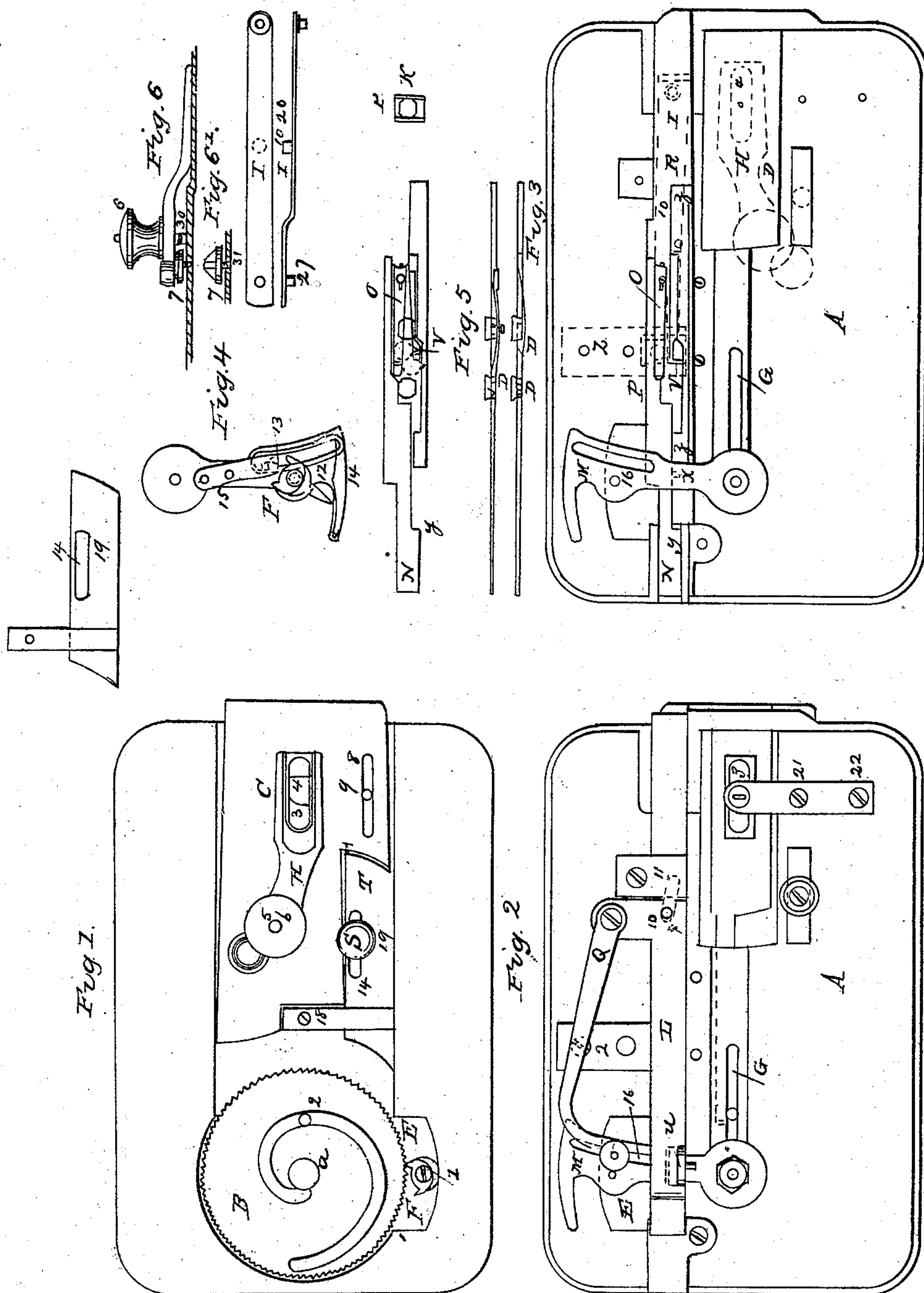


J. A. & H. A. HOUSE.  
Button Hole Sewing Machine.

No. 55,863.

Patented June 26, 1866.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

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

## IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINES.

Specification forming part of Letters Patent No. **55,863**, 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 Machine 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, in which—

Figure 1 represents a plan view of the machine with its covering-plate removed to show the spirally-slotted ratchet-wheel and its pawl. Fig. 2 represents a plan view of the under side of the machine. Fig. 3 represents a view of the under side of the machine with parts removed to exhibit the details. Fig. 4 represents, in detail, the parts which reverse the position of the pawl to reverse the feed; and Fig. 5 shows the details of the switch-block for changing the throw of the clamping-plate.

It is the object of our invention to work a button-hole and finish it on both sides without turning the fabric in which it is worked, which has hitherto been a desideratum in this class of machines, and which gives to the button-hole machine a largely-increased capability for rapid work, besides rendering the working of button-holes strictly automatic; and to this end our invention consists, first, in working a button-hole on both sides without turning the cloth; second, in a scroll-cam ratchet-wheel having a reversible motion to feed the fabric back and forth the distance required for any determined length of button-hole; third, in shifting the pawl automatically by adjustable stops that determine the length of button-hole to be worked; fourth, in determining the length of stitch by the pawl-sweep, slotted and fulcrumed on the axis of the scroll-cam, and connected by a bent rod with the jog-bar; fifth, in combining with a reciprocating shell-plate a stationary and an adjustable switch-hook to sew button-holes of varying lengths; sixth, in governing the vibration of the clamping-plate by a switch-block to sew the opposite sides of button-holes of whatever length; seventh, in attaching to the under side of the fixed bed-plate an adjustable stitching-plate, so that it may be always in proper relation to the needle; eighth, in an adjustable screw-pivot for

the clamp, to adapt it to any thickness of cloth; ninth, in supporting the cloth by a clamp on a vibrating plate, which has also a longitudinal reciprocatory motion, to work both sides and both ends of a button-hole without turning the cloth.

The whole of the mechanism involved in our invention may be conveniently supported on or attached to the opposite sides of a bed-plate, A, having a covering-plate (not shown in the drawings) over the scroll ratchet-wheel B. The top of plate A is cut down circularly, to permit the scroll-wheel B to rotate beneath its surface, and longitudinally, to receive a vibrating plate, C, which has also a reciprocating or forward and back motion.

The bed-plate A is cut through and through at the forward portion of the depression, as at D in Fig. 3, and on one side of the scroll-wheel, as at E, Figs. 1, 2, and 3, to permit the vibration of the pawl F over the teeth of the scroll-wheel.

The scroll-wheel B carries a scroll-slot, 1, cut spirally from near its outer edge to near its axis *a*, and the perimeter of the wheel is cut into ratchet-teeth.

The plate C is attached to or may form part of a bar, G, that carries near its rear end a pin or stud, 2, which projects from the top of the bar into the scroll-slot of the ratchet-wheel B, and as the scroll-wheel is alternately rotated back and forth the pin 2 approaches or recedes from its axis, and thus imparts a limited longitudinal reciprocation to the plate C, and this plate carries a slot, 3, at its forward end, of the length of the largest button-hole to be worked on the machine. The plate C also carries a clamp, H, having a slot, 4, over the button-hole, and which is pivoted on a screw, 5, fastened in the plate C, and having a milled nut, 6, above the clamp, and a spiral spring, 30, beneath it.

The rear end of the clamp rests on a milled nut, 7, that turns on a screw, 31, also fastened to the plate C. This milled screw-nut 7 is finished with a cone shape on the top, and the rear of the clamp has a corresponding cone-shaped depression, so that as the nut 7 is turned to rise on its screw the clamp can always be made to rest on cloths of varying thicknesses with a pressure parallel to the plate C, over the whole under surface



of the presser, and thus render the pull on the stitch uniform in all parts of the button-hole, the clamp H and its adjusting-cone 7 being shown in Figs. 6 and 6' in elevation and section. The plate C carries a slot, 8, in which a stud, 9, rests, that is secured to a bar, I, (shown in red lines in Fig. 3,) having its fulcrum in a plate, K, (also shown in red lines,) the bar I being shown independently in plan and edge views 20. This bar I carries a stud, 10, that rests in the slot 11 of the jog-bar L. Now, as the slot 11 in the jog-bar has an inclination to the straight movements of the bar, the position of the stud 10 in this slot will determine the movement of the clamping-plate sidewise, while the position of the stud 2 in the slot 1 of the scroll-cam will determine the longitudinal position of the clamping-plate, so that a single forward-and-back movement of the jog-bar will cause a forward and back vibration of the clamping-plate for each stitch in the button-hole, and a forward or back motion of the clamping-plate to advance or retract the button-hole for the next stitch.

The switch-pawl F is bifurcated, and carries a tail, 12, and a point, 13, on its under side, the former resting against a curved spring, 14, and the point resting between the forked projections of a lever, 15, fulcrumed on the sweep M, which is fulcrumed on the axis of the scroll-cam. The sweep M is vibrated by the movements of the jog-bar, and carries the pawl with it, and as one or the other of its teeth is constantly engaged with the ratchet-teeth of the scroll-wheel the movements of this wheel will continue in one direction or the other with the vibration of the jog-bar. The switch F is automatically changed to move the scroll-wheel in opposite directions by a reversing stop on the sliding bar N and movable switch V. (Shown in blue lines in Fig. 3 and in detail in Fig. 5.)

A pin, X, projects from the upper side of the forked lever 15, that is alternately struck by a projection, Y, on the sliding bar N and by the movable switching-wedge V.

A switch-block, P, is attached to the bed-plate by being dovetailed in a plate, Z, as shown in red lines, and this switch-block is moved in opposite directions by the switch-wedge V passing on one side, and its own passage past a stationary switch, O, on the other; or, in other words, the bar N is fastened to the bar R, which is secured to the vibrating plate C in such a manner as to partake of its longitudinal but not of its vibrating movement.

The bar N carries a switch, O, and has a shoulder at Y, that strikes the pin X on the upper side of the forked lever 15, that vibrates the pawl, and when the side of the button-hole which is sewed on the advance movement of the plate C is finished the shoulder Y reverses the pawl, and the movement of the plate C is reversed by the reversed movement of the scroll-cam.

A switch, V, is attached to the sliding bar z, that carries the set-screw S in the slot 14, to adjust the length of the stitching to the length

of the button-hole, and as this switch and the bar z, when adjusted, also partake of the longitudinal movements of the plate C, the end of the bar z always moves in a fixed relation to the projection or shoulder y on the bar N, and when the side of the button-hole sewed by the return movement of the plate C is finished the end of the bar z strikes the pin X in the lever 15, and reversing the pawl, reverses, the movement of the scroll-cam. Now, as the stitches are formed by two punctures of the needle for each stitch, and as two sets of stitches are required for each button-hole, it is evident that the vibrations of the plate C must be kept in progress on one side of the button-hole at a time, that the goods may be moved under the needle the distance determined for the length of stitch, and to effect this the switch-block P is secured to the under side of a sliding bar, R, held by the plate Z, and carrying a hole to receive the pin 27 of the lever I, which vibrates the plate C, and as one side of the button-hole is being stitched the switch-block P is pressed by the switch V, and when the other side of the button-hole is sewed the switch O presses the block to the opposite side, and so changes the fulcrum of lever I, and causes it to shift laterally the plate C, in addition to its ordinary vibrations, and thus the plate C is made to vibrate alternately on opposite sides of the button-hole without interrupting the regular spacing of the stitching. This movement is to keep the clamping-plate in position to permit the opposite sides of the button-hole to be automatically sewed, for as the sewing of one side of the button-hole is finished by—say the forward movement of the clamping-plate, when the feed is changed the sliding switch passes between the switch-block and the edge of the bed-plate, and shoves the clamp over a sufficient distance, and holds it long enough to sew the opposite side of the button-hole, leaving the clamping-plate ample vibration to sew on the sides of a cut button-hole, or to leave room between the stitching to cut the button-hole after it has been sewed on both sides of the cut.

The pawl-sweep M carries a slot, 16, curved in the arc of the radius of the bent bar Q, which is fastened by a set-screw at one end in the slot 16, and at the other to the jog-bar L at 17, and by changing the position of the rod Q in the slot 16 you change the distance between the stitches in the button-hole, because, as the radius of the bent bar is increased, the pawl passes over a greater distance on the scroll-wheel, and as the radius of the bent bar is diminished the pawl will pass over a smaller number of the teeth in the scroll-wheel, so that the space between the stitches is increased by moving the bent bar out from, and diminished by moving it in toward the fulcrum of the sweep.

The bar R, (shown in red lines in Fig. 3,) which carries the switch-wedge V, has a stud in its forward end that receives a milled nut, S, above the bed-plate. This stud moves back



and forth in a slot, 14, in a sliding plate, T, attached to the vibrating plate C. Of course the plates T and C move together longitudinally; but the plate T has no vibrating movement, being confined by dovetailed ways, and connected to the bed-plate by a loose joint, or by the screw 18, resting in a transverse slot in the bed-plate. Now, all that is required to vary the movements of the clamping or bed plate to button-holes of any length is the change of the position of set-screw S in the slot 19; for as this set-screw determines the traverse of the switch-wedge V, the pawl will be shifted earlier or later, and the traverse of the scroll-cam 1 past the stud 2 will be increased or diminished. The movement of the set-screw S forward will lengthen the traverse of the scroll-cam, and its movement backward will diminish its traverse, and in the example shown in the drawings it is evident that the length of the button-hole may be varied to any radius extending from the end of the scroll-cam near the axis of the ratchet-wheel to any other point on the scroll-cam.

To the under side of the bed-plate we attach a stitching-plate, U, having slotted screw-holes 21 and 22, to permit it a slight longitudinal adjustment, so as to prevent the needle from striking its edges, and secure a uniform pull upon the loop of needle-thread by the hook, which could hardly be the case were the needle to enter the side of the opening in the stitching instead of always entering precisely in the center of this opening.

The operation is as follows: Our invention being applied to a Wheeler & Wilson sewing-machine, has its jog-bar suitably connected by a switch-cam to the main shaft, the rotation of which reciprocates the jog-bar, the goods being placed on the clamping-plate, and the stitching-plate adjusted for the needle to pass through the centre of its opening. The reciprocation of the jog-bar imparts two vibrations to the clamping-plate, and one feed-motion forward to space the stitches for each vibration of the jog-bar, during which the needle descends twice and forms a single stitch on one side of the button-hole, which is completed by the continued reciprocatory movement of the jog-bar, and at this moment the pawl is shifted and the switch-block moves the clamping-plate a sufficient distance laterally to sew the opposite side of the button-hole, which in this example terminates in a point

of short stitching at each end; but we are not limited to any shape for the termination of the ends of the button-hole, as the form of these ends is strictly under control of our invention. The mode of changing the length of the button-hole and the spaces of the stitches having been heretofore described, demonstrates that our invention will automatically produce button-holes without turning the cloth.

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

1. Working a button-hole automatically and on both sides without turning the cloth, by the devices substantially as described.
2. The scroll-cam ratchet-wheel, to give a rectilinear reciprocatory motion to and to govern the length of the button-hole, substantially as described.
3. The combination of the scroll-cam ratchet-wheel, shifting-pawl, and jog-bar, substantially as and for the purpose set forth.
4. The combination of the scroll-cam ratchet-wheel, the sweep, bent lever, and jog-bar, to space the stitching, substantially as set forth.
5. The combination of the reciprocating vibrating clamping-plate, the adjustable switch-wedge, and the jog-bar, for the purpose of varying the length of stitching for a button-hole, substantially as described.
6. The combination of the jog-bar, clamping-plate, movable switch and switch-block, to sew both sides of button-holes automatically, substantially as described.
7. The combination of an adjustable stitching-plate with the fixed bed-plate, substantially as and for the purpose set forth.
8. The combination of the clamp to hold the cloth with an adjustable screw-pivot to render the bearing-surface of the clamp parallel with cloth of varying thicknesses, substantially as set forth.
9. The combination of the vibrating and reciprocating plate with the adjustable clamp, when so arranged that both shall move together to hold the cloth smoothly between them, as set forth.

In testimony whereof we have hereunto subscribed our names.

JAMES A. HOUSE.  
HENRY A. HOUSE.

Witnesses:

GEORGE O. BISHOP,  
SAMUEL BURR.