2 Sheets—Sheet 1.

T. S. HUNTINGTON.

BUTTON HOLE ATTACHMENT FOR SEWING-MACHINES.

No. 190,329. Patented May 1, 1877.

FIG. 1.

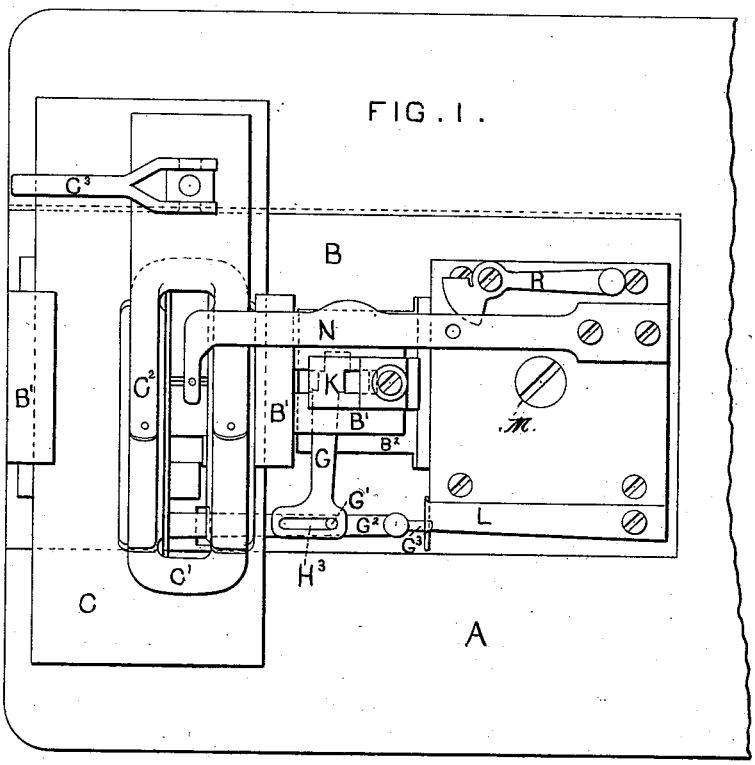
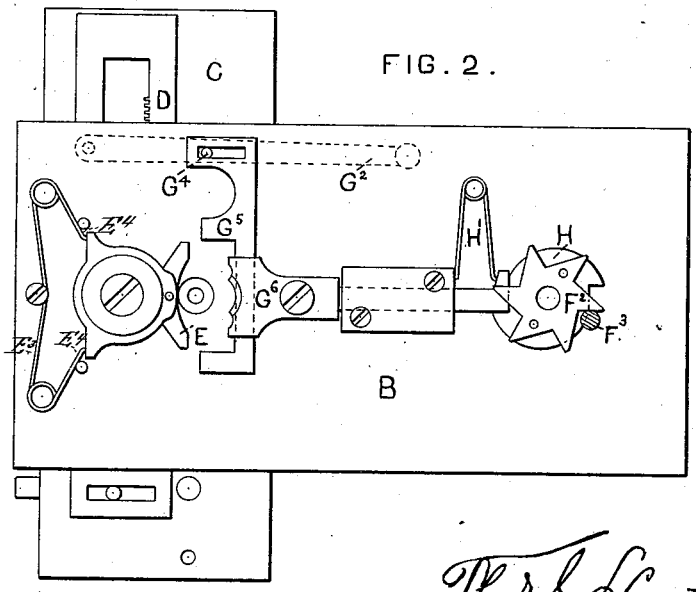


FIG. 2.



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Edward R. Quackenbush.

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2 Sheets—Sheet 2.

T. S. HUNTINGTON.

BUTTON HOLE ATTACHMENT FOR SEWING-MACHINES.

No. 190,329. Patented May 1, 1877.

FIG. 3.

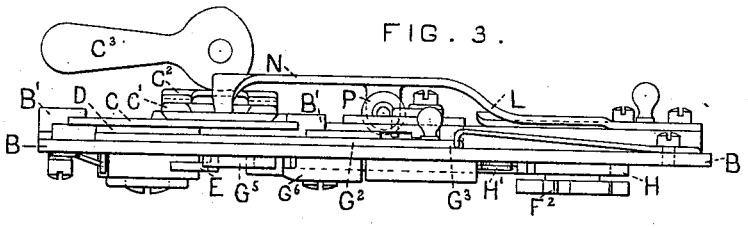


FIG. 4.

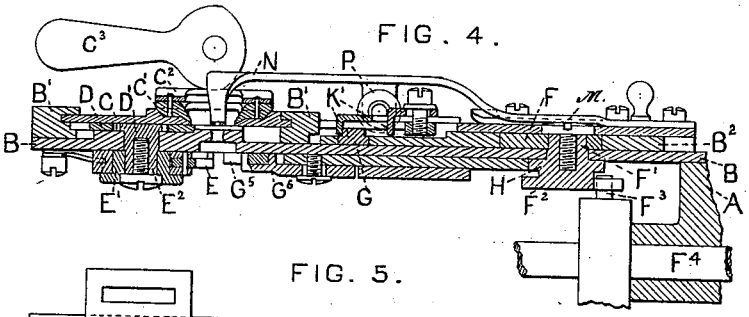


FIG. 5.

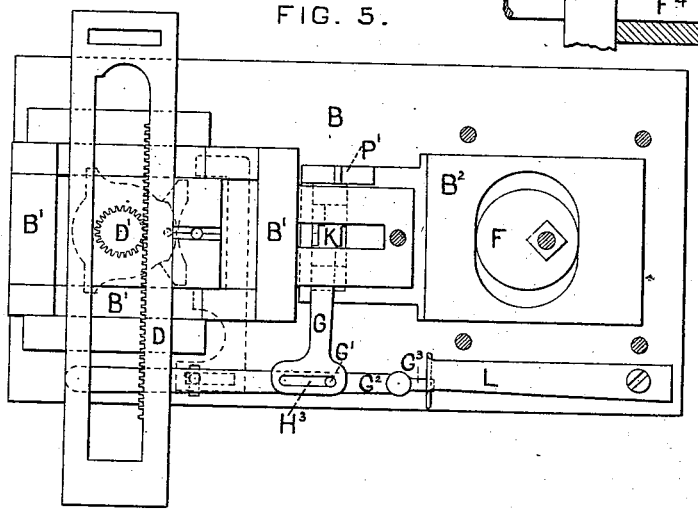


FIG. 6.

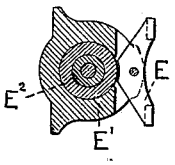
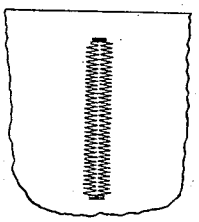


FIG. 7.



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THOMAS S. HUNTINGTON, OF NEW YORK, N. Y.

IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **190,329**, dated May 1, 1877; application filed February 5, 1877.

To all whom it may concern:

Be it known that I, THOMAS S. HUNTINGTON, of the city, county, and State of New York, have invented a new and useful Improvement in Button-Hole Attachments for Sewing-Machines, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a plan of the apparatus as placed on the bed-plate of a sewing-machine. Fig. 2 is a plan of the under side of the apparatus. Fig. 3 is an elevation of the front edge of the apparatus. Fig. 4 is a longitudinal section through the center. Fig. 5 is a plan of some of the parts, the clamp and top plate being removed to show the cams and feed-gear. Fig. 6 is a transverse section of the clutch on the feed-wheel shaft, and Fig. 7 is a diagram of a button-hole as stitched or bound and barred in a piece of cloth previous to its being cut.

This invention is for the purpose of making or binding button-holes by the use of a sewing-machine; and the invention consists in the combination, with a sewing-machine, of a clamping device for holding the fabric, and feeding devices so arranged as to give the proper movements for binding the edges of the hole, and also for barring the ends thereof, at the pleasure of the operator, as will hereinafter appear.

In the operation of the devices herein set forth, the motion of the needle is not changed from that used in ordinary sewing-machines, but the fabric is caused to make the various movements required to form the binding of the button-hole; consequently, it must be moved the distance of each stitch in the direction of the length of the hole, and, at the same time, to the right and left the distance that the threads must catch into the fabric from the side of the hole, and then at the end it must be moved across from one side to the other, to bar the cut in the fabric from extending any farther endwise, as represented in Fig. 7 of the drawings.

These several operations must also take place on the opposite side and end of the hole, so that, when one side and end are completed, the motions must be reversed, and the fabric must be moved in the reverse direction. These several movements are all produced by the operator merely changing a single lever, which shifts the mechanism without stopping the machine until the hole is completed.

At A, Fig. 1, is represented a portion of the bed-plate of a sewing-machine, and at B is represented the bed-plate of the button-hole attachment, which may slide into the recess for the throat-plate in some machines—as, for example, in the Wheeler & Wilson, No. 8—by simply removing the throat-plates and the feed-bar.

The clamping devices are shown at C C^1, of which there are two. The lower plate C is formed to work in grooves in a plate, as at B^1, and at a right angle to it, and thereby carries the fabric to and fro in its motion, or longitudinally with the button-hole.

Mounted upon the plate C is the upper clamping-plate C^1, between which and the lower plate the fabric is held to be operated upon; and these two are compressed together by a binding-plate, C^2, one end of which rests on the first plate C, and the other end on the middle of the upper plate C^1; and upon said plate C^2 there is mounted a cam-lever, C^3, which is pivoted to a screw-stem, so that it can be adjusted to any thickness of cloth, when the clamping-surfaces are compressed, by depressing the cam-lever.

Both of the said clamping-plates are slotted longitudinally to permit the needle of the machine to work through them to the extent required for any desired button-hole.

The lower clamping and fabric-holding plate C is caused to move gradually endwise by a rack and pinion on its under side, as shown at D D′; and said pinion is caused to rotate by a double friction-pawl, as at E, on the lower end of the pinion-shaft. A separate view of this friction-pawl is shown at Fig. 6, where E represents the double pawl, pivoted at its center to a sleeve, as at E^1, that surrounds the pinion-shaft, as at E^2, and thus forms a kind of clamping device around the shaft, the apex of the pawl biting in upon one side of the shaft whenever either of its toes are acted upon, and it is reversed by one of the springs, as at E^3, bearing against the projections on the sleeves at E^4, which causes it to reciprocate back on the pinion-shaft, and thus the pinion is rotated, and thereby causing the

clamping-plates to move endwise at each successive stitch.

The plate C is mounted in a plate, B^1, at a right angle to it; and the plate B^1 is arranged to work in guides on the bed-plate B, so that it can reciprocate endwise, and thereby move the clamping-plate sidewise, and thus transfer the fabric to and fro, to carry the thread in the needle from the edge of the button to a sufficient distance back to bind the fabric around the hole.

This plate B^1 is coupled to another plate, as at B^2, which is reciprocated by an eccentric, as at F, on a vertical axis, F^1, working through the bed-plate B; and on the lower end of said axis there is a toothed wheel, as at F^2, which engages with pins or teeth, as at F^3, on the main shaft of the machine, as at F^4, or a wheel thereon.

Said eccentric has a sufficient throw to move the plates B^1 and B^2 the greatest distance required for any button-hole; but to graduate said distance there is provided a gage or key, (best seen in Figs. 1 and 5, at G,) which partially or wholly, as desired, fills the space between the stops on these two plates, so that any desired change of distance in the lateral throw of the clamping-plates is effected by the use of a different gage, which may be easily introduced by removing the screw or pin, as at G^1, that connects it with the operating-lever G^2, and substituting another gage in the same place.

Said gage consists of a plate or strip of metal having its edges recessed to a depth corresponding to the amount of throw required for the clamping-plates, and said recesses serve as stops to prevent the clamping-plates from moving to and fro to the right or left in the exact proportion to the depth of the recesses in the edges of the said gage; or, in other words, it acts as a key in a tumbler-lock, to determine the movement to and fro of the clamping-plates.

Said lever G^2 is provided with a knob, as at G^3, to enable the operator to shift it back and forth to make all the changes required in the machine in working the button-hole complete—namely, changing both the feeding devices and setting the gage G to give the proper bight of the thread on each side of the button-hole.

By referring to Fig. 2 it will be seen that the lever G^2 is shown in dotted lines, and that one end is pivoted to the bed-plate B, and near its center there is a pin, as at G^4, which connects it with a slot in the tripping-piece G^5, that strikes the toes at the friction-pawl at E.

This tripping-piece G^5 is arranged to slide endwise in a clamp, as at G^6, and said clamp is moved endwise by a cam-wheel, H, on the axis F^1, and it is reversed or held against the cam-wheel by a spring, as at H^1, and thus the tripping-piece G^5 is caused to move toward and from the toes of the double pawl, and when placed as shown in Fig. 2 it will not strike either of the toes of the pawl, and, therefore, the feed-rack and its pinion are free to be moved, and to allow the clamping-plates to be slipped endwise in either direction, to adjust the fabric to the proper position under the needle in beginning the work. But if said tripping-piece be moved endwise in either direction, by moving the lever G^2 at an angle to the position shown in Fig. 2, then one or the other of the toes of the pawl will be struck by the edge of the tripping-piece as it is moved edgewise by the cam-wheel H, and thus the pinion-wheel will be caused to rotate, and thereby move the clamping-plates endwise and the fabric in the direction of the length of the button-hole, and consequently, by the three changes of position in the lever G^2, the feed-motion is caused to act in two directions or remain at rest while the machine is running.

The gage G is also attached to the lever G^2 by a pin in a slot, as at H^3, Figs. 1 and 5, so that as the lever is moved to either of its three positions it also moves the gage G, and by so doing regulates the other movements of the clamping devices, or their motion to move the fabric from side to side at right angles to the button-hole.

This is effected by having the gage G made with three steps or recesses on its edges, as shown at K, Figs. 1 and 5, which come in contact with the steps at K′ on the plates B^1 and B^2, and thus the degree or amount of the throw of the plate B^1 is determined by whichever of these steps or recesses that are between the two plates—as, for example, in the position shown the central step is in working position, and the button-hole will be equally distant on each side of the needle, and will, therefore, be in the proper position for fastening or barring the ends of the hole; and as the lever G^2 is moved at an angle on each side of the present position, it will control the distance of the bight of the thread from the cut in the fabric back from each side of the hole, and, consequently, if a greater or less bight is desired, a gage with greater difference in its steps must be used, and vice versa.

It will be seen at Figs. 1 and 5 that there is a small projection on the end of the lever G^2, where the knob is attached that extends out underneath a flat spring, L, upon the top of the bed-plate B, and the free end of said spring is turned down toward the plate B, and is made considerably wider than the spring. This turned-down portion is provided with three notches on its lower edge to receive the small end of the lever, for the purpose of holding it in its proper working position. It is shown in the drawings in the central notch.

The upper end of the axis F^1 is provided with a slot, as at M, for the purpose of using a screw-driver to turn the axis in adjusting the other working parts without operating the sewing mechanism.

At N, Figs. 1, 3, and 4, there is shown a

spring, which acts as a substitute for the presser-foot of the machine, and it is provided with a small roller, as at P, on its under side, to travel over a rib on the reciprocating plate B^2, as shown in plan at P′ in Fig. 5, so that as the fabric is moving from side to side of the button-hole the end of the spring presser-foot N will not rest upon it, and only as the needle is rising out of it to assist in stripping it from the cloth.

At R there is pivoted a cam-lever to hold the said spring presser-foot up when the fabric is to be adjusted between the clamps.

It is evident that various modifications in the mechanism may be made to suit various kinds of machines without departing from the nature of my invention.

I therefore claim—

1. The combination, with the bed-plate of the attachment, and the mechanism for clamping the material, of a friction-clutch and pawl constructed substantially as described, and operating mechanism, whereby the material being operated on may be fed in opposite directions, or be brought to a state of rest, essentially as described.

2. The combination, with the sleeve E^1 and pinion-shaft E^2, of the double pawl E, pivoted in said sleeve, and provided with toes, as described, whereby the said shaft may be revolved in either direction by pressing upon either of said toes, as and for the purposes set forth.

3. The combination, with the sleeve E^1, pinion-shafts E^2, and double pawl E, pivoted in said sleeve, as described, of the tripping-piece G^5, sleeve G, and operating mechanism, whereby either of the projections or the said tripping-piece may be brought in contact with its appropriate toe on the double pawl, and thereby revolve the pinion-shaft in either direction, as and for the purposes set forth.

4. The combination, with the tripping-piece G^5 and slide G^6, of the lever G^2, connected with said tripping-piece, as and for the purposes set forth.

5. The combination, with the mechanism for clamping the material, the pinion-shaft E^2, and the friction-clutch and pawl for operating the same, of the tripping-piece G^5, levers G^2 and G^6, cam H, and spring H^1, whereby the proper motions are imparted to the said clamping mechanism, as and for the purpose set forth.

6. The combination, with the actuating-lever G^2 and tripping-piece G^5, of the spring-gage L, as and for the purposes set forth.

7. The combination, with the clamping mechanism and the slide B^1, for carrying the same, of the slide B, adapted to be reciprocated in suitable guides, of a mechanism interposed between said slides for adjusting the position of the button-hole with respect to the stitch-forming mechanism, as and for the purposes set forth.

8. The combination, with the slides B^1 and B^2 and gage or key G, constructed as described, of the actuating-lever G^2 and spring-gage L, as and for the purposes set forth.

9. The combination, with the slides B^1 B^2 and the gage or key G, constructed as described, of the adjustable steps K and K′, whereby the amount of lateral movement of the clamp may be varied without moving said gage or key, as and for the purposes set forth.

10. The combination, with the slides B^1 B^2, gage or key G, and tripping-piece G^5, of the lever G^2 and spring-gage L, whereby the button-hole is brought in the proper relative position to the stitch-forming mechanism for stitching its sides and barring its ends, and the foot at the same time is adjusted to move the proper direction, or be brought to a state of rest, as and for the purposes set forth.

11. The combination, with the slide B^2, provided with the projection P′, of the spring presser-foot N, whereby it is caused to rest upon the material during the time that the needle is in said material, as and for the purposes set forth.

12. The combination, with the slide B^2 and spring presser-foot N, of the lever R, for raising the said spring presser-foot from the material, as and for the purposes described.

THOS. S. HUNTINGTON.

Attest:

JOHN W. RIPLEY,

BOYD ELIOT.