

S. J. BAIRD.

Button Holing Attachment for Sewing Machines.

No. 97,856.

Patented Dec. 14, 1869.

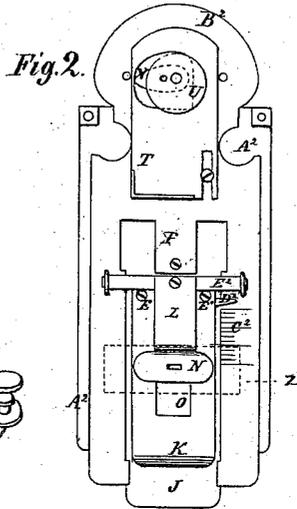
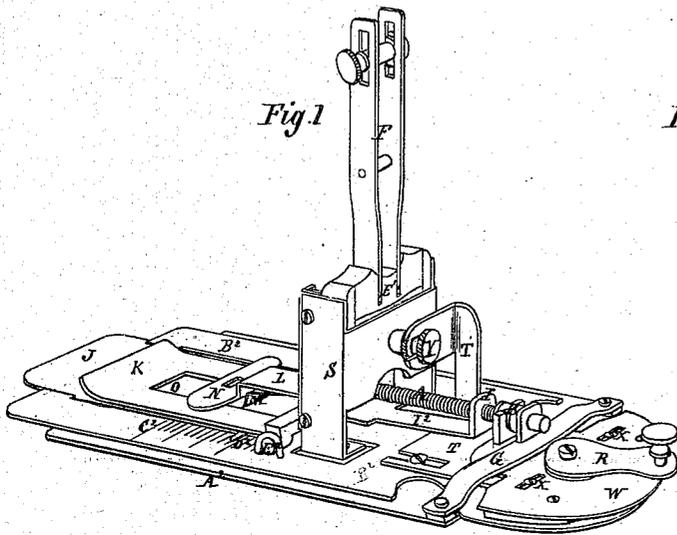


Fig. 3.

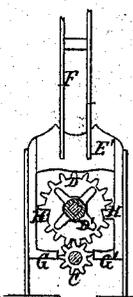


Fig. 4.

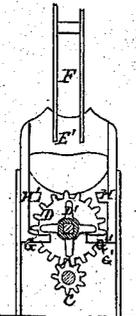


Fig. 5.

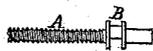


Fig. 6.

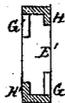


Fig. 7.

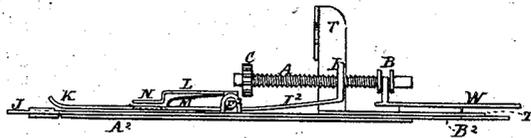
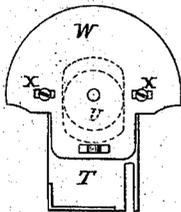


Fig. 8.



Witnesses
Edmund Masson.

Inventor,
Samuel Baird

UNITED STATES PATENT OFFICE.

SAMUEL J. BAIRD, OF STAUNTON, VIRGINIA.

IMPROVEMENT IN BUTTON-HOLING ATTACHMENT FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. 97,856, dated December 14, 1869.

To all whom it may concern:

Be it known that I, SAMUEL J. BAIRD, of the city of Staunton, in the county of Augusta and State of Virginia, have invented an Attachment to Sewing-Machines for Working Button-Holes; and I declare the following to be a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure 1 is a perspective view of my invention; Fig. 2, a plan view, the rack, frame, screw, and connected parts being removed, so as to exhibit the oscillating plate and clamp. Fig. 7 is a side view, the rack, frame, and large wheel being removed; and Figs. 3, 4, 5, 6, and 8 are representations of parts of the device, to which reference will herein be made by their respective figures and letters.

The object of my invention is to feed the cloth to the needle of any sewing-machine in such a way that the stitches made by the machine, whether loop or lock, single or double chain stitch, shall be laid on each edge and the ends of the button-hole in a series parallel to each other, and at right angles to the button-hole, so as to form the requisite binding for it.

In Figs. 1, 2, and 7, A² represents the base-plate, the edges of which only appear. It is to be fastened down to the bed-plate of the machine by thumb-screws or otherwise, and serves as a basis for the other parts of my device. On the under side of this plate there is a blind slot or depression, indicated by the dotted lines at *z* in Fig. 2. The design of this is to leave room for the play of the feed-bar of the machine, while the cloth is protected from its action and left free to the operation of my device.

In Figs. 1, 2, and 7, B² represents the oscillating plate, which moves upon a center-screw at P, Fig. 2, which is the fulcrum of oscillation and the means of fastening this to the bed-plate. The front half of this plate is provided with a slot or longitudinal opening, an inch or more wide, within which, directed by appropriate grooves or other suitable means, the clamp for holding the cloth slides longitudinally. This clamp consists of two jaws or plates, J and K. The plate J is slotted. The edges about this slot are beveled, so as to bring them down to a feather-edge, resting

on the base-plate. The upper jaw K of the clamp is also slotted, and the edges about the slot are turned down, so as to maintain the parallel between them and the adjacent bevel of the under jaw. When, therefore, the cloth is placed between the jaws of the clamp and the upper one pressed down upon it, it is forced down to the base-plate of the machine, and firmly held by the two jaws.

To give greater firmness to the gripe upon the cloth, the depressed edges of the upper jaw may be notched into teeth. The front end of the upper jaw is turned up to facilitate the insertion of the cloth. At the other end of the clamp the two plates are held together by the screws E E, which are so inserted as to allow the upper plate sufficient movement for the ready insertion and removal of the cloth. Placed transversely upon the upper jaw of the clamp is a rest, N, upon which the presser-foot of the machine is to stand, by the pressure of which the jaws of the clamp are to be compressed upon the cloth. In the rest is a small slot, through which, and through a hole in the base-plate beneath, the needle is to pass.

The rest is connected with the oscillating plate by means of the tongue L and the axle and staples E², so that it does not traverse longitudinally with the clamp, but remains under the presser-foot, and moves with the oscillating plate of the machine. Under this rest, and connected therewith, there is a spring, M, as broad as, and resting within, the slot in the upper jaw of the clamp and upon the cloth, which it holds down by a gentle pressure, while the needle, passing through a small slot in it, penetrates the cloth and returns.

The clamp is connected by a rod or bar behind (I², Figs. 1 and 7) with the nut I and the screw A. This bar has a joint at the point of connection with the clamp, so that while the latter is carried to and fro by the longitudinal movement of the nut, the oscillation of the clamp is not embarrassed by the direct line of the movement of the nut upon the screw.

The screw A and its eccentric B, in combination, constitute the essential feature of my device. The former carries the button-hole longitudinally under the needle, while the latter communicates the lateral reciprocating

motion which is necessary to form the parallel series of stitches at the side of the slit. The screw is operated by means of the wheels C and D, the four-toothed ratchet D¹, and the rack E¹, Figs. 1, 3, and 4. The object is to secure accurately a semi-revolution of the screw for each descent of the needle, so that the eccentric may be presented alternately to the right and the left of the axial line of the screw on its horizontal plane. To accomplish this, the wheel C is fastened on the end of the screw, and is driven by the wheel D, which is double the size of the other, so that the latter makes two revolutions for every one of former. To the large wheel is attached the ratchet D¹, consisting of four teeth, at right angles to each other, revolving on the same axis and together with the large wheel.

The ratchet is driven by means of the double rack, which is represented at E¹, Fig. 1, and in Figs. 3, 4, and 6, the latter of which is an end view of it. The rack consists of four teeth, G and H, and G' and H'. Of these the former are in one plane and the latter in another, slightly removed, at right angles to the plane of revolution of the wheels. One pair of these teeth only—those lying in the same plane—operate at the same time, as we shall presently see. The rack is operated by the needle-bar of the machine passing through the collar F, and carrying it and the rack with it, as it ascends and descends, in driving the needle. Let us suppose that the machinery is so adjusted that the teeth of the rack, G and H, are in the same plane with the ratchet D¹. As the rack descends, driven by the descending needle-bar, the tooth H drives down the interposing tooth of the ratchet until it assumes the position shown in Fig. 3—its teeth at an angle of forty-five degrees to the perpendicular. The rack-tooth is made of such a length, and so adjusted, that it can only carry the wheel thus far, and to aid in fixing it in this position the head of the rack is at such a distance that when the rack descends the head rests upon the two upper teeth of the ratchet, thus holding them in the position indicated. When the rack rises again the tooth H is carried up past the upper tooth of the ratchet and out of the way of its descent, and immediately the tooth G on the opposite side of the rack comes in contact with the lower adjacent tooth of the ratchet, and carries it up to the position shown in Fig. 4, at right angles to the perpendicular. Each successive descent and return of the needle and the rack with it brings, in succession, a new tooth into the same position, thus accomplishing a quarter-revolution of the ratchet and wheel, and, by consequence, a semi-revolution of the small wheel, screw, and eccentric, at every descent of the needle. When by this means one side of the button-hole has been formed the ratchet, which is made to slide at pleasure on the axle of the wheel while revolving with it, is shifted, by means to be presently described, so as to be actuated by the other pair of rack-teeth, G'

and H'. The operation of these instantly reverses the revolution of the wheel, and with it that of the screw, and at the same time the oscillating plate is so changed in its relation to the needle that the other side of the button-hole receives the stitches as the whole is carried back to its original position. The frame, in which are the bearings of the large wheel and ratchet and of one end of the screw, is fastened to the base-plate, holes being cut in the oscillating plate, so as to clear its movements of interference from the fixed position of the frame and connected parts.

The bearing of the other end of the screw is also, by means of the bridge Q or otherwise, fastened to the base-plate, which thus becomes the fixed fulcrum of all the movements. The eccentric, on the other hand, is connected, by means of the jaws which inclose it, with the connecting-plate W, which, by means of screws in the slots at X X, Fig. 1, is joined to the oscillating plate, on the end of which it rests. Between these two plates are two cams, revolving upon one central post, which springs out of the oscillating plate. These cams are operated by the lever R, Fig. 1, and are represented by U and V, Fig. 2. The cam V is designed to drive the carrier T, Figs. 2, 1, and 7, which may also be done by a pin inserted in cam U.

By means of the carrier, thus operated, the ratchet D¹, sliding upon the square spindle of the big wheel, is brought at will into the plane of the one or the other pair of teeth of the rack, the hub of the ratchet being girdled with a groove, which receives the jaws of the carrier at Y, Fig. 1, by means of which it is held in the one position or the other. The connecting-plate W, Figs. 1 and 8, is fastened to the oscillating plate by the two screws which slide in the slots at X X.

The position of the screws in these slots, and the consequent position of the connecting and oscillating plates with relation to each other, are governed by the cam U, as revolved on its center by the lever R. The line of the eccentricity of the cam being coincident with the axial line of the lever, and the latter being placed at right angles to the axis of the oscillating plate, the latter and the connecting-plate are forced laterally in opposite directions by the pressure of the cam upon its axis of motion in the former, and its eccentric edge against its frame in the latter. While the several parts remain in this position, the two plates act as one, the revolution of the eccentric communicates a laterally-reciprocating motion to the jaws and connecting-plate, and through it to the oscillating plate. The latter, vibrating upon its center P, moves the clamp and the cloth laterally under the needle. This, together with the longitudinal motion caused by the nut traversing the screw, so carries the cloth under the needle as to form the succession of parallel stitches, which make one side of the button-hole. The operator then moves the lever to the other side of the con-

necting-plate, and the cam carries the oscillating plate in a lateral direction, with relation to the connecting-plate, opposite to that previously occupied. This induces a corresponding change through the fulcrum at P, Fig. 2, in the oscillation of the plate, clamp, and cloth under the needle, so that, the movement of the screw having been reversed at the same instant by the cam V, as already described, the stitches formed in the return movement are in a line parallel to that formed before, and adjacent, but on the other side of, the button-hole.

The ends of the hole are to be bound by stitches continued past the ends of the slit on each side. This is accomplished by carrying the lever around, say, one-fourth of its whole movement, and holding it in that position until the one side of the end is formed; then carrying it around to a corresponding position on the other side until the formation of the end is complete, when it is carried home to the side.

Projecting from the side of the clamp at D², Figs. 1 and 2, is an index-finger, by means of which and the graduated scale C² on the oscillating plate the length of the button-hole is regulated. The shaft of the rack is so constructed that the vibrating arm carrying the needle moves freely between its limbs, and only operates it so far as is necessary to drive the ratchet. The eccentric is made of an oblong or elliptical form, and so adjusted with relation to the screw and wheels that the part of its revolution in which it moves freely between the jaws without touching or moving them occurs during the descending movement of the rack while the needle is in the cloth. The movement, on the contrary, by which the jaws and plates are operated, is accomplished by the tooth G as the rack rises after the needle has been withdrawn, and the cloth, therefore, is free to move.

The length of the stitch may be regulated, if desirable, by connecting the center of oscillation P with a slide, or otherwise making it movable toward the one or other end of the oscillating plate, by having two or more eccentrics of graduated eccentricity on the screw, and adjusting the jaws of the oscillating plate to the one or other, at pleasure, with a slide and thumb-screw, or by framing the eccentric into the end of the screw with a transverse dovetail, and adjusting its distance from the center by a regulating-screw.

In order to bring the one or the other pair of teeth of the rack into connection with those of the ratchet at pleasure, the carrier T may be so constructed that the ratchet shall be so fastened to the spindle of the large wheel that it shall revolve immovably in one plane, while the upright end of the carrier, instead of operating upon the hub of the ratchet, shall embrace the rack itself, and direct its movement so as to bring, at pleasure, the one or other pair of teeth into the plane of the revolution of the ratchet. The rack itself, instead of being made in the form represented in the drawings, may be made of two plates of metal, the planes of which shall be at right angles to the axis of revolution of the ratchet, with slots vertically in the middle, to allow their descent on each side of the axle, and pins inserted at such points as to correspond with and subserve the purpose of the teeth G H and G' H'. The ratchet would then lie between the two plates, and its teeth be operated by the pins projecting from the surface of the one or other plate at pleasure, as regulated by the means already described.

The design of my device is to work the button-hole in the cloth either before or after cutting it.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The screw having the eccentric thereon, in combination with the cloth-clamp and oscillating plate, as and for the purposes described.

2. The cloth-clamp, the rest, the spring, and presser in combination, substantially as and for the purposes described.

3. The cloth-clamp and its operating screw, in combination with the double rack, the ratchet, and cog-wheels, substantially as and for the purposes described.

4. The connecting-plate, the oscillating plate, and the lever and cam in combination, substantially as and for the purposes described.

5. The cam V and carrier T, in combination with the sliding ratchet, for changing its position, and changing the movement of the clamp, substantially as described.

SAMUEL J. BAIRD.

Attest:

F. B. BERKELEY,
R. W. BAIRD.