

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

3 Sheets—Sheet 1.

No. 55,865.

Patented June 26, 1866.

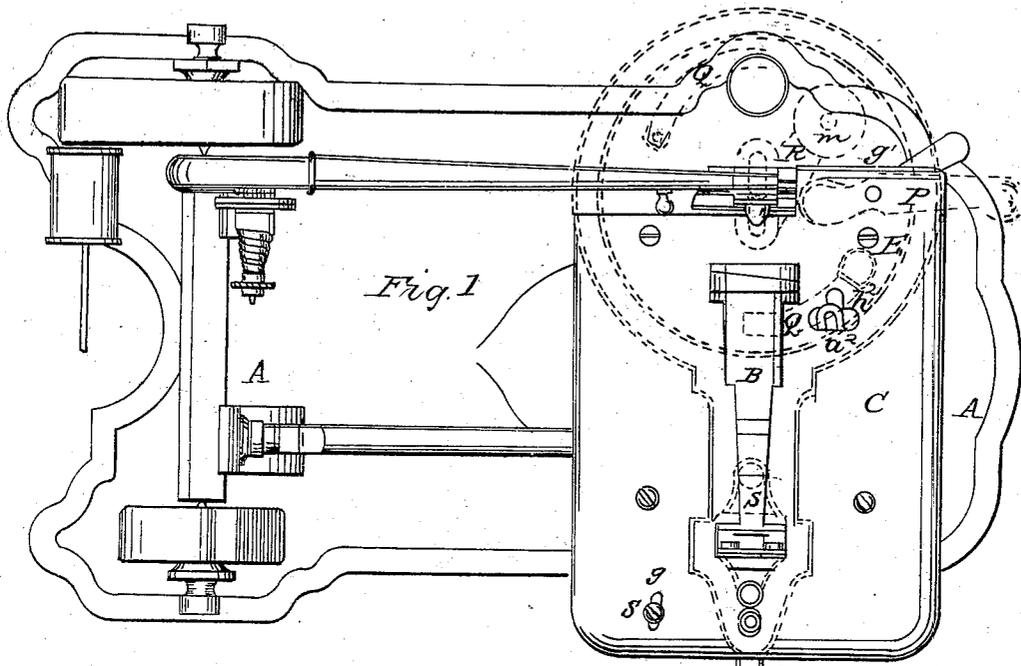


Fig. 1

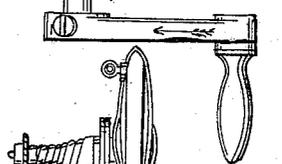
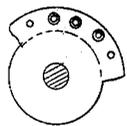
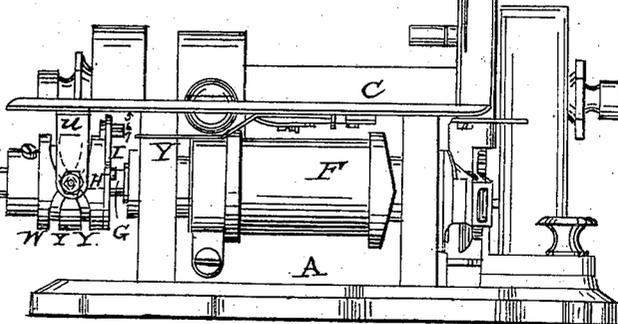


Fig. 2



WITNESSES

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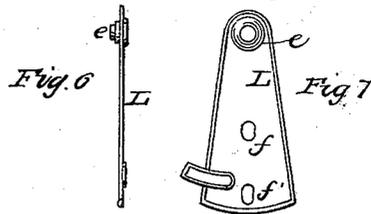
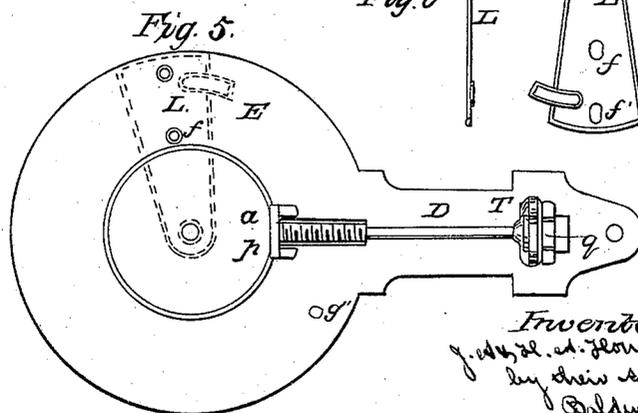
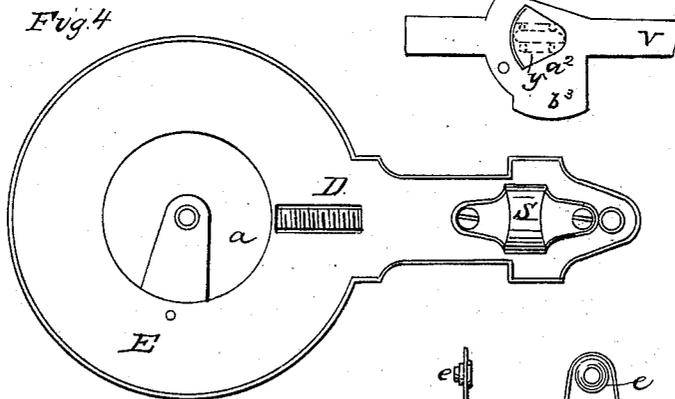
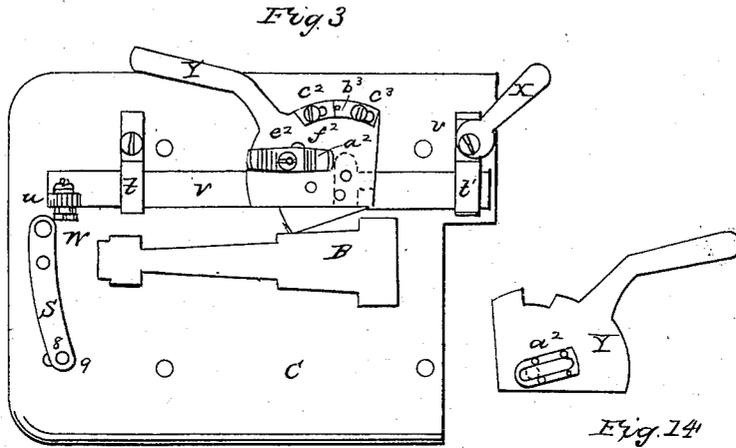


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 by their atty
 Baldwin & Co*

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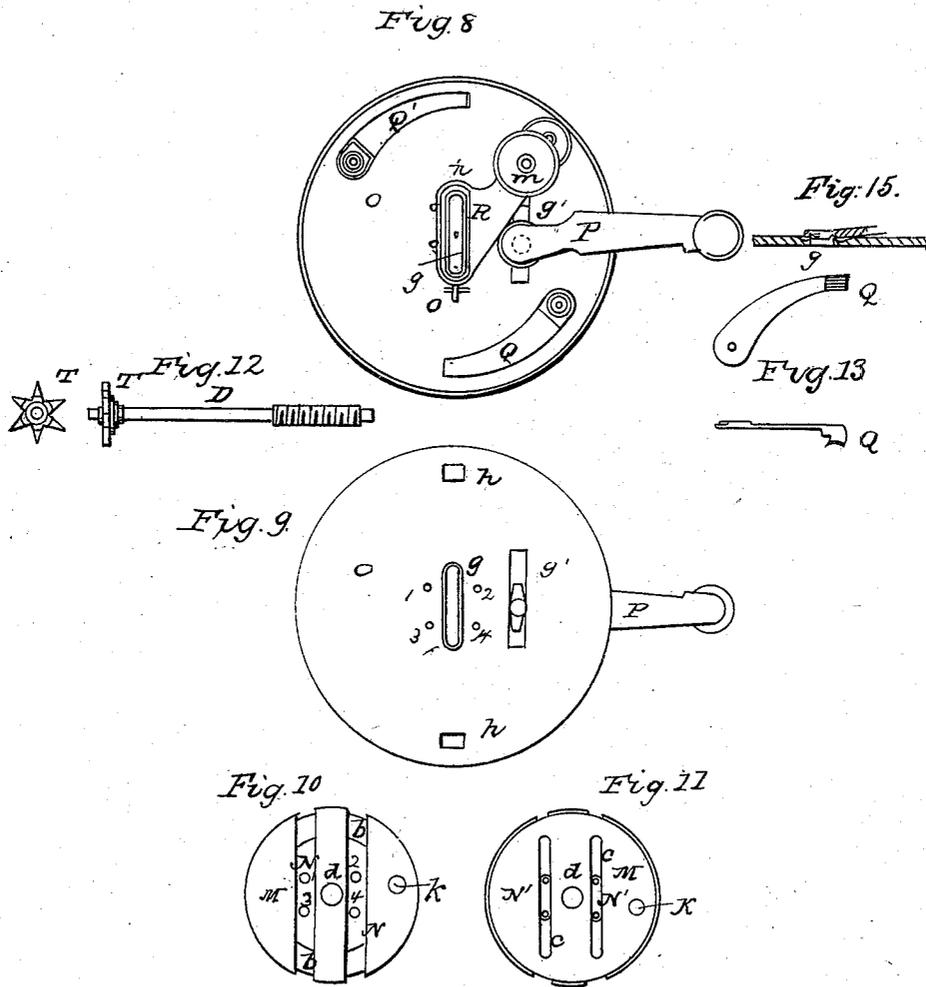
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UNITED STATES PATENT OFFICE.

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

IMPROVEMENT IN BUTTON-HOLE SEWING-MACHINES.

Specification forming part of Letters Patent No. 55,865, 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 Button-Hole Sewing-Machines; 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 top view of a sewing-machine to which our invention is applied. Fig. 2 is a front elevation of the same. Fig. 3 is a view of the under side of the table. Fig. 4 is a top view of the bed-plate. Fig. 5 is a view of the under side of the bed-plate. Fig. 6 is an edge view, and Fig. 7 a plan view, of the adjustable stitching-plate. Fig. 8 is a top view of the revolving plate carrying the clamp and feeding-nuts and other devices for regulating its motions. Fig. 9 is a view of the under side of the revolving plate. Fig. 10 is a top view, and Fig. 11 a view of the under side, of the gib-plate. Fig. 12 is the feed-screw and its star-toothed pinion. Fig. 13 is a plan and edge view of one of the spring feeding-nuts. Fig. 14 is a plan view of the throw-lever, and Fig. 15 is a section of the clamp.

It is the object of our invention to work button-holes automatically; and to this end our invention consists, first, in operating the feeding and vibrating the cloth-holding mechanism from a spooling-pin screwed into and forming a continuation of the main shaft of the sewing-machine; second, in a bed-plate fulcrumed at one end, vibrated at the other end, and carrying the feeding and cloth holding and turning mechanism; third, in a revolving reciprocating feeding-plate to support the material in which the button-hole is to be worked, and carrying the clamp for the material, the lever by which it is turned, and the spring feeding-nuts; fourth, in an adjustable stitching-plate pierced for the needle to pass through and attached to the vibrating plate; fifth, in the employment of a center plate and gibs to guide the feeding-plate and unite it with the vibrating plate by square or dove-tailed grooves; sixth, in a dog-lever fulcrumed in the gib-plate, with a block-crimp resting in

a slot in the feeding-plate, which leaves the plate free to reciprocate and enables the lever to rotate the plate to reverse its movement; seventh, in a clamping-lever attached to the feeding-plate and set at an angle to its button-hole slot, to permit the button-hole to be worked longitudinally with the goods, or at a right or any less angle thereto; eighth, in grooving the clamp longitudinally, so that when in position it will stretch the cloth and hold it taut when receiving the puncture and resisting the pull of the needle; ninth, in feeding the revoluble plate intermittently forward or backward by a single screw to space the stitches or finish the ends of the button-hole; tenth, in connecting the feeding-plate to the screw by spring half-nuts, so that while the screw only rotates in one direction the motion of the feeding-plate may be reversed; eleventh, in rotating the screw intermittently by adjustable pins located on the switch-cam and secured to the spooling-pin; twelfth, in a switch-cam located on the spooling-pin, for reciprocating the jag-bar that vibrates the front end of the bed-plate; thirteenth, in swiveling the switch on the heel of the jag-bar, that the longitudinal movement of the latter may be uniform, though the bed-plate may have greater or less vibration; fourteenth, in the adjustable slide-bar attached to the jag-bar to vibrate the bed-plate from a pin in the plate working in a slot in the lever; fifteenth, in a shield-cap carrying a supporting-stud to attach the feeding-screw to the bed-plate and facilitate its removal; sixteenth, in an adjusting-lever fulcrumed in the frame or table to adjust the longitudinal position of the bed-plate in proper relation to the needle; seventeenth, in the slotted guide for the jag-bar and imparting thereto a transverse vibratory motion by an eccentric arm or lever to control and regulate the position of the bed-plate in relation to the needle; eighteenth, in the combination of a friction-spring and adjustable stops with the throw-lever to give it a yielding pressure and a determined position; nineteenth, in attaching a pin plate or disk to the switch-cam, so that the vibrating bed-plate and revoluble feeding-plate shall harmonize in motions to work a button-hole while both are actuated by the rotation of the same cam; twentieth, in

so combining a bed-plate with the stitching and feeding plates as to work a button-hole automatically.

In the accompanying drawings, which exemplify one way of carrying out the objects of our invention, our improvement is shown as adapted to the Wheeler & Wilson sewing-machine, A.

An opening, B, is cut in the table C to receive the feeding-screw D and allow the bed-plate E a limited vibratory movement on the surface of the table.

The main driving-shaft F is drilled centrally in the rear end and furnished with a screw-thread so cut that the screw will tend to tighten as the main shaft rotates in its proper direction. A spooling-pin, G, having a proper screw cut thereon, is screwed firmly into the main shaft, and constitutes a prolongation thereof, of course revolving with it. Upon this spooling-pin G we secure, in any proper manner, the switch-cam H and its pin plate or disk I, through which the required movements of the bed-plate E and the reciprocating movements of the revolable feeding-plate O are imparted. It will hence be seen that in adapting our invention thus to the sewing-machine we add nothing to the friction of its operative mechanism.

The bed-plate E is circular at its front and prolonged at its rear, with a central opening, *a*, as shown in Figs. 4 and 5. It supports on its under side the feeding-screw D and the adjustable stitching-plate L, and when in position rests upon the table C, the screw passing into the opening B, and the plate is allowed a determined vibration on the table, it being fulcrumed on an adjusting-lever, *s*, attached to the under side of the table.

The central opening, *a*, in the bed-plate E is filled with a flanged center plate, M, Figs. 10 and 11, which has parallel grooves *b b* across its under surface, to receive gibs N, which move longitudinally in the grooves, which have slots *c c* through them. The gibs carry central projections, N', on their upper side to move in the slots, and they are secured to the revolving feeding-plate O by screws 1 2 3 4. This center plate, M, has a central opening, *d*, to receive the eyelet-needle guide *e* in the end of the stitching-plate L, the needle-eyelet guide *e* being long enough to pass through the bed-plate E and the feeding-plate O, and the stitching-plate being slotted at *f* and *f'* to permit it a longitudinal adjustment, that the needle may always enter the eyelet-guide without touching it. Thus the perimeter of the center plate, M, resting on the flange in the bed-plate E, is prevented from passing through the central opening, *a*, and the screws 1 2 3 4 in the gibs N unite it securely to the feeding-plate O, and leave both the center and feeding plate free to be revolved when desired, while the gibs, being attached to the feeding-plate, allow it a free longitudinal reciprocation for the length of the slots, or for the distance required for any sized button-hole.

The feeding-plate O rests evenly upon the bed-plate E, and it is slotted at *g* and *g'*, and has square holes cut in it at *h* and *h'*, the slot *g* being across its center, to admit the eyelet-guide *e* and allow the plate to move longitudinally for the length of the slot or revolve on the bed-plate. The slot *g'* is to receive the block-cramp *i* of the hand dog-lever P without embarrassing the longitudinal movement of the feeding-plate. The square holes *h* and *h'* are to receive the spring half-nuts Q and Q', and are situated at the opposite sides of the feeding-plate in line with the slot *g*. The sides of the slot *g* are chamfered to leave the edges of the slot acute, for a purpose that shall be presently named.

Attached to the feeding-plate, and fastened by screws, are the spring half-nuts Q and Q', Fig. 13, each nut with its spring resting on top of it. These half-nuts project through the feeding-plate at the openings *h* and *h'*, and carry threads to match with the thread of the feed-screw, upon which they rest while feeding, and from which they are released by the dog-lever when rotating the feeding-plate. Thus when one side of the button-hole is stitched the feeding-plate receives from the dog-lever a half-rotation, and the opposite half-nut is brought into bite with the feed-screw, when, though the rotation of this screw is continuous in one direction, the plate O is fed back or forward again the length of the button-hole, the opposite side of which is then stitched; and when the ends of the button-hole are reached the feed can be suspended, the vibrating plate given an increased motion, and the ends of the button-hole neatly secured. This feeding-plate carries a dog-lever, P, which has its fulcrum at *k* in the center plate, M, the lever having a block, *i*, secured to it sufficiently less than the slot *g'* in which it rests to permit the feeding-plate a longitudinal reciprocating movement as long as the lever is at rest; but when the feed-plate is to receive a half-rotation the movement of the dog-lever by the operator causes the feed-plate to turn by the bite of the block *i* in the slot *g'*, and at the same time its fulcrum moves round with the center plate, M, through its attachment with the feeding-plate, and thus the rotary and longitudinal movements of the feeding-plate are not interrupted.

The feeding-plate O has attached to its upper side a clamping-lever, R, so placed diagonally to the center slot, *g*, that the material to be stitched may be fed longitudinally or transversely, and it is fastened by a screw when in position, and has a spring beneath it to tend to raise it from the cloth.

A set-screw, 6, passes through the clamping-lever, and has a thumb-nut, *m*, on it to release the lever when the button-hole is finished, or hold it secure in position while the button-holes is being stitched.

The forward end of the lever terminates in a flared slot, *n*, of the length of the longest button-hole to be stitched, and perpendicular to the slot *g* in the feed-plate O. The top of

this flared slot may be marked with a scale and carry a guide-wire, *o*, to guide the gimp when gimp is to be used. The under side of the flared slot is grooved, so that when it presses the cloth between it and the chamfered edges of the slot *g* in the feed-plate O (see Fig. 15) it will be drawn tight and remain rigidly stretched to resist the puncture of the needle or the drawing of the stitch, and thus keep the stitching perfectly regular and uniformly smooth.

The forward end of the feeding-screw D rests in a bracket, *p*, attached to the under side of the bed-plate E, and at its rear end is supported by a bracket, *q*, in the shield-cap, S, which is fastened on the upper side of the bed-plate, as shown in Fig. 4. This cap S thus forms a shield to protect the operator from being hurt by the star-toothed pinion T on the rear of the feed-screw, and supports the bracket, while admitting the feed-screw to be removed or replaced with facility, and leaves its teeth free beneath to receive motion from its driver.

An intermittent rotating motion is imparted to the feed-screw D from the disk I and its adjustable screws 5 6 7, acting on the teeth of the star-pinion T, the disk I being attached to the switch-cam H on its inner side, or being made a part of it, as preferred, of course rotated with the main driving-shaft and the switch-cam. This disk may be cut away in part, the purpose of it being to furnish a proper support for the adjustable screws 5, 6, and 7 and carry a sufficient number of screw-holes to vary the adjustment of the screws as required.

The switch-cam H consists of two cam-grooves, *r* and *r'*, parallel for about two-thirds of the circumference of the cam, and then crossing each other, the radius of one groove being precisely coincident with that of the other, and the whole cam is secured to the spooling-pin by a set-screw, or, if preferred, a feather may be formed on the pin to hold the cam in place.

To the under side of the table C we attach the adjusting-lever *s*, which forms the fulcrum of the bed-plate E. This lever is pivoted at one end, and carries at the other a set-screw, 8, that passes through the slot 9 in the table, and by this set-screw the lever may be securely fastened when the bed-plate E has been properly adjusted, so as that the eyelet-guide *e* shall be in proper longitudinal relation to the needle.

A slide-bar, V, resting in guides *t* and *t'*, secured to the under side of the table, carries an arm, *u*, that supports the switch W, which rests in the grooves *r* and *r'* of the switch-cam. The guide *t*, which supports the rear end of the slide-bar, is stationary, while the guide *t'* is notched and slotted, and may be moved in the direction of its length either way by means of an eccentric-lever, X, that works in the notch *v*. This lever, passing outside of the table, can be moved by the operator to vary at pleasure the position of the bed-plate E, so

as always to keep the eyelet-guide *e* in its proper transverse relation to the needle.

Between the guides *t* and *t'* the slide-bar is enlarged to receive a lever, Y, by which the vibration of the bed-plate is controlled with precision and at the pleasure of the operator. A segment-formed opening, *y*, (see Fig. 14,) is made at this enlarged part in the slide-bar, and it receives a slotted strap, *a''*, that is free to vibrate in the opening *y*, and to this strap the lever Y is secured rigidly by screws. Near the outside of the enlargement of the slide-bar a pin, *b³*, is placed, and on each side of this pin *b³*, but on the lever Y, adjustable slotted stops *e''* and *e'''* are placed. Thus the limit of movement of the lever Y is regulated, and can be no greater, of course, than the space between the adjusting-stops less the diameter of the pin. A spring, *a''*, resting on the lever Y, but fastened by a screw, *e''*, to the slide-bar, passing through a slot, *f''*, in the lever Y, serves to keep the lever Y in contact with the slide-bar with a yielding pressure, and the inward movement of the lever will diminish and the outward movement of the lever increase the extent of vibration of the bed-plate and enable the operator to stitch both sides of the button-hole and secure its ends without stopping the machine.

A pin, *g''*, secured to the under side of the bed-plate, passing through the openings *h''* in the table, enters the slot in the strap *a''*, and through the changes of position of this strap-slotted connection the bed-plate is free to vibrate more or less as the slide-bar reciprocates by the rotation of the switch-cam on the spooling-pin.

The operation is as follows: The position of the eyelet-guide being fixed in proper relation to the needle, and the goods in which the button-hole is to be worked placed beneath the slotted clamp, through which, as well as through the revoluble feeding-plate, the needle passes, the needle and bobbin being properly threaded, the machine may be set in motion by turning the crank-arm in the direction of the red arrow. When one stitch is made the screw-pins in the disk I rotate the feed-screw the distance of the next stitch, and the switch on the jag-bar V vibrates the bed-plate the distance necessary to carry the goods so far to one side as that the needle shall pass into the button-hole, and the locking of the stitch will secure the gimp when one is used, and which is to be held in position by the guide-wire *o* on the clamp. The repetition of these stitches continues to the end of the button-hole, when the lever that controls the vibration of the bed-plate is moved and the needle carries its thread twice the former distance and locks the end of the button-hole securely. The feeding-plate is now turned half round by the dog-lever, in doing which the feed half-nut first in connection with the feed-screw is released and the opposite one is brought into bite on the feed-screw, when the

feed of the goods is reversed, and the opposite side of the button-hole is worked and locked, as the first side was, when the button-hole is finished.

It is obvious that our invention will sew a button-hole that has been cut; but it will also sew a secure pair of parallel seams with our button-hole stitch (for which we have made a separate application for a patent, and do not therefore claim here) and lock them at the ends, so that the button-hole may be cut after the working, and this, in all such goods as draw when cut—stockinets, for example—will be found highly valuable.

It is also manifest that in adapting our invention to the Wheeler & Wilson sewing-machine we have not deprived the machine proper of any of its varied capabilities when its usual feed-movement is placed upon it.

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

1. Operating the button-hole mechanism from the spooling-pin, substantially as and for the purpose set forth.

2. The bed-plate E, having a reciprocating motion and being laterally and longitudinally adjustable, substantially as and for the purpose set forth.

3. The revoluble reciprocating feeding-plate, combined with the vibrating bed-plate, substantially as and for the purpose described.

4. The adjustable stitching-plate, combined with its eyelet-guide, substantially as and for the purpose described.

5. The combination of the center plate and gibs, substantially as and for the purpose set forth.

6. The dog-lever, combined with the center plate, the block-cramp, and the revoluble plate, substantially in the manner and for the purpose described.

7. The combination of the clamping-lever with the revoluble plate, substantially as described, to admit of the turning of the cloth, so that the button-hole can be worked at a right angle, or less than a right angle, to the selvage, or parallel therewith.

8. The combination of the grooves in the rotating plate with those in the clamping-lever, substantially as and for the purpose set forth.

9. The feeding-screw to intermittently reciprocate the feeding-plate or hold it at rest, substantially as and for the purpose described.

10. The combination of the feeding-screw with the feeding-plate by spring half-nuts, substantially as and for the purpose set forth.

11. The combination of the feeding-screw with the bed-plate and adjustable plate on the switch-cam, substantially as and for the purpose set forth.

12. The combination of the switch, the jag-bar, and the slotted strap, substantially as and for the purpose set forth.

13. The combination of the jag-bar with the adjustable slide-bar, substantially as and for the purpose set forth.

14. The combination of the bed-plate and shield-cap, substantially as and for the purpose set forth.

15. The combination of the bed-plate and table with the adjustable lever and stitching-plate, substantially as and for the purpose described.

16. The combination of the bed-plate, jag-bar, lever, and stitching-plate, substantially as and for the purpose described.

17. The combination of the friction-spring and adjustable stops of the throw-lever Y with the jag-bar and its stop-pin, substantially in the manner and for the purpose described.

18. The combination of the plate and its adjustable screws or pins with the switch-cam and jag-bar, substantially as and for the purpose set forth.

In testimony whereof we have hereunto subscribed our names.

JAMES ALFORD HOUSE.
HENRY ALONZO HOUSE.

Witnesses:

GEORGE C. BISHOP,
SAMUEL BURR.