(Model.)

L. T. BULLEY.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 456,355. Patented July 21, 1891.

Fig. 1.

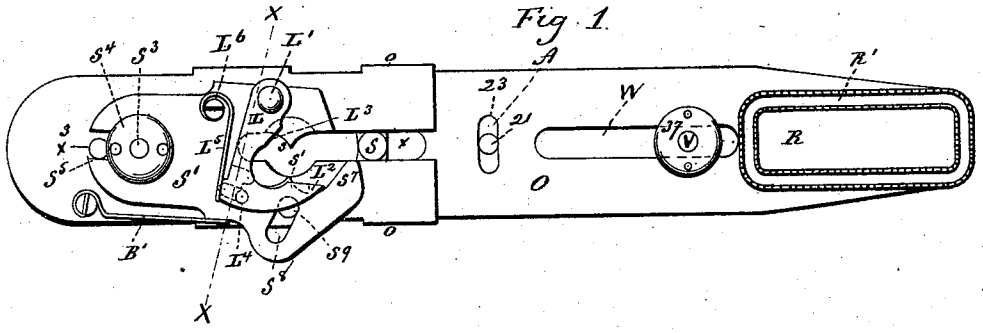


Fig. 2.

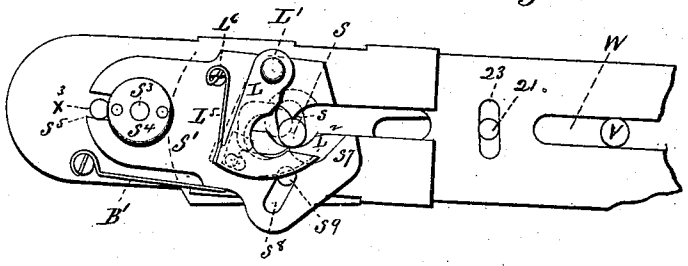


Fig. 3.

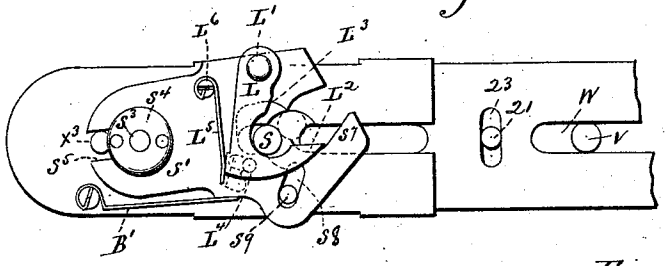


Fig. 9.

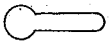


Fig. 8.

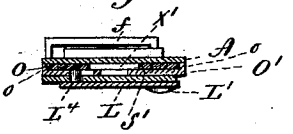


Fig. 4.

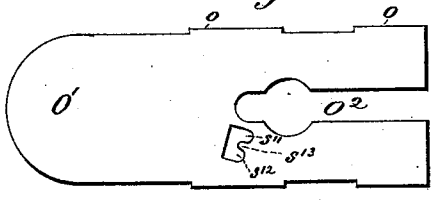


Fig. 6.

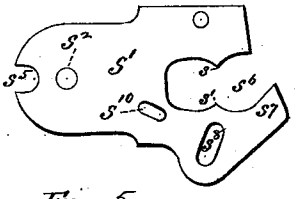


Fig. 7.

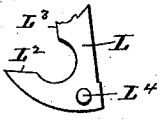
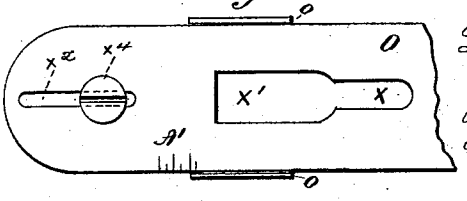


Fig. 5.



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UNITED STATES PATENT OFFICE.

LOUIS T. BULLEY, OF NEW HAVEN, ASSIGNOR TO THE PEERLESS BUTTON HOLE ATTACHMENT COMPANY, OF TYLER CITY, CONNECTICUT.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 456,355, dated July 21, 1891.

Application filed June 20, 1890. Serial No. 356,128. (Model.)

To all whom it may concern:

Be it known that I, LOUIS T. BULLEY, of New Haven, in the county of New Haven and State of Connecticut, have invented a new Improvement in Button-Hole Attachments for Sewing-Machines; and I do hereby declare the following, when taken in connection with accompanying drawings and the letters and figures of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, a reverse plan view of a button-hole attachment provided with my improved supplemental parts, which are shown in the positions due to them when the straight edges of the button-hole are being wrought; Fig. 2, a similar view with the forward end of the vibratory plate broken away and the supplemental parts shown in the positions due to them when they are acting upon the switch-stud so as to impart a curved movement to the forward end of the vibratory plate; Fig. 3, a similar view with the switch-plate of the supplemental parts switched into its secondary position to cause the forward end of the vibratory plate to move in an opposite curve; Fig. 4, a detached reverse plan view of the auxiliary plate; Fig. 5, a broken plan view showing the rear ends of the vibrating and auxiliary plates; Fig. 6, a detached plan view of the switch-plate; Fig. 7, a detached broken view of the latch; Fig. 8, a view of the device in vertical transverse section on line $x\,x$ of Fig. 1; Fig. 9, a view of such a button-hole as the device is designed to work.

My invention relates to an improvement in that class of button-hole attachments which are adapted to work button-holes having the well-known circular enlargement at their outer ends, the object being to provide a simple and compact mechanism of few parts for performing that part of the work relating to the curving of the stitching at the required points.

With these ends in view my invention consists in a button-hole attachment having certain details of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

The several improved co-operating parts of my invention are supplemental to a button-hole attachment of approved construction and are well adapted to be used in connection with the device patented to Albert W. Johnson in United States Patent No. 374,837, of December 13, 1887, to which attention is invited for fuller comprehension of the application and use of my improvement.

As herein shown, the vibratory plate O, which engages with the cloth and moves the edge to be wrought under the needle in a path conforming to the outline of the button-hole, the driving-stud 21, which imparts longitudinal movement to the said plate, the lateral slot 23, formed in the plate and permitting the same to clear the said driving-stud in being moved laterally thereto, the laterally-movable fulcrum-stud V, which is shifted at the end of each stroke of the plate, the longitudinal slot W, clearing the plate from the fulcrum-stud, the flat key-nut 37, secured to the lower end of the fulcrum-stud and holding the plate O in place, the base-plate A, against the lower face of which the plate O is held, the needle-opening R, through which the needle plays, the switch-stud S, imparting vibratory movement to the plate O for securing the "bite" and in my device co-operating with novel parts to impart a circular shape to the outer end of the button-hole, the slot x, with the edge whereof the said stud engages to throw the plate O, and the switch f correspond, except as specified, to parts and formations designated by the same letters and numbers in the said patent. In my construction the opening R is surrounded by an open serrated plate R′ instead of upsetting and serrating the edges around the opening, as shown in the patent. Under my invention the outer half of the slot x is widened, as at x', in order to give clearance to the plate O from the switch-stud S in the outer half of the stroke of the said plate, which is extended at its rear end and provided with an elongated slot x^2, receiving a threaded binding-stud x^3, projecting upwardly through it from the outer end of the upper face of a longitudinally-adjustable auxiliary plate O′, virtually corresponding in width to the vibratory plate O and having its edges turned upward, as at o, to embrace the

parallel edges thereof, and secured in its adjustments by means of a binding-nut x^4, applied to the upper end of the said binding-stud and bearing upon the upper face of the plate O. A slot O^2, formed in the inner end of the said plate O′, is arranged in alignment with the slot x aforesaid, made to correspond in width thereto at its outer end and at its inner end is enlarged to the general outline of a button-hole, the outer end whereof is of circular formation. The curved opposite edges of the enlarged inner end of the said slot O^2 are alternately engaged with the switch-stud S for modifying the vibratory motion of the plate O and causing the outer end thereof to vibrate in a curved path by means of a switch-plate S′ of peculiar formation and a latch L, pivoted thereto by a pivot L′, and some other minor parts. The said switch-plate is provided at its rear end with a pivot-hole S^2, receiving a stud S^3, projecting downward from the lower face of the rear end of the plate O′, and is held in place by a flat key-nut S^4, screwed upon the lower end of the said stud. A notch S^5, formed at the extreme rear end of the switch-plate, clears the same of the headed lower end of the binding-stud x^3, before mentioned. The forward end of the switch-plate has formed in it an open slot S^6, extending in the direction of its length, broken in outline by two corresponding inwardly-projecting deflecting points $s\ s'$, located directly opposite each other, having concaved edges, and respectively adapted to co-operate with the said curved opposite edges of the rear end of the slot O^2. The said plate is also shaped to form an operating-finger S^7, located at its extreme forward end and extending obliquely across the open forward end of the slot O^2 in certain positions of the switch-plate. A spring B′, secured to the lower face of the plate O′ and near the rear end thereof, is engaged at its free forward end with one edge of the switch-plate, the said edge being grooved to receive and retain it. This spring exerts a constant tendency to swing the switch-plate so as to cut its operating-finger across the forward end of the slot O^2, the movement of the plate in either direction being limited by a slot S^8, formed in it and receiving a stud S^9, located in the lower face of the plate O′.

The latch L is pivoted to the switch-plate S′ at a point thereon opposite the slot S^8 therein and provided with operating-faces L^2 and L^3 and with a locking-stud L^4, projecting from its upper face and passing through a clearance-slot S^{10}, formed in the switch-plate S′, and entering a locking-slot formed in the auxiliary plate O′ at a point near the rear end of the slot O^2 and to one side thereof, and having two divisions S^{11} and S^{12}, which are separated by a rearwardly-projecting finger S^{13}, the said locking-stud and slot co-operating to hold the switch-plate S′ in its two working positions, as shown by Figs. 1, 2, and 3 of the drawings, so that it will present rigid edges to the switch-stud. A spring L^5, secured by a screw L^6 to the switch-plate S′, is engaged at its free outer end with the rear edge of the latch L, which is thereto grooved to receive the end of the spring and hold the same in place.

The upper face of the vibratory plate O is provided near one of its edges and at its rear end with a graduated scale A′, which guides the user of the device in adjusting the auxiliary plate O′ to the size of the button-holes to be wrought, the said adjustment of the plate being effected by loosening the binding-nut x^4 and then moving the said plate longitudinally on the vibratory plate O as desired. The adjustment of the auxiliary plate O′ is conformed to the vibration of the vibratory plate O, which is controlled by adjustable devices not herein shown, but forming a part of the device shown and described in the patent above referred to.

The switch-stud S is connected at its upper end with a switch f, corresponding to the part called a "dog" and designated by the same letter in the said patent.

Having now described my improved supplemental parts in detail, I will proceed to set forth the method of their operation in modifying the ordinary vibratory action of the oscillating plate of a button-hole attachment, so that the same will be vibrated back and forth, as usual, and also at the forward end of its stroke in a curved path, conforming to the circular outline of the outer end of a button-hole having a circular enlargement at that point.

The description of the operation of the device will be best understood by reference to the drawings, in Figs. 1 and 2 of which the device is shown with the switch-plate locked in its primary position, in which its inwardly-projecting deflecting points co-operate with the curved opposite edge of the slot O^2 in the plate O′ to form a curved passage-way, the edges of which are as the vibratory plate is moved forward presented to the switch-stud, whereby the forward end of the plate is caused to vibrate in a curved path corresponding exactly to the curve of the passage-way. During this time one half of the enlarged end of the button-hole is wrought. Just before the said vibratory plate reaches the extreme limit of its forward stroke the operating-face L^3 of the latch is engaged with the switch-stud and the latch pushed back, whereby its locking-stud L^4 is lifted out of the division S^{12} of the locking-slot, thus unlocking the switch-plate, which is at once moved by its spring B′ into its secondary position, (shown in Fig. 3 of the drawings,) in which it is locked by the locking-stud, which now enters the division S^{11} of the locking-slot. In this position of the switch-plate the deflecting point S′ co-operates with the curved edge of the slot O^2 opposite to it in forming a passage-way having an opposite curve from the curve of the passage-way before formed.

Now as the vibratory plate begins its rearward movement the edges of the newly-formed curved passage-way are presented to the switch-stud, whereby the forward end of the vibratory plate is caused to vibrate in a curved path corresponding exactly to the curve of the passage-way. During this time the other half of the enlarged end of the button-hole is wrought. Just before the rearward movement of the vibratory plate clears the curved passage-way from the switch-stud the face L^2 of the latch is presented to the same and the latch moved back and its locking-stud L^4 lifted out of the division S^{11} of the locking-slot, whereby the switch-plate is unlocked. The rearward movement of the plate O continuing, the finger S^7 of the switch-plate is presented to the switch-stud, whereby the plate is gradually moved back to its primary position, in which it is again locked by the entrance of the locking-stud into the division S^{12} of the locking-slot as soon as the movement of the switch-plate over the auxiliary plate has brought the said stud into alignment with that division of the slot therein.

It will be understood that the vibratory plate and its attached parts really describe a circular path around the switch-stud, and not vice versa. It will thus be seen that through the agency of my improved supplemental parts the ordinary vibratory action of the oscillating plate of a button-hole attachment is modified during portions of its stroke, so as to describe a circular path conforming to the outline of the circular inner end of a button-hole of the character described.

By loosening the binding-nut x^4 the auxiliary plate O′ may be moved outwardly on the plate O and its attachments virtually retired, the outer end of its slot O^2 then co-operating with the slot x to act on the switch-stud S in making ordinary straight-sided button-holes. Under this adjustment of parts the switch-plate will be locked in its primary position. I would therefore have it understood that I do not limit myself to the exact construction and arrangement of parts herein shown and described, but hold myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a button-hole attachment, the combination, with a vibratory plate, of means for moving the same longitudinally, a switch-stud to vibrate the plate transversely to its longitudinal path, an auxiliary plate attached to the lower face of the rear end of the vibratory plate and provided with a slot conformed in general outline to the form of the enlarged end of a button-hole, a switch-plate attached to the lower face of the auxiliary plate and having oppositely-curved surfaces which engage the switch-stud, and means for switching the switch-plate and locking it in its switched position, substantially as described.

2. In a button-hole attachment, the combination, with a vibratory plate, of means for moving the same longitudinally, a switch-stud to vibrate the plate transversely to its longitudinal path, an auxiliary plate attached to the lower end of the rear end of the vibratory plate and provided with a slot conformed to the form of the enlarged end of a button-hole, a switch-plate pivoted to the lower face of the auxiliary plate, constructed with a slot having two inwardly-projecting deflecting points and provided with an operating-finger, and a latch pivoted to the lower face of the switch-plate and adapted to lock and unlock the same, the said switch-plate and latch being engaged with the switch-stud and operated thereby, substantially as described.

3. In a button-hole attachment, the combination, with a vibratory plate and means for moving it longitudinally and transversely, of an auxiliary plate adjustably connected with the rear end of the vibratory plate and provided at its forward end with a slot having its rear end enlarged to conform in general outline to the shape of a button-hole having a circular enlargement at its inner end, a switch-plate pivoted to the lower face of the said auxiliary plate and provided at its forward end with a slot having two corresponding inwardly-projecting deflecting points and an operating-finger, and a latch pivoted to the said switch-plate, provided with two operating-surfaces which are presented to the switch-stud of the device and with a locking-stud which enters a locking-slot formed in the auxiliary plate and locks the switch-plate in its two working positions.

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