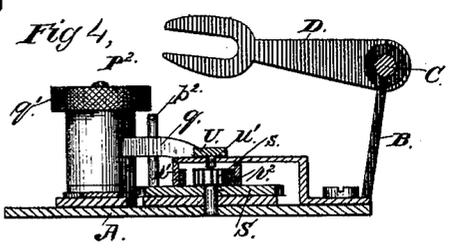
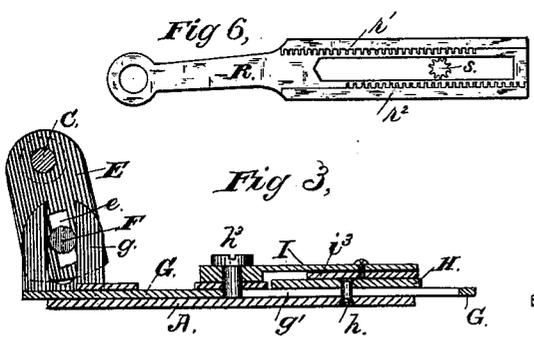
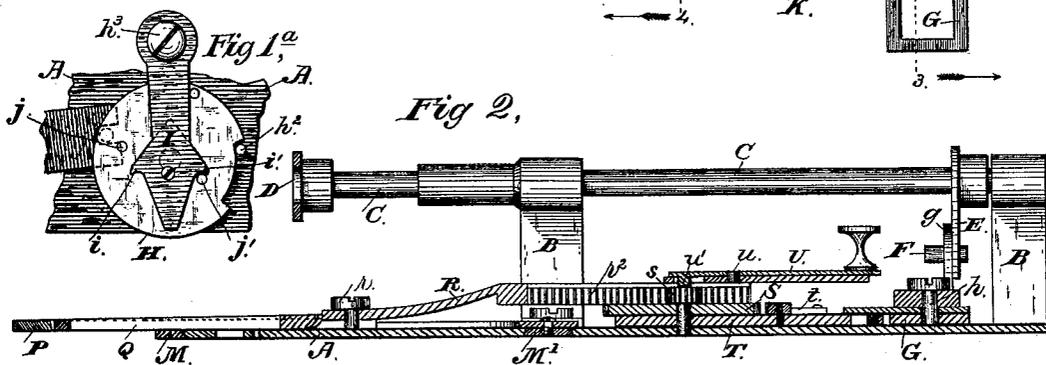
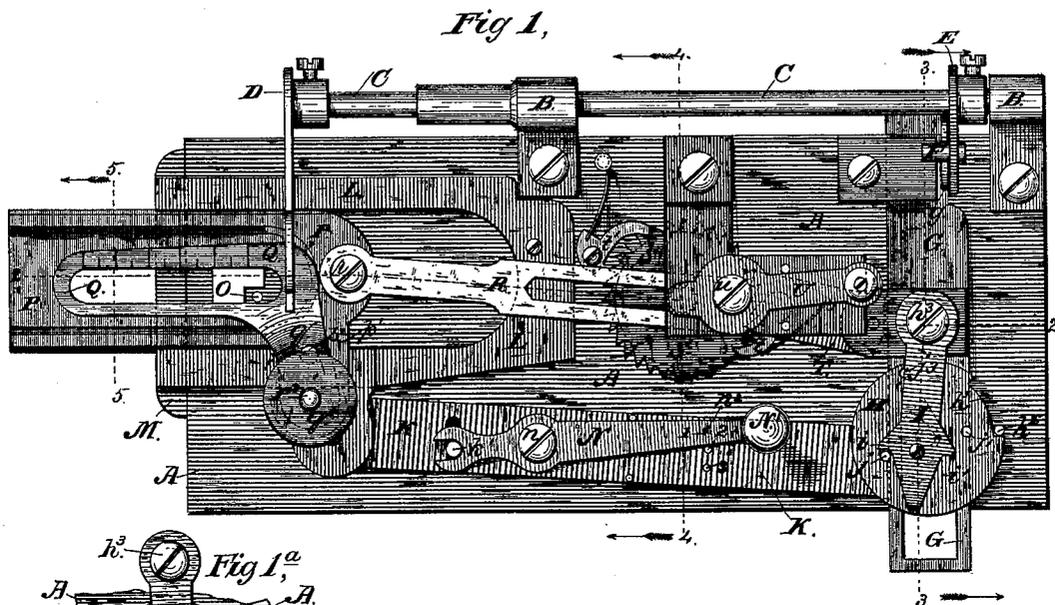


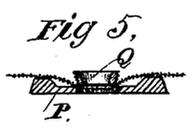
R. H. St. JOHN.  
 Button-Hole Attachment for Sewing-Machines.

No. 222,543.

Patented Dec. 9, 1879.



Attest  
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# UNITED STATES PATENT OFFICE

ROSWELL H. ST. JOHN, OF SPRINGFIELD, OHIO.

## IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. 222,543, dated December 9, 1879; application filed August 15, 1879.

To all whom it may concern:

Be it known that I, ROSWELL H. ST. JOHN, of Springfield, in the county of Clarke and State of Ohio, have invented a new and useful Improvement in Button-Hole Attachments for Sewing-Machines, of which the following is a specification.

The subject of my invention is an attachment for sewing button-holes, said attachment being operated from the needle-bar of the sewing-machine through the medium of a forked arm and a rock-shaft communicating through an oscillating pawl and a lever with the clamp which holds the goods, so as to move the said clamp laterally in opposite directions alternately on each upward stroke of the needle-bar, and, with the aid of suitable feed mechanism, produce the required transverse stitches from end to end on one side of the button-hole. This done, the clamp is shifted sufficiently to cause the stitches to be laid centrally across the end of the button-hole, the feed being meantime suspended. The clamp is then shifted further, and the other side of the button-hole is stitched by reversed movement of the feed, after which it is again placed in intermediate position to stitch the other end of the button-hole while the feed is again suspended.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a plan of the attachment adjusted for sewing on one side of the button-hole. Fig. 1<sup>a</sup> is a plan of the oscillating disk and lever, showing them at the opposite extremity of their stroke from that represented in Fig. 1. Fig. 2 is a longitudinal section on the line 2 2, Fig. 1. Fig. 3 is a transverse section on the line 3 3, Fig. 1. Fig. 4 is a transverse section on the line 4 4, Fig. 1. Fig. 5 is a transverse section of the clamp on the line 5 5, Fig. 1. The arrows in each case indicate the direction of vision in the sectional views. Fig. 6 is an under-side view of the slotted feed-bar, hereinafter described, with the feeding-pinion in the central position relatively to the said bar, which position is that which said pinion occupies when the feed is suspended.

A represents the bed-plate of the attachment, which is to be fixed to the cloth-plate of

a sewing-machine in any usual or customary manner. B B are a pair of standards affording bearings for a rock-shaft, C, on which is fixed a horizontal forked arm, D, the forks of which in operation embrace a pin or lug on the needle-bar, so as to impart a reciprocating rotary movement to the rock-shaft. E represents an arm projecting vertically downward from the rock-shaft C, and carrying a wrist, F, which is adjustable in a vertical slot, e, in the arm E, so as to vary the radial distance of the said wrist from its center of oscillation, and thereby adapt it to receive the same stroke from needle-bars having different lengths of stroke.

The wrist F works in a notch in a vertical lug, g, projecting upward from a horizontal slide, G, which is provided with a guiding-slot, g', near its extremity, working over a stud, h, forming the axis of a horizontal disk, H, which is formed with a segmental notch, h', in its periphery to limit the oscillating movement of the disk by contact of the ends of the notch with a stud, h<sup>2</sup>, projecting upward from the bed A.

Pivoted at h<sup>2</sup>, near the center of the slide G, is a pawl, I, having an anchor-shaped head, the arms i i' of which engage alternately with studs j j', projecting upward from the face of the disk H.

A third stud, j<sup>3</sup>, projecting upward from the face of the disk, near its periphery, midway between the studs j j', engages at each alternate return movement of the pawl I with the opposite faces of a wedge-shaped cam, i<sup>2</sup>, fixed beneath the pawl I, so as to deflect the said pawl from side to side in its return movement, and cause it in its successive forward movements to engage with the pins j j' alternately, and thereby oscillate the disk H. To this disk is connected one end of a lever, K, fulcrumed on a stud, k', and pivoted at its forward end to a laterally-reciprocating guide, L, which carries the cloth-clamp P Q, and guides it in its longitudinal feed movement, and is itself guided transversely by slides M M'.

The lever K is provided with a transverse slot to receive the fixed fulcrum-stud k' and permit the adjustment of the fulcrum-point of the lever thereon. This adjustment of the fulcrum-point of the lever K is effected by means

of a secondary lever, N, fulcrumed to said lever K at  $n$ , moved by a knob,  $N'$ , and formed at its extremity with a notch or fork embracing the fixed fulcrum-stud  $k'$ . A stud,  $n^2$ , on the under surface of the lever N, catches in either of the holes 1 2 3 prepared for it in the face of the lever K, so as to hold the secondary lever N at either extremity of its movement or in an intermediate position, accordingly as it is desired to stitch one or the other side of the button-hole or to stitch across one end thereof. The needle-hole in the bed-plate A is shown at O.

P Q are the two parts of the clamp for holding the cloth. The lower part, P, is fitted to move longitudinally within the reciprocating guide L, and is connected by a pivot-screw,  $r$ , with a slotted feed-bar, R, which is formed on each side of its slot with a rack,  $r'$   $r^2$ , either one of which racks, as the slotted feed-bar is moved to one side or the other side, engages with a feed-pinion,  $s$ , projecting upward from the center of the ratchet-wheel S, which is actuated by a pawl,  $t$ , on a lever, F, fulcrumed concentrically to the pivot of said ratchet-wheel and pivoted to the slide G.

$t'$  represents a pawl for preventing the retrograde movement of the ratchet-wheel S. The movement of the feed-bar R from side to side is effected by means of a switching-lever, U, fulcrumed at  $u$ , and having a stud,  $u'$ , projecting downward from its extremity within the slot of the feed-bar R over the center of the pinion  $s$ . This position of the shifting-stud adapts it to move the feed-bar so that either of its racks will be brought into effective gear with the pinion  $s$  in any longitudinal position of the feed-bar R. The distance asunder of the racks  $r'$   $r^2$  and the diameter of the pinion are such as to permit the suspension of the feed at any time by setting the feed-bar R in a central position by means of the switching-lever U, the racks  $r'$   $r^2$  being thus both held out of contact with the pinion  $s$ , as shown in Fig. 5. The lower member, P, of the clamp is formed with a lateral arm,  $p'$ , from which projects upward a stud,  $P^2$ , to receive the neck  $q$  of the upper clamp-jaw, Q, and a screw,  $q'$ , by which said jaw is pressed down on the lower member, P, of the clamp.

$p^2$  represents a guiding-stud passing through an aperture prepared for it in the neck of the clamp-jaw Q, so as to guide the said jaw in a vertical path as it is raised and lowered, to prevent its turning out of its proper position.

The operation is as follows: The cloth where the button-hole is to be made is clamped between the jaws P Q, the hole being previously slit or not, as may be preferred. The parts being in the position shown in Fig. 1, the needle-hole O will be seen close to the edge of the opening in the clamp-jaw Q. The needle-bar has now reached the upward extremity of its stroke, bringing the operating-arm D to the position shown in Fig. 4. The descent of

the needle-bar, carrying with it the arm D, retracts the pawl I, causing that face of the wedge-shaped cam  $i^3$  which is seen on the left in Fig. 1 to come in contact with the pin  $j^3$ , said pin being placed at the left of the center by reason of the position of the oscillating disk H. The contact of this cam-surface with the said pin  $j^3$  throws the pawl I to the right, or in the opposite direction from which it is seen in Fig. 1, as the slide G is retracted, causing it, on the next upward stroke of the needle-bar, to engage with the pin  $j'$  on the disk H, throwing it to the other extremity of its oscillation, thereby moving the lever K and drawing the clamp, together with the cloth, so as to bring its longitudinal center nearly over the needle-hole O, thus permitting the needle on its next descent to pierce the cloth at the other extremity of the desired stitch. The same upward movement of the needle-bar, by the connection of the slide with the lever T and pawl  $t$ , rotates the ratchet feed-wheel S the distance of one tooth, and thereby feeds the cloth longitudinally of the button-hole, in readiness for the next stitch. The sewing of one side of the button-hole being thus effected from end to end, the shifting-lever N and the switching-lever U are both placed in an intermediate position, so as to bring the clamp in such position relatively to the needle-hole that its lateral movement will cause the stitches to be laid centrally across the end of the button-hole, the feed being suspended by the intermediate position of the slotted feed-bar R. Any necessary number of stitches may thus be made at the end of the button-hole to impart the necessary strength thereto.

A further movement of the secondary lever N and the switching-lever U to the other extremities of their strokes then causes the stitches to be laid along the other side of the button-hole, while the reversal of the feed carries the cloth backward beneath the needle in the manner already described. The first end of the button-hole being reached on this return movement, the switching-levers are placed in their intermediate positions, so as to stitch the end and complete the button-hole.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

1. The combination of the horizontal rock-shaft C, forked arm D, arm E, adjustable wrist F, slide G, provided with lug  $g$ , vibrating pawl I, and oscillating disk H, having pins  $j' j^3$ , for imparting an effective oscillating movement to said disk from needle-bars of various lengths of stroke, as set forth.

2. The combination of the slide G, suitable mechanism for operating the same, the vibrating pawl I, oscillating disk H, having pins  $j' j^3$ , lever K, reciprocating guide L, slides M M', and cloth-clamps P Q, as and for the purposes set forth.

3. The combination of the reciprocating cloth-clamp P Q, guide L, lever K, feed-bar R, switching-levers U and N, feed mechanism S and T, and mechanism for imparting reciprocating movement to the levers K T, substantially as and for the purposes specified.

4. The combination, with the slide G, pawl I, and mechanism for operating said slide, of

the disk H, provided with pins  $j j' j^3$ , to effect the oscillation of the pawl and cause the latter to impart a vibrating motion to the disk, substantially as described.

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Witnesses:

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W. E. GUY.