2 Sheets—Sheet 1.

W. RANDEL.

BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

No, 192,008. Patented June 12, 1877.

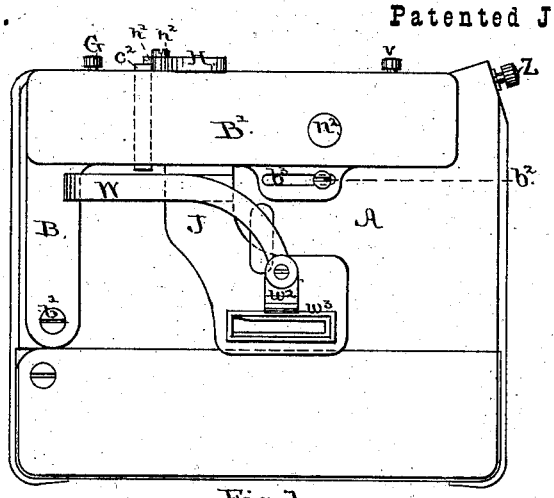

Fig.1.

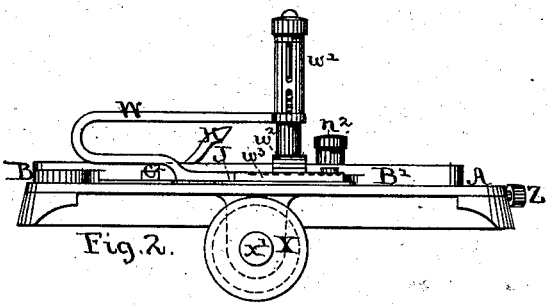

Fig.2.

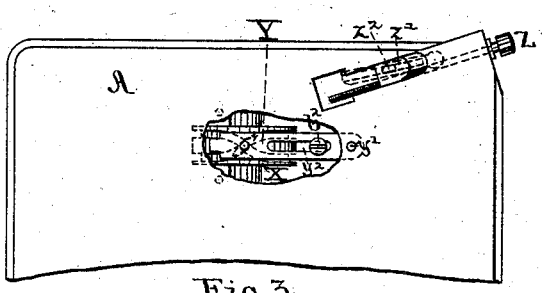

Fig.3.

Witnesses

Harvey H Swain

James a Carr

Inventor

William Randel

2 Sheets—Sheet 2.

W. RANDEL.

BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

No. 192,008. Patented June 12, 1877.

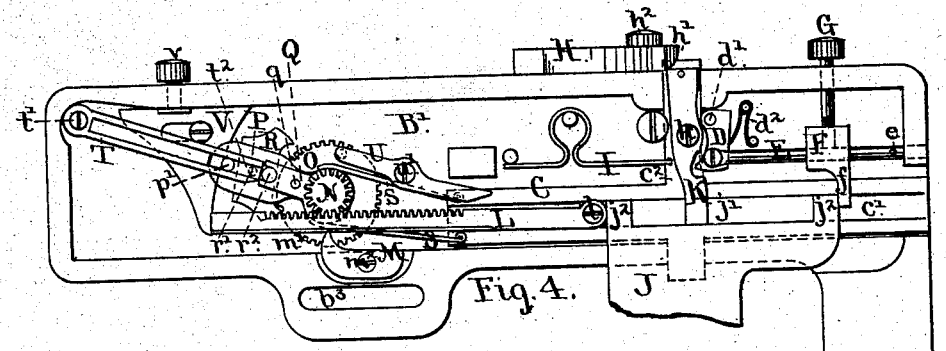

Fig. 4.

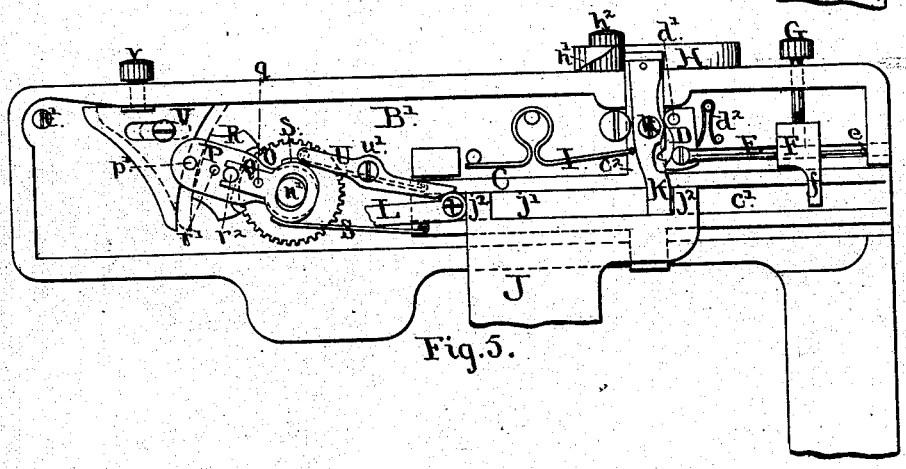

Fig. 5.

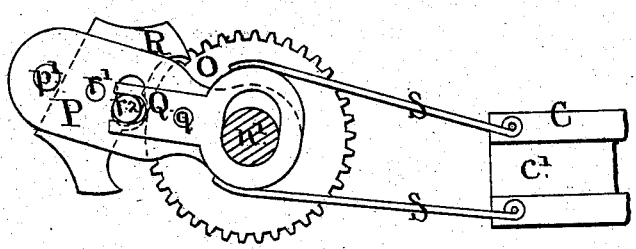

Fig. 6.

Witnesses.

Harvey A Swain

James a Carr

Inventor.

William Randel

UNITED STATES PATENT OFFICE.

WILLIAM RANDEL, OF TROY, NEW YORK, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO JOHN W. CIPPERLEY, JOHN C. COLE, AND THEODORE E. HASLEHURST, OF SAME PLACE.

IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **192,008**, dated June 12, 1877; application filed January 2, 1877.

To all whom it may concern:

Be it known that I, WILLIAM RANDEL, of Troy, in the county of Rensselaer and State of New York, have invented a new and useful Button-Hole Attachment for Sewing-Machines, of which the following is a full and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan view, Fig. 2 a front elevation, Fig. 3 a plan view of part of the bottom plate, having a portion of it removed to show the moving mechanism; Figs. 4 and 5, plan views of the under side of the vibrating arm containing the feeding device; and Fig. 6 an enlarged and detached view of the reversible feed-motion.

The object of my invention is to produce a button-hole attachment that can be applied to any ordinary sewing-machine, by means of which the button-hole will be perfectly stitched on each of its edges, the material being carried to the needle by means of an automatic feeding device, that can be adjusted to suit the character of the work upon which the button-holes are made.

As shown in the drawings, A is the bottom plate, to which the several principal parts of my invention are connected, and which is intended to be substituted for the ordinary cloth-plate of some kinds of sewing-machines, while in others it can be attached directly to the bed of the machine, the mode of attachment being dependent upon the style of machine upon which it is used. B is a bent vibrating arm, pivoted to the plate A by means of the screw b^1. Its recessed arm B^1 is made hollow on its under side, for the purpose of containing the feeding device; C, a shifting guide-bar, placed within the recessed arm B^1, and provided with a groove, c^1, and a cross-bar, c^2, the latter passing through openings formed in the sides of the recessed arm, maintaining the guide-bar C in perfect line during its changes of position, as hereinafter described. One of the arms of the cross-bar c^2 is provided with a notch, into which the pawl D engages. This pawl is pivoted to the vibrating arm by the studs d^1, and is held in the notch of the cross-bar c^2 by the spring d^2. A rod, E, is attached to the pawl D, and is provided with a stop, F, having an arm, *f*, projecting sidewise therefrom, and which is secured to and rendered adjustable upon its rod by means of the set-screw G, the head of which projects beyond the side of the vibrating arm. A cross-pin, *e*, inserted in the rod E, serves as a check to prevent the pawl D from being raised too far. The outer end of the cross-bar c^2 is cut away, so as to present a beveled surface, against which the spiral face h^1 of the lever H bears, for the purpose of moving the guide-bar C inward. The lever H is pivoted to the vibrating arm by the stud h^2. By means of the spring I, which engages in the cross-bar c^2, the guide-bar C is forced outward, as hereinafter described. J is the clamp-plate, having a slide, j^1, which fits into the groove of the guide-bar C, and is guided thereby. Two projecting ears, j^2, serve to attach the clamp-plate and the slide j^1 together, leaving the surface of the slide exposed to receive the pressure of the friction-spring K, which is secured to the cross-bar c^2 by the screw *k*, the function of which will be hereinafter described. The feeding device is connected to the clamp-plate by means of the rack L, which is pivoted to the end of the slide j^1 by the stud *l*, so as to allow it to vibrate thereon. This rack I preferably make with its back edge formed into an obtuse knife-edge, and for the purpose of holding it (the rack) in gear with its pinion, and to allow the pivoted end of the rack to change its position as required, I place a bearing-piece, M, with a pointed end, m^1, made to fit the back of the rack, arranged directly opposite the center of the pinion of the feeding device. By this means a vibrating movement is afforded to the rack L without any danger of its being cramped. The bearing-piece is secured in a recess in the vibrating arm B by the screw m^2. The pinion N of the feeding device has a spindle, n^1, passing out through the top of the recessed arm B, where it is provided with a head, n^2, for turning the pinion by hand when it becomes necessary so to do.

O is a ratchet-wheel, secured to the spindle n^1. P is an arm, having an eye or hub surrounding the spindle n^1, but unconnected therewith, so that either may be moved independently of the other. Q is another arm, placed between the pinion N and arm P. It has an elongated eye, through which the spindle n^1 passes, so as to allow of the eye being shifted sidewise, in the manner hereinafter set forth. It is pivoted to the arm P by the pin q. R is a double pawl, pivoted to the arm P by the pin r^1. It is provided with a stud, r^2, which is secured thereto, and which passes through a curved slot in the arm P, and engages in a slotted opening in the end of the arm Q. S is springs, secured to the end of the guide-bar C at the opposite sides, and so arranged that one of them will press against the corresponding side of the eye of the arm Q in such manner that as the guide-bar is moved a corresponding movement of the eye of the arm Q occurs. This, as will readily be seen, forces the double pawl R into position, so that its proper point will be brought into contact with the teeth of the ratchet-wheel O. T is a slotted arm, pivoted to the arm B^1 by the stud t^1. It has an opening, t^2, which engages upon the stud p^1 of the arm P, for the purpose of communicating motion to the feeding device, in the manner hereinafter described. U is a brake-lever, pivoted to the arm B^1 by the stud u^1, and so arranged that, upon the completion of the button-hole, the hub of the rack L is brought into contact with the beveled end of the lever, thereby causing a pin in the other end of the lever to press against the side of the eye of the arm Q, forcing the double pawl into a neutral position, as shown in Fig. 5, so that neither point of it will engage in the teeth of the ratchet-wheel, and entirely stopping the operation of the feed. V is a sliding stop-piece, having a handle, v, for operating it, projecting from the arm B^1. By means of this stop-piece, as indicated by the dotted lines in Fig. 5, the double pawl R may be thrown into its neutral position at any moment, and the feed mechanism thereby stopped. When in this position, the slide j^1 may be moved in either direction by turning the pinion N by means of the head n^2. The clamping device consists of the clamp-plate J, having an arm, W, provided with a socket, w^1, carrying a spring presser-foot, w^2, having an open frame, w^3, provided with teeth on its under side, and fitting into an opening formed in the clamp-plate. The material to be operated on is inserted in the clamping device by raising the presser-foot, and passing the goods between it and the clamp-plate. When arranged in proper position the presser-foot firmly clamps the material, and retains it until it is removed therefrom.

It is obvious that the operation of my presser-foot differs materially from the presser-foot commonly used upon sewing-machines, for the reason that in my device it holds the material securely, and carries it during all its changes of direction, while the ordinary presser-foot, which simply holds the material on the machine in proper condition to be acted upon by the feed and for the action of the needle, permits the material to move under it.

X is a cam, secured to the shaft x^1, and provided with suitable grooves, for imparting motion to the arm Y, which is pivoted by the stud y^1 to the under side of the plate A, a portion of which, in Fig. 3 of the drawing, is broken away to show the parts X and Y. The arm Y has a slotted opening, y^2, for the purpose of receiving and adjusting the screw-stud b^2, which is secured thereto, and passes through the slotted opening b^3 of the vibrating arm B, thereby forming a connection between the two arms, so that the motion of the arm T is transmitted thereby to the arm B^1. Z is an adjusting-screw, fixed to the bottom plate A, for adjusting the position of the sliding block z^1 in the slotted opening of the bottom plate, so as to regulate the stitch to be made. The sliding block z^1 is provided with a pivoted stud, z^2, with which the slot of the arm T engages, the relative position of the arm to the stud being indicated by the dotted lines on Fig. 3.

The operation of my invention is as follows: The material being clamped in the proper position in the clamping device, and the requisite motion being given to the cam X, (which should be secured to the driving-shaft of the sewing-machine,) which imparts a vibratory motion to the arms Y and B^1. By the movement of the arm B the pivoted end of the arm T is carried back and forth with it; the stud z^2, acting as a pivotal point, gives to the arm T an oscillatory motion, which is communicated to the arm P of the feeding device. By moving the guide-bar C, by means of the lever H, into the position shown in Fig. 4 of the drawings, one of the springs S forces the eye of the arm Q in the direction the guide-bar is moved. This causes the arm Q to turn upon its pivot q, whereby the position of the double pawl is changed so as to bring one of its points to engage with the teeth of the ratchet-wheel O, as shown in Fig. 4. By the continued vibrations of the arm P, by the means before stated, an intermittent motion is imparted to the pinion N, which is communicated to the clamping device through the rack L and its attached parts; thereby the feeding of the material to the action of the needle of the sewing-machine in the proper direction is effected. The pressure of the friction-spring K upon the slide j^1 prevents the pawl R from giving a retrograde motion to the ratchet-wheel O during the return-strokes of the pawl, the springs S yielding sufficiently at such times to allow the point of the pawl to pass freely backward over the points of the teeth of the ratchet-wheel. When the stitching is completed on one side of the button-hole, one of the ears j^2, by engaging with the arm f of the stop F, secured to the rod E, carries the pawl D out of its notch in the cross-bar c^2, whereupon the spring I forces the guide-bar C into the position

shown in Fig. 5, shifting the position of the clamping device sidewise, so as to bring the unfinished side of the button-hole under the line of the needle, at the same time the arm Q and pawl R are forced by one of the springs S into the position shown in Fig. 6, by which the direction of the feed is changed, and the material is fed so as to stitch the other side of the button-hole until the hub of the rack L strikes the beveled end of the brake-lever U and forces the pawl R into its neutral position, as hereinbefore described, thereby throwing the feeding device out of action and leaving the attachment in a condition for a repetition of the same operation. By the vibratory motion of the arms B the stitches are alternately made at the edge of the button-hole, and at a distance from its edges, which distance may be varied by adjusting the position of the studs b^2 in the slot of the arm Y, whereby the movement of the arm B can be increased or diminished.

I claim as my invention—

1. A sewing-machine button-hole attachment, consisting of a vibrating arm, B, provided with the button-hole clamp, and with automatic reversible feeding mechanism, and with automatic laterally-shifting mechanism, whereby the forward feed on one side, the switching over to the other side, and the reverse feed on the other side of the button-hole is effected by the vibrations of said arm B, as set forth.

2. The combination of the plate A, provided with a stud, z^2, with the vibrating arm B and slotted arm T, for the purpose of imparting motion to the feeding device, in the manner herein specified.

3. The combination of the guide-bar C, provided with the cross-bar c^2, spring-pawl D, and lever H, with the clamping device herein described, for the purpose set forth.

4. The feeding device herein described, consisting of the combination of the rack L, pinion N, ratchet-wheel O, arms P and Q, double pawl R, and springs S, as and for the purpose specified.

5. The combination of the guide-bar C, slide j^1 provided with projections j^2, with the spring-pawl D, rod E, adjustable stop F, and spring I, as and for the purpose herein specified.

6. The combination, with the adjusting-screw Z, of the sliding block z^1, held laterally in a fixed position in the bottom plate A, stud z^2, and slotted arm T, as and for the purpose set forth.

7. The combination, with the slide j^1 and brake-lever U, of the arm Q and pawl R, as and for the purpose specified.

8. The combination of the sliding clamp-plate with mechanism, substantially as described, for automatically changing the position of said clamp laterally, and mechanism, substantially as described, for automatically reversing the motion of said clamp laterally, whereby the material is so fed with relation to the needle that the button-hole is stitched on both sides, as set forth.

WILLIAM RANDEL.

Witnesses:
HARVEY H. SWAIN,
JAMES A. CARR.

3,000 words.