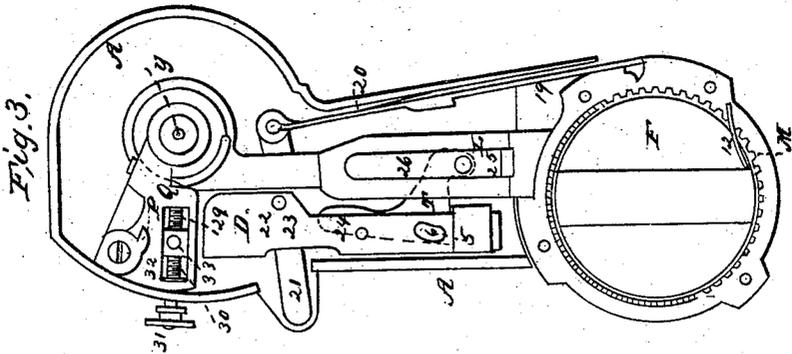
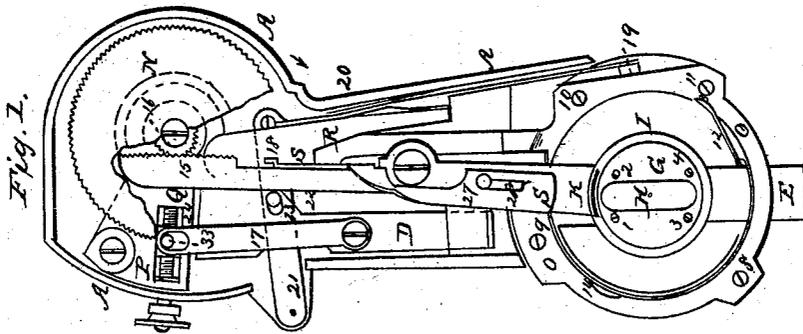
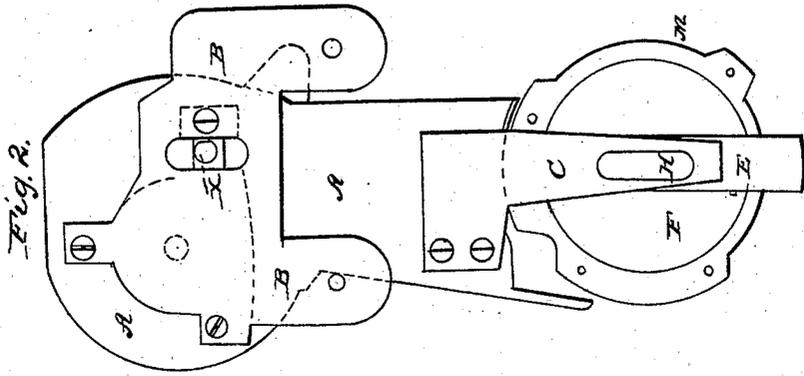


J. A. & H. A. HOUSE.  
 Button Hole Sewing Machine.

No. 55,864.

Patented June 26, 1866.



Witnesses:

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# UNITED STATES PATENT OFFICE.

JAMES A. HOUSE AND H. A. HOUSE, OF BRIDGEPORT, CONNECTICUT.

## IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINES.

Specification forming part of Letters Patent No. 55,864, dated June 26, 1866.

*To all whom it may concern:*

Be it known that we, JAMES A. HOUSE and HENRY A. HOUSE, both of Bridgeport, in the county of Fairfield and State of Connecticut, have invented a new and useful Improvement in Machines for Working Button-Holes; and we do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and in which—

Figure 1 is a plan view of the under side of our machine with the covering-plate removed. Fig. 2 is a plan view of the upper side of the machine; and Fig. 3 is a view of parts of the machine, showing some of its interior details in different colors.

It is the object of our invention to sew button-holes automatically by a mechanism capable of being effectively attached, with either side up, to any sewing-machine that can impart a horizontal reciprocatory motion suitable for working our devices; and to this end our invention consists, first, in inclosing the mechanism in a shell-case that will permit the same to be turned either side upward and the button-hole to be worked either on the upper or lower side of the bed-plate to which it may be attached; second, in giving the button-hole cloth-holder a rectilinear, rotating, and vibrating movement to sew both sides and both ends of the button-hole automatically; third, in so combining a jog-bar, a rack-bar, and a ratchet-wheel with the cloth-holder as to give the latter a rectilinear intermittent movement; fourth, in so combining a jog-bar, a pawl-lever, and toothed ratchet-wheel with the cloth-holder as to give the latter an intermittent rotary motion; fifth, in so combining a jog-bar with a supporting arm or bar that holds the cloth as to give the latter constantly a motion of vibration; sixth, in so combining an adjustable slide with the bar that supports the cloth-holder and a pawl-lever as to vary the length of button-hole to be worked; seventh, in so combining a jog-bar, a pawl-sweep, and a ratchet-wheel with the cloth-holder as to control the spacing of the stitches.

The case A may be made of cast or sheet metal, and secured to a plate, B, having screw-holes by which to attach it to the sewing-machine.

A stud, X, passing through a slot in the case A and plate B, may receive a reciprocatory movement from the sewing-machine in any suitable manner. We have found a double-scroll cam secured upon the revolving shaft of a sewing-machine well adapted to give this stud X its required reciprocation, and this stud is secured to the jog-bar D within the case, which bar imparts the movements to all the operative members of our button-hole machine.

The case A may be attached to the upper or under side of the sewing-machine, and when the cloth-holder is not interrupted by the sewing-machine in any of its movements the button-hole clamp C may be turned downward and the cloth held beneath the case, or the button-hole attachment may be placed on top of the bed-plate of the sewing-machine and the cloth held above the case. Our attachment will work effectively in either position, and from this peculiarity may be readily adapted to sewing-machines of almost every style.

The cloth-holder C is attached to the under side of a plate, E, which is arranged to slide in the slot of a toothed disk, F, which has, at given periods, an intermittent semi-rotation, while the plate E has an intermittent reciprocatory motion in its slot across the disk. The plate E has attached to its upper side, by screws 1 2 3 4, a circular plate, G, Fig. 1, which moves on the toothed disk F, and thus the cloth-holder C is held in position by the disk F on one side and the plate G on the other, and is thus free to rotate intermittently with the toothed disk and to have an intermittent progressive movement across the disk, while the cloth-holder C, the plate E, and the circular plate G are all slotted, as at H, to permit the needle of the sewing mechanism to pass through the cloth to work the button-hole.

The circular plate G is held in a ring, I, on the forward end of the feed-lever K, fulcrumed on the supporting-beam L, (shown in blue lines in Fig. 3,) which derives a motion of vibration from the pin 5 in slot 6 of the jog-bar D. (Shown in red lines in Fig. 3.)

The toothed disk F is supported in a ring, M, on the forward end of the supporting-beam L, which is fulcrumed around the axis 7 of the ratchet-wheel N, and the disk F is secured by

a cap, O, on the ring M, which is fastened by screws 8, 9, 10, and 11. The disk carries a small spring, 12, which, resting in depressions 13 and 14 in the ring, serves to keep the disk in position when the plate E is in position to receive its rectilinear movement, or while that movement is in progress, and thus the cloth-holder is always free to vibrate the length of a button-hole stitch, whether it is rotating or moving forward, and of course the sewing is uniform on the edges and around the ends of the button-hole, which is worked also strictly automatically.

The cloth-holder derives its rectilinear movement from the ratchet-teeth 15 on the rear end of the feed-bar K, working in gear with the pinion 16 on the under side of the ratchet-wheel N, which is actuated by a pawl, P, on the sweep Q, which is connected by the strap 17 with the jog-bar D. The longitudinal reciprocation of the jog-bar, produced by the switch-cam or other reciprocating device on the sewing-machine, rotates the ratchet-wheel automatically, and this motion is communicated to the feed-bar by the pinion working on the ratchet-teeth while the sides of the button-hole are being stitched, and this is effected by a continuous progression, which governs the stitching of the sides one side at a time, for after one side of the button-hole has been stitched the feed-bar is thrown out of gear with its driving-pinion by the mechanism which gives the intermittent rotary motion to the cloth-holder, which is as follows: A plate, R, carries a square stud, 18, which presses against the toothed side of the slide S on the feed-bar K while this bar is feeding forward; but when one side of the button-hole is stitched the end of the slide S passes the stud 18 and permits it to rest against the feed-bar and arrest its forward movement, for at the instant the stud 18 comes against the feed-bar a hooked pawl, 19, (shown in Fig. 1 and in red lines in Fig. 3,) is pressed by its spring 20 into contact with the teeth of the disk F, which carries the cloth-holder, and as the hooked pawl is connected by a strap, 21, and stud 22 with the slot 23 in the jog-bar D, it receives a reciprocatory movement that in coming back pulls the teeth of the disk and slips over them in going forward until a half-revolution of the cloth-holder is completed, and at the first pull of the hooked pawl on the teeth of the disk the plate G, in commencing to turn, throws the rack on the rear end of its feed-bar, which is free to turn on a center, out of gear with its pinion; but when a half-revolution of cloth-holder is effected the feed-bar has been forced back until the plate G is near the inner edge of the ring M and the rack brought into gear with the teeth of its pinion, when the stud 18 will again rest on the outside of the slide S, when the opposite side of the button-hole is in position to be stitched. The stitching mechanism having worked one side of the button-hole on its former forward movement and one end of the

button-hole in the first half-revolution of the cloth-holder, (for during these movements of the cloth-holder it has all the time been under a motion of vibration to determine the length of the stitches, and this motion is derived from a slot, 6, in the jog-bar that is placed on an angle to the line of motion of the jog-bar D,) a pin, 5, in this slot is secured to a crank-lever, T, pivoted on its long arm at 24 and carrying a stud, 25, in its short arm, that rests in the slot 26 in the supporting-beam L, that is fulcrumed around the axis of the ratchet-wheel, so that as the jog-bar is reciprocated the position of the stud in its inclined slot is continually changing and vibrating the crank-lever T, and with it the cloth-holder is also under continuous vibration while the machine is in operation.

To vary the sewing to button-holes of different lengths, we provide a slotted slide, S, that rests upon the feed-bar and is adjusted longitudinally by a set-screw, 27, past which the slot 28 moves and shortens or lengthens the period of contact between the teeth of the feed-bar and its pinion, so that when the slide S is moved toward the rack end of the feed-bar a longer button-hole can be worked, and, vice versa, when the bar S is moved from the rack a shorter button-hole will be worked.

To vary the distance between the stitches, we cut a slot, 29, in the sweep Q, in which we place a screw, 30, that is rotated by a milled head, 31, on the outside of the case. This screw passes through a threaded block, 32, which carries a stud, 33, which, as the screw is turned, will traverse. The stud 33 rests in the rear slotted end of the strap 17, which connects it to the jog-bar D, which thus imparts a vibratory motion to the sweep Q, which is fulcrumed around the axis of the ratchet-wheel N, and, as the threaded block is near to or farther from the fulcrum of the sweep, the distance between one stitch and another will be shorter or longer, for while the throw of the sweep will be continuous the distance it vibrates will change with the position of the stud that works in the slot of the strap.

The operation is as follows: The goods in which it is desired to work button-holes must be placed in the cloth-holder so that the spot where the button-hole is desired shall come centrally between the slots in the clamp and the sliding plate. The sewing-machine now being put in motion, the needle will penetrate the cloth, and when its loop has been taken will rise, and the cloth-holder will vibrate the length of a stitch, when the needle will again descend and form a stitch, which will be drawn tight as the needle again rises, when the feed will take place and the descending needle will commence a new stitch. The continuance of these movements will sew one side of the button-hole from end to end, when the cloth-holder will be rotated for half a revolution, and while this rotation is going on the stitching continues to complete the end of the button-hole, which

has now been finished to the outer edge of the toothed ring, and, of course, the half-revolution this ring has performed will have brought the edge of the button-hole back to be stitched, like the first side, by the forward progression of the cloth-holder, and thus a button-hole will be automatically worked by a mechanism that works its sides by a forward movement only of its opposite sides and the ends while it is rotating, and so that the integrity of the stitches is kept perfect by the vibration of the cloth continually, whether the sides or ends of the button-hole are being completed.

We have rendered the movements of this mechanism harmonious by making the axis of the toothed ratchet-wheel the fulcrum both of the cloth-holder and of the sweep which carries the pawl, for whenever these movements are to be changed from rotary to rectilinear the feed is brought into gear properly, and when either motion is in progress there is no disturbance of the vibrations of the cloth necessary to the integrity of the stitching.

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

1. Working button-holes automatically above or below the bed-plate of sewing-machines, substantially as and for the purpose set forth.

2. Sewing button-holes automatically by giving the goods a progressive, a semi-rotary, and a vibrating movement from a center to stitch the sides and ends of the button-hole with stitches of uniform length.

3. The combination of a jog-bar, a rack-bar, and a ratchet-wheel with the cloth-holder, substantially in the manner and for the purpose set forth.

4. The combination of a jog-bar, a pawl-lever, and toothed wheel with the cloth-holder, substantially as and for the purpose set forth.

5. The combination of a jog-bar, a crank-lever, and supporting-beam L with the cloth-holder, substantially in the manner and for the purpose set forth.

6. The combination of an adjustable slide with the feed device and cloth-holder, substantially in the manner and for the purpose set forth.

7. The combination of a jog-bar, a pawl-sweep, and a ratchet-wheel with the cloth-holder, substantially as and for the purpose set forth.

8. The jog-bar, when combined with the cloth-holder and pawl-sweep, substantially as described, to give the cloth-holder all its required motions to vary the spacing between the stitches and to adapt the sewing to button-holes of different lengths, substantially in the manner described.

In testimony whereof we have hereunto subscribed our names.

JAMES A. HOUSE.  
HENRY A. HOUSE.

Witnesses:

GEORGE H. DIMOND,  
GEORGE C. BISHOP.