

*E. Howard & W. H. Jackson*  
*Sewing Mach.*

*N<sup>o</sup> 94.212.*

*Patented Aug. 31. 1869.*

Fig. 1.

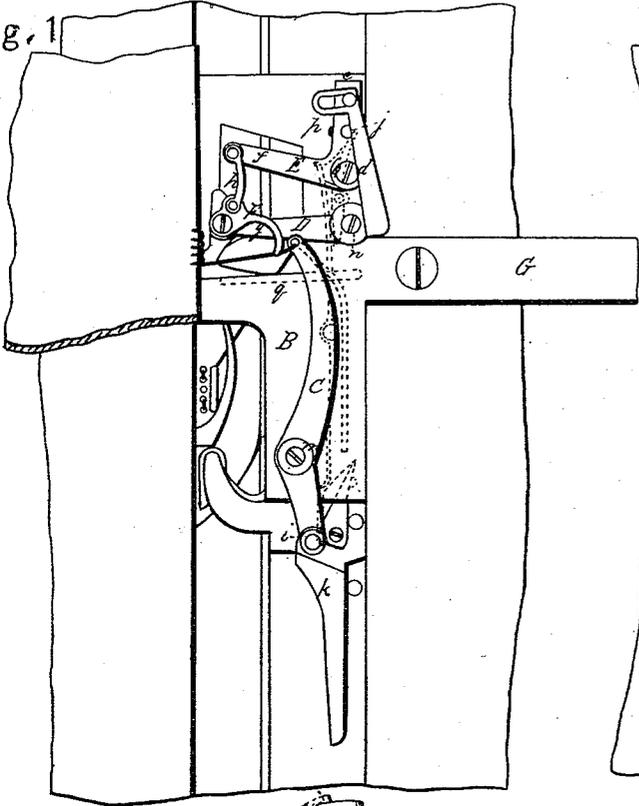


Fig. 2.

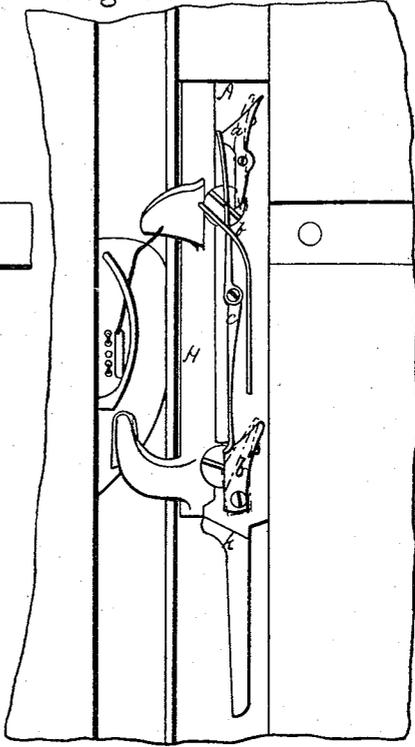


Fig. 3.

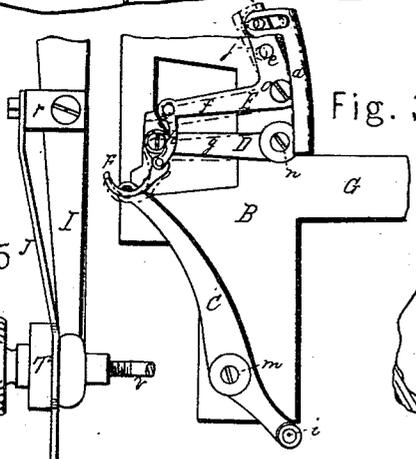


Fig. 4.

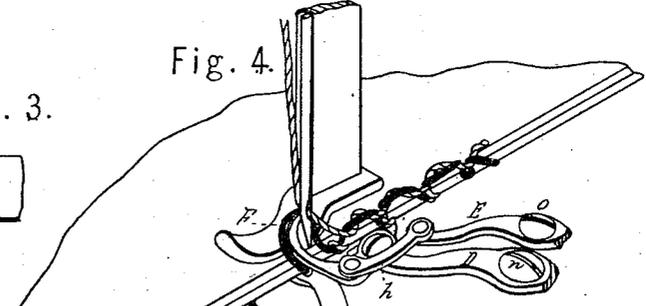


Fig. 5.

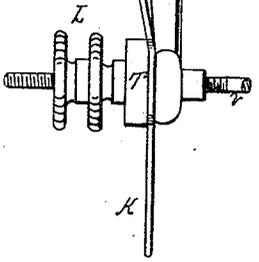


Fig. 7.

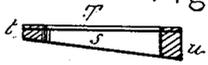
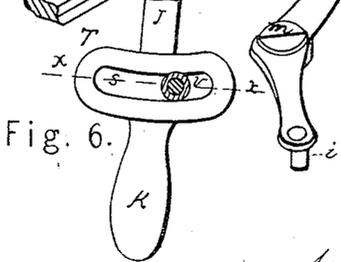


Fig. 6.



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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN SEWING-MACHINES FOR WORKING BUTTON-HOLES.

Specification forming part of Letters Patent No. 94,212, dated August 31, 1869.

*To all whom it may concern:*

Be it known that we, EDMUND HOWARD, of Flushing, New York, and W. H. JACKSON, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sewing-Machines; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, and to the letters of reference marked thereon, like letters indicating like parts wherever they occur.

To enable others skilled in the art to construct and use our invention, we will proceed to describe it.

Our invention relates to certain improvements on an attachment for sewing-machines for which Letters Patent No. 69,671, dated October, 1867, were granted to us, and of that class known as the "shuttle-machines," in which two threads are employed to form the stitch. The object of the attachment for which these Letters Patent were granted was to produce a perfect button-hole stitch, similar in its general characteristics to that produced by hand-sewing; but we have found it necessary, in the practical working of our attachment, to make some important changes in some of the devices composing it. These changes, with some additions, constitute the principal features of our present invention, which consists, mainly, in the novel construction and arrangement of a lever device for drawing the shuttle-thread back from, and returning with it back to, the edge of the goods, as well as in the use of a spring so arranged as to control the slack of this thread, and also in the employment of a novel device for regulating the length of the stitch, and in the production of the stitch itself.

In the drawings, Figure 1 is a top-plan view of our attachment, showing it secured in place upon a sewing-machine. Fig. 2 is a top-plan view of the same with the upper plate of our attachment removed. Fig. 3 is a top-plan view of the upper plate of our attachment detached. Fig. 4 is a perspective view of a portion of the devices of a sewing-machine, and of our attachment, in the act of forming the stitch, and of the stitches when loosely formed. Fig. 5 is an edge or side view of our stitch-

regulator attached to the leg of the feed-brake-Fig. 6 is a front view of the lower part of our stitch-regulator, broken off; and Fig. 7 is a cross-section on the line *xx* of Fig. 6.

In constructing our attachment, designed to be placed upon the bed-plate or platform of a shuttle-machine of the "Singer" or any similar manufacture, we make two plates, A and B, the former to be attached to the shuttle-carrier, as clearly shown in Fig. 2, and the latter to be placed immediately over it and attached in the position of the ordinary throat-piece, as shown in Fig. 1. The form of these plates is shown in Figs. 1, 2, and 3. To the upper side of the plate A we attach cams *a* and *b'*, in the relative positions, and shaped as shown in Fig. 2, and so as to turn freely on their points of attachment. These cams *a* and *b'* are held in position by springs *c*, attached to the plate, as shown also in Fig. 2; and also to the same plate we attach rigidly the cams *b* and *k*, in the relative positions and shaped as shown in the same figure. If desired, one or both of these cams may form a part of the plate, though, preferably, we attach the cam *b*, and make the cam *k* a part of the plate.

The upper plate B we construct with a tang, G, on its rear side, for attachment to the bed-plate of the machine, in the place occupied by the throat-plate, as shown in Fig. 1, and near its front side we provide a throat-hole, *l*, through which the needle plays, as shown in Fig. 1. To this plate B, on its upper side, we attach the bent lever C and the elbow-levers D and E, in the relative positions and shaped as clearly shown in Figs. 1 and 3, and so as to turn freely about their respective points of attachment, *m*, *n*, and *o*. The short arm of the lever C is operated by means of a pin, *i*, attached and projecting under it, acting against the cam *b* on the plate A. The long arm of the lever is curved slightly, both in its vertical and horizontal planes, so as to be parallel with that portion of the plate B which is immediately under its range of motion, and also so that its extreme end, which is provided with an eye, may have this eye brought directly under the throat-hole *l* of the plate, the edge of the plate at this point being constructed with a lip, in which the throat-hole is located, and so arranged as to permit the

eye of the lever to come directly under the throat-hole, as shown in Figs. 3 and 4.

The front end of the arm *g* of the elbow-lever D enters a groove (shown in dotted lines in Fig. 3) of the requisite length to partially limit its movement, and near its end has a hook, F, pivoted to it, curved in both its vertical and horizontal planes, and provided on its outer edge and front end with a groove, to catch the thread and guide it, as will be explained hereafter. This hook F is also connected loosely to the arm *f* of the elbow-lever E by a link, *h*, its point of connection being a little in front of its point of connection to the arm of the lever D, as clearly shown in Figs. 1, 3, and 4. The end of the arm *d* of the elbow-lever D is provided with an oblong opening or slot, which lies or fits on a pin attached to the upper side of the arm *e* of the elbow-lever E, as clearly shown in Figs. 1 and 3, in such a manner as to permit the pin to move freely in the slot, the length of which limits the movement of the lever D, as shown in the same figures. The arm *e* of the elbow-lever E has also another pin, *j*, on its under side, which enters and passes through an oblong opening or slot *p* in the plate B, and is acted on by the cam *a*, pivoted to the plate A, as shown in Fig. 1. To the under side of the plate B is attached at one end a straight spring, *q*, at right angles to the length of the plate, and so as to be under the long arm of the lever C, and to have its free end toward the throat-hole, as shown by the dotted lines in Fig. 1. The relative length, shape, form, position, and connections of these different mechanical devices are shown in the drawings, and are such as to produce the different movements hereinafter described.

To apply and operate this attachment to and with the sewing-machines mentioned, we first remove from them the throat-piece, and then connect the under plate A to the shuttle-carrier H by means of a screw, and over the plate A we place the plate B, fastening it to the bed-plate of the machine by means of a screw, which passes through the tang G, which lies in the same seat occupied by the throat-piece when it is on the machine, these plates having been first provided with the mechanical devices described. The upper or needle thread is adjusted in the usual manner. The lower or shuttle thread, coming from the bobbin, is passed under the spring *q*, and then through the eye in the end of the arm of the lever C, if the lever is thrown back, as shown in Fig. 1. The cloth on which the stitch is to be worked, whether on its edge or in a button-hole, is then adjusted, and the proper tension given to the threads by the usual devices. The machine is then operated.

The needle descends, carrying its thread, through the loop of which the shuttle passes, in the usual way, and as the shuttle returns the devices take the position clearly shown in Fig. 1. This position is taken almost immedi-

ately after it commences its return, and, as it continues its return, the hook F catches the lower or shuttle thread in the groove on its end and carries it forward over the throat *l*, the long arm of the lever C quickly following it, and taking a position with its eye directly under the throat. At the same instant the arms *f* and *g* of the elbow-levers D and E move a short distance in the direction of the forward line of the shuttle, carrying the hook *f* with them, which, by this motion, spreads or opens the thread into a loop, gets out of the way of the needle, and returns to its former position. As it returns the needle goes through the loop thus formed, and on through the throat in the plate and the eye in the end of the lever C, carrying its thread with it, through the loop of which the shuttle again passes. Then, as the needle ascends, and as soon as it rises from the throat, the arm of the lever C draws the stitch tight, and draws the upper or needle thread both from above and below the edge of the cloth, and forms the purl of the thread in a line on the edge. The stitch thus made is shown in Fig. 4, and closely resembles the hand-made button-hole stitch. The loop thrown under the point of the needle, with the shuttle-thread and the loop thrown around the shuttle-thread by the needle-thread below, when drawn tightly together by the arm of the lever, must make the stitch as described.

In operating the machine with our attachment we have found it necessary oftentimes, and especially in forming the stitches around the inner ends of button-holes against which the eye of the button bears, to have the feed-regulator so present the edge of the curve of the button-hole that the stitches about this curve will be uniform with the rest of the work. To do this it is necessary that the feed gradually move more rapidly as the stitches are worked from the beginning of the curve to its highest point, and in like manner move slower as it passes from this point to the straight edge of the button-hole. The reason for this is that, unless it were done, the stitches about the curve would not be at uniform distances. To accomplish this we attach to the leg I of the brake or feeding device a stitch-regulator, or device for regulating the feed, as desired, and so arrange it that the operator can increase or diminish the rapidity of the feed at the same time, and without interfering with his general management of the work.

This device is shown in Figs. 5, 6, and 7, and consists of a spring, J, with a yoke, *r*, attached loosely to its upper end, which yoke straddles and is secured to the arm I of the usual rock-shaft. The lower end of the spring is connected by rod *v* with the usual leg for clutching the feed-wheel. This spring is flat, and Fig. 5 shows an edge view. Its lower end is provided with a wedge-shaped piece, T, having a curved oblong slot or opening, *s*, below which projects a handle, K, as shown in Fig. 6, which presents a front view. The material forming this slot is made wedge-shaped longi-

tudinally, as clearly shown in section in Fig. 7, the smaller end being at *t*, and the larger at *u*. The slot *s*, in attaching the spring to the leg of the brake, is slipped on the rod *v*, connecting the leg of the brake to the brake itself of the machine, and over it are placed the thumb-nuts *L*, ordinarily used to regulate the length of the rod *v*, and through it the feed and length of stitch.

Instead of using these thumb-nuts, we use our stitch-regulator. We have found from experience that the thumb-nut cannot be manipulated with sufficient ease and rapidity to regulate the feed as desired for turning the curve in the button-hole; but by means of our device the rod *v* is gradually lengthened or shortened by simply swinging or turning our stitch-regulator backward or forward, the wedge-shaped piece *T* and the action of the spring accomplishing this result.

Having thus described the improvements constituting our invention, what we claim is—

1. The lever *C*, arranged to carry the shuttle-thread and draw the loops of the needle-

thread to the edge of the cloth and lock them there, substantially as described.

2. The vibrating hook *F*, in combination with the elbow-levers *D* and *E*, constructed and arranged to operate as described, whereby the hook is made to carry the shuttle-thread up over the edge of the fabric, to engage with the needle-thread, and then move out of the way of the needle, as set forth.

3. In combination with the lever *C* and the hook *F*, with its operating-levers, we claim the plate *A*, provided with its cams *a*, *b*, *b'*, and *k*, for operating the levers *C*, *D*, and *E*, with hook *F*, substantially as herein described.

4. The pivoted wedge-shaped piece *T*, in combination with the rocking arm *I*, for varying the extent of the feed-motion, substantially as herein described.

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Witnesses:

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