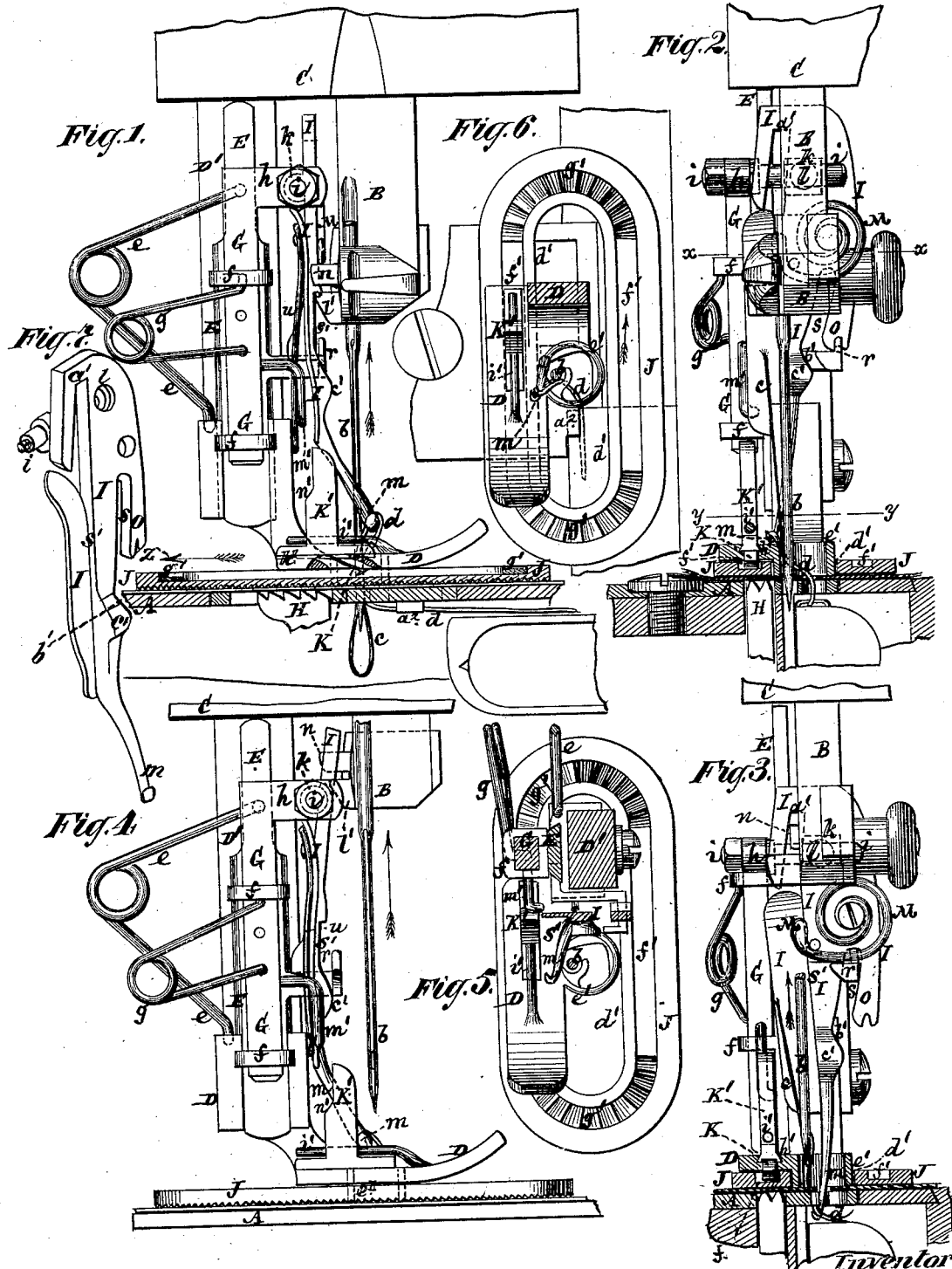


A. H. TAIT, Jr.
 Button-Hole Stitching Attachment for Sewing-Machine.

No. 210,370.

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Witnesses
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UNITED STATES PATENT OFFICE.

AUGUSTUS H. TAIT, JR., OF JERSEY CITY HEIGHTS, NEW JERSEY, ASSIGNOR
OF ONE-HALF HIS RIGHT TO EDWARD HEM, OF SAME PLACE.

IMPROVEMENT IN BUTTON-HOLE-STITCHING ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **210,370**, dated November 26, 1878; application filed
March 23, 1878.

To all whom it may concern:

Be it known that I, AUGUSTUS H. TAIT, JR., of Jersey City Heights, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Attachments to Sewing-Machines for Stitching Button-Holes, of which the following is a description, reference being had to the accompanying drawing, which forms part of this specification.

This invention is more particularly designed to be used as an attachment to sewing-machines for stitching button-holes, but is also applicable in part to over-seam or edge finishing or stitching—as, for instance, the edge-finishing of kid gloves and other articles.

The invention consists in novel constructions and combinations of a hook-bar having three double or six reverse single movements, for carrying the shuttle-thread around the needle-thread, and for forming, in connection with the needle and shuttle, the required stitch.

Furthermore, the invention consists in an independent clamping or feeding plate of peculiar construction interposed between the presser-foot and the material under operation, in combination with a guide attached to the presser-foot for directing the feed of the material in stitching button-holes, and in certain means for automatically actuating said plate when stitching round the ends of a button-hole, substantially as herein described.

In the accompanying drawing, Figure 1 represents a partly-sectional front view of a sewing-machine in part, having my invention applied, with the sewing-needle as rising but not yet out of the cloth. Fig. 2 is a sectional side view at right angles to Fig. 1 of the same, with the needle and other parts in like position. Fig. 3 is a similar view to Fig. 2, but showing the needle as farther raised and out of the cloth, and with other parts or devices used in my invention as occupying a changed relative position. Fig. 4 is a partly-sectional front view, showing the needle as still farther raised, and the position of other working parts changed to correspond. Fig. 5 is a horizontal section on the line *xx*, and Fig. 6 a further horizontal section on the line *yy*. Fig.

7 is a perspective view of a hook-bar, with attached hook forming part of this invention.

A represents the cloth bed or table of a double or lock-stitch shuttle sewing-machine; B, its reciprocating needle-bar, working through the usual face or head plate C; and *b*, the sewing-needle carried by said bar. D is the presser-foot, and D' its bar.

The needle-thread is represented by the letter *c* and the shuttle-thread by the letter *d*.

Carried in a sliding or adjustable manner, to compensate for different thicknesses of material under operation by the presser-foot D, is an upright bar, E, which has a stationary position when the machine is in operation by its upper end resting against the under side of the face-plate or head C, a spring, *e*, serving to keep said bar pressed up against said plate or head. This bar has on its front side guide loops or eyes *f*, within which, so as to be capable of sliding up and down there-through, is a bar, G, which is pressed downward by a spring, *g*. The upper end of said bar G is formed with a head, *h*, through which, on the needle side of the presser-foot bar D', is projected a horizontal pin or pivot, *i*, arranged in a transverse direction to the general or straight feed by the toothed dog or feeding-bar H, which feeds in direction of the arrow *z*. Fitted to rock on this pin or pivot *i*, in rear of the head *h*, is a sleeve, *k*, to which a hook-bar, I, is secured by a pivot, *l*, arranged at right angles to the pivot *i*. By means of these two pivots *i* and *l* the hook-bar I, which carries the hook *m*, that engages with the shuttle-thread to produce the required stitch, is free to have a twofold motion in directions at right angles with each other—that is to say, backward and forward in transverse relation with the main feed and backward and forward in direction of said feed, or thereabout—besides an up-and-down motion due to the vertically-sliding bar G, by which it is carried.

The means by which these several motions are or may be obtained will now be explained in connection with the needle *b* and its operating-bar B.

When the needle *b*, after having passed down through the cloth and formed a loop of

the needle-thread, through which the shuttle-thread is passed, reaches a position in its ascent equal to about three-fourths of its upstroke, or thereabout, and before it leaves the cloth, as shown in Figs. 1 and 2, a pin or projection, *n*, on the needle-bar strikes and passes a spring cam or latch, *M*, secured to the face of the hook-bar *I*, and shifts the latter on its pivot *l*. By this movement a rear leg, *o*, forming part of the hook-bar *I*, is moved from a stationary rest, *r*, which projects from the bar *E*. The spring *g* then throws the bar *G*, and with it the hook-bar *J*, down, the rest *r* being received within a slot, *s*, in the hook-bar *I* for the purpose, and a spring, *u*, at the same time acting on the hook-bar *I* to throw or keep it pressed outward in a reverse direction to the main feed. This puts the hook-bar *I* in position, as shown in Fig. 3, for the hook *m* to engage with the shuttle-thread, which latter is held obliquely across the path of the hook by a downward stud or projection, *a*², on the needle-plate, to insure the engagement of the descending hook with the shuttle-thread. As the needle-bar then continues its upward movement to the position shown in Fig. 4, the pin *n* of the needle-bar, moving up within a slot in the latter, and striking an extremity or portion, *a*¹, (see Figs. 2 and 3,) on the front side of the pivot *l*, carries the hook-bar *I* up, subject to its guidance by the rest *r* in the slot *s*, which rest serves, as the hook-bar *I* continues its upward movement, to bear against an inclined surface, *b*¹, of a cam-like portion, *c*¹, of said bar, to move the latter against the pressure of the spring *u* at back of the bar; and as the lower end of the slot *s* rises above the rest *r* the pin *n*, acting at a leverage on lifting portion *a*¹ relatively to the pivot *l*, and the side of the cam-portion *c*¹, bearing against the rest *r*, cause the hook-bar to be swung toward the front of the machine. After this the hook-bar *I* remains stationary, supported by its leg *o* upon the rest *r*, till the needle passes through the loop, when the pin *n* bears against an inclined edge projection, *s*¹, on the face of the hook-bar, and throws the hook out of the loop, causing the shuttle-thread to be passed round the needle, after which the needle continues its descent, to assist in completing the stitch, and the needle again rises to operate as before.

The hook-bar *I*, it will be observed, moves in three different double or six reverse single directions, and makes both its up and down movements when the needle is on the rise. It may be constructed so that the needle-bar will move it in both directions in line with the feed and the spring *u* be dispensed with.

To give proper direction to the feed when stitching button-holes, I interpose between the presser-foot *D* and the cloth an oblong plate, *J*, of roughened or serrated construction on its under surface, to secure a firm hold on the cloth. This plate has an oblong opening, *d*¹, through it in direction of its length, through which a short tube, *e*¹, carried

by the presser-foot, projects to guide the plate when in motion, the needle *b* and hook *m* working through said tube. In or on the upper surface of this plate is a guiding groove or way, *f*, consisting of two straight parallel courses, arranged on opposite sides of the opening *d*¹, and connected at their ends by semi-circular toothed portions *g*¹. During the movement of this plate along with the cloth, as effected by the feeding-dog *H*, said plate is guided in a straight direction, in part by the tube *e*¹ and in part by a spring-pawl, *K*, connected with the presser-foot and bearing down or in one straight line or course of the way *f*¹, to stitch one side or edge of the button-hole. The said plate is then turned half-round, corresponding with either of its toothed portions *g*¹, to stitch around one end of the button-hole, after which it is guided in a straight direction again, the other straight line or course of the way *f*¹ passing under the presser-foot, and subsequently said plate turned half round again, corresponding with the other toothed portion, *g*¹, to stitch around the other end of the button-hole. Said plate *J* and the cloth which its lower roughened surface grips are turned, when stitching the ends of the button-hole, by the engagement of the pawl *K* with the toothed portions *g*¹ of the plate, and by the operation which takes place of said pawl successively, in reverse directions alternately, by the needle-bar *B* and the rising-and-falling bar *G*, which carries the hook-bar *I*. Thus the pawl *K* is carried by an upright holder, *K*¹, which is fitted by a dovetail construction of its base within a longitudinal slot, *h*¹, in the presser-foot, to admit of the pawl and its holder moving lengthwise of the presser-foot. A rod, *i*, attached to the presser-foot and passing through the pawl-holder, may also serve to guide the pawl and its holder in their longitudinal movement relatively to the presser-foot.

Upon the needle-bar *B* is a projection, *l*¹, which, when the needle-bar comes down, acts upon the back of the upper end of the pawl-holder *K*¹, and moves the latter, together with its pawl *K*, so that when the latter engages with either toothed portion *g*¹ of the plate *J* it shifts said plate the distance of one or more teeth in a circular direction, after which, and as the projection *l*¹ rises out of the way with the ascent of the needle-bar, the bar *G*, which carries the hook-bar, descends, and, by means of an arm or projection, *m*¹, on said bar *G* coming in contact with an incline, *n*¹, on the front of the pawl-holder *K*¹, causes the pawl *K* to be returned and made to engage with another tooth on the portion *g*¹, for the purpose, as the needle-bar again descends, of continuing the circular feed of the plate *J* and cloth with which the plate, by its roughened surface, engages.

If desired, instead of the slotted feeding-plate *J* being turned automatically, as described, around the tube *e*¹ as the ends of the slot *d*¹ successively come up against said tube,

it and the cloth or material which it gripes or holds may be turned by hand on the tube *e'*, as a bearing or guide.

I claim—

1. The combination, with the needle-bar provided with the projection *n*, of the hook-bar I, having the lifting-extremity *a'* and incline *s'*, the spring cam or latch M, the pivots *i* and *l*, arranged at right angles with each other, and the rising-and-falling bar G and its controlling-spring *g*, substantially as specified.

2. The hook-bar I, having a rising-and-falling motion, constructed with a rear leg, *o*, and slots, in combination with the bar E, provided with the rest *r*, the bar G, and the pivots *i* and *l*, essentially as described.

3. The combination of the rising-and-falling hook-bar I, having a cam-like projection, *e'*, on its face, the bars E and G, the pivots *i* and *l*, and the spring *u*, substantially as specified.

4. The combination, with the presser-foot bar D', of the bar E, the face-plate or head C, the bar G, connected with the bar E by one or more guides, *f*, the spring *g*, the pivot *i*, the sleeve *k*, the pivot *l*, and the hook-bar I, essentially as described.

5. The combination of the needle-plate provided with a stud or projection, *a''*, and the

hook-bar I, substantially as and for the purpose herein described.

6. The combination of the presser-foot provided with a tubular projection, *e'*, with the slotted feed-plate having a roughened under surface and fitted to the said projection on the presser-foot, substantially as and for the purpose herein described.

7. The independent feed-plate J, constructed with a longitudinal slot, *d'*, in it, and having its under surface serrated and its upper surface formed with a groove or way, *f'*, running in parallel courses and terminating in opposite end toothed semicircular portions *g'*, in combination with the sliding pawl-holder K', the spring-pawl K, the needle-bar having a projection, *l'*, the rising-and-falling bar G, having a projection, *m'*, and the presser-foot provided with a tubular projection, *e'*, essentially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

A. H. TAIT, JR.

Witnesses:

VERNON H. HARRIS,
FRED. HAYNES.