L. THOMAS.

Button-Hole Attachments for Sewing-Machines.

No. 211,435. Patented Jan. 14, 1879.

Fig. 1

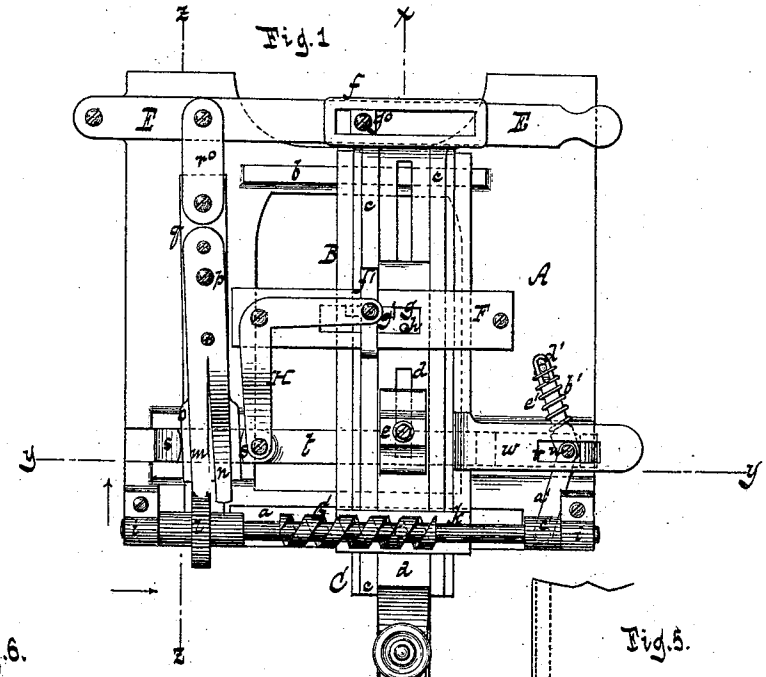


Fig. 6.

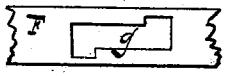


Fig. 5.

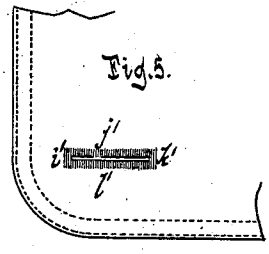


Fig. 2.

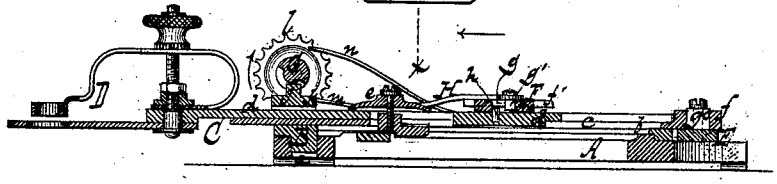
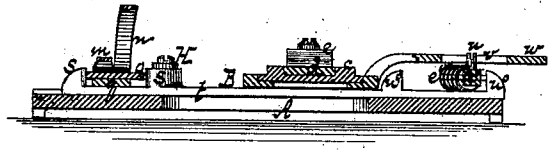
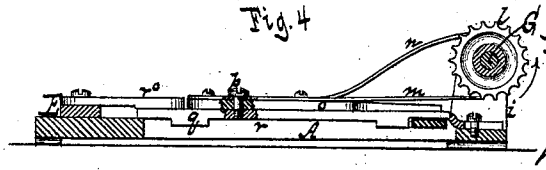


Fig. 3.



Witnesses.
Otto Applelund.
W. C. Hauff

Fig. 4



Inventor.
Leopold Thomas.
by
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his attys.

UNITED STATES PATENT OFFICE.

LEOPOLD THOMAS, OF HOBOKEN, NEW JERSEY.

IMPROVEMENT IN BUTTON-HOLE ATTACHMENTS FOR SEWING-MACHINES.

Specification forming part of Letters Patent No. **211,435**, dated January 14, 1879; application filed September 25, 1878.

To all whom it may concern:

Be it known that I, LEOPOLD THOMAS, of Hoboken, in the county of Hudson and State of New Jersey, have invented a new and useful Improvement in Button-Hole Attachments to Sewing-Machines, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 represents a plan or top view. Fig. 2 is a vertical longitudinal section in the line *x x*, Fig. 1, and looking in the direction of the arrow opposite to that line. Fig. 3 is a transverse vertical section in the line *y y*, Fig. 1, and looking in the direction of the arrow opposite to that line. Fig. 4 is a longitudinal vertical section in the line *z z*, Fig. 1, and looking in the direction of the arrow opposite to that line. Fig. 5 is a plan of the button-hole finished by the aid of my attachment.

Similar letters indicate corresponding parts.

The invention consists, first, in a button-hole attachment for sewing-machines, the combination, with a cloth-clamp carrier composed of a primary and secondary slide, of a friction-clamp applied to the two slides, mechanism for imparting reciprocating motion to the primary slide, and a pin on the secondary slide, and a bridge-plate spanning said slide, and having a slot, into which said pin projects for graduating the motion of said slide, as will be hereinafter particularly explained; second, in the combination, in a button-hole attachment for sewing-machines, of the bed-plate, a transversely-sliding carriage having a cloth-clamp carrier and an upwardly-projecting tooth or pin, a revolving screw-spindle, between the threads of which said tooth or pin projects, and a suitable mechanism for operating said spindle, and thereby giving the desired transverse motion to the carriage, all as hereinafter particularly described and explained.

The invention also consists in certain other arrangement and combination of parts, as will be fully hereinafter described in detail.

In the drawings, the letter A designates the bed-plate, which supports the working parts of my button-hole attachment. This bed-plate is provided with a groove, *a*, and rib *b*, which form the guides for a carriage, B, and in this carriage is fitted the cloth-clamp carrier C. This carrier consists of two slides, *c d*, the secondary slide *d* being fitted into guideways formed on the primary slide *c*, and being connected to the same by a friction-clamp, *e*, which is adjusted in such manner that both slides move together until the secondary slide meets with a resistance, when its motion stops, while the primary slide completes its stroke.

The cloth-clamp D is secured to the outer end of the secondary slide *d*, while the primary slide *c* is provided with a slotted head, *f*, which engages with a block, g^0, secured to a vibrating lever, E, pivoted at one end to the bed-plate, and having at its opposite end suitable means for connecting it with the driving-shaft of the machine. These means may consist of a cam-follower on the lever, against which a switch-cam upon the driving-shaft of the sewing-machine works, so that when my button-hole attachment is secured in the proper position on the cloth-plate of said sewing-machine a vibrating motion is imparted to the lever E, and thereby the clamp-carrier receives a reciprocating motion in a longitudinal direction, while the carriage B is free to travel in a transverse direction to the extent of the slot in the head *f* of the primary slide *c*.

Over the carriage B and the clamp-carrier C, and transversely to the same, is situated a bridge, F, provided with a slot, *g*, and from the secondary slide *d* projects a pin, *h*, into said slot. The reciprocating motion of the secondary slide and of the cloth-clamp D is limited by the width of the slot *g*, while the motion of the primary slide *c* depends upon the stroke of the lever E; and whenever the pin *h* strikes the sides of the slot *g* the motion of the secondary slide stops, while that of the primary slide continues, the friction-clamp *e* being so adjusted that the above-named motion is rendered possible.

The transverse motion of the carriage B, together with the clamp-carrier C, is produced by a screw-spindle, G, which has its bearings in suitable journal-boxes *i*, secured to the bed-plate A. The spiral groove of this screw-spindle engages with a tooth, *j*, which rises from a bridge, *k*, Fig. 2, secured to the carriage B. On this screw-spindle is mounted a cog-wheel, *l*, which is alternately exposed to the action of one or the other of two pawls, *m n*, the pawl *m* being so situated that when it is thrown in gear with the cog-wheel *l* it imparts to the same a step-by-step movement in the direction of the arrow marked near it in Figs. 2 and 4, while the pawl *n*, when thrown in gear with said cog-wheel, turns the same step by step in

the opposite direction. Said pawls are firmly secured to a lever, *o*, which has its fulcrum on a pivot, *p*, secured in a slide, *q*, Figs. 1 and 4, which is guided in a suitable slot, *r*, in the bed-plate, and which connects by a link, r^0, with the moving lever E. The front end of the pawl-lever *o* fits between two lugs, *s s*, which rise from a transverse slide, *t*, Figs. 1 and 3, extending across the bed-plate beneath the carriage B, and being guided in suitable grooves in said bed-plate. From this transverse slide rise also two lugs, w^0 w^0, between which extend two toggle-levers, *a' b'*, which are connected together by a pivot, *u*, that rises up into a slot, *v*, formed in an arm, *w*, that extends from the carriage B. The toggle-levers *a' b'* have their fulcra, respectively, on pivots *c' d'*, secured in the bed-plate A, and they are exposed to the action of a spring, *e'*, by which said toggle-levers, whenever the pivot *u* passes their center of motion, are suddenly thrown toward one side or toward the other, according to the transverse motion of the carriage B.

The transverse slide *t* connects, by a bell-crank lever, H, with a slide, *f'*, fitted into a groove in the bridge F, Figs. 1 and 2, and to this slide is secured a block, *g'*, which extends down into the slot *g* of said bridge. The length and width of this block are less than those of the slot *g*, and different blocks are provided for different sizes of button-holes.

If at the beginning of the operation the cloth-clamp occupies the position shown in Fig. 1, the needle passes down through the cloth at the point *h'*, and as the lever E moves, the pin *h* of the secondary slide *d* traverses the entire width of the slot *g*, and a stitch is formed equal in length to the motion of this pin. After two or more such long or barring stitches, *i*, Fig. 5, have been completed, the carriage B has moved in a transverse direction sufficiently far to bring the block *g'* in the path of the pin *h*, the motion of the secondary slide and of the cloth-clamp is limited, and a series of short stitches, *j'*, are formed, Fig. 5, while the transverse motion of the carriage, produced by the lower pawl, *m*, on the cog-wheel *l*, proceeds, and the outer end of the slot *v* in the arm *w* is caused to act on the stud *u* of the toggle-levers *a' b'*. After a sufficient number of short stitches *j'* have been completed and the pin *h* has passed the block *g'*, a small number of long or barring stitches, *k'*, are formed, and at the same time the toggle-levers *a' b'* are thrown beyond their center of motion, so as to change the position of the transverse slide *t*, and to throw the upper pawl, *n*, in gear with the cog-wheel *l*, thereby reversing the transverse motion of the carriage B. By this motion of the transverse slide the block *g'* is also moved to the opposite side of the slot *g*, and as the transverse motion of the carriage B progresses the short stitches *l'*, Fig. 5, are formed and the button-hole is finished.

It will be seen from this description that the number of barring or long stitches formed on the opposite ends of the button-hole depends upon the length of the block *g'*, and the length of the short stitches *j'* and *l'* depends upon the width of said block. The time when the transverse motion of the carriage B is changed depends upon the length of the slot *v* in the arm *w*, and for button-holes of different lengths the length of this slot must be made adjustable. This can easily be effected by securing to one of its ends an adjustable slide.

If my attachment is to be used for one size button-hole only, the block *g'* can be dispensed with, the slot *g* being made in the form shown in Fig. 6.

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

1. In a button-hole attachment for sewing-machines, the combination, with a cloth-clamp carrier composed of a primary and secondary slide, of a friction-clamp applied to the two slides, mechanism for imparting reciprocating motion to the primary slide, and a pin, *h*, on the secondary slide, and a bridge-plate having a slot, *g*, for graduating the motion of said secondary slide, substantially as shown and described.

2. The combination, in a button-hole attachment for sewing-machines, of the bed-plate of said attachment, a transversely-sliding carriage having a cloth-clamp carrier and a tooth rising from said carriage, a revolving screw-spindle, between the threads of which said tooth projects, and a suitable mechanism for operating said spindle, and thereby giving the transverse motion to the carriage, substantially as herein set forth.

3. The combination, with the carriage B, which carries the cloth-clamp carrier, and with the screw-spindle, for imparting to said carriage a transverse motion, of an automatic reversing mechanism, consisting, essentially, of toggle-levers *a' b'*, a slotted arm, *w*, acting on the pivot *u* of said toggle-levers, a transverse slide, *t*, lever *o*, carrying two pawls, *m n*, a cog-wheel, *l*, mounted on the screw-spindle, and lever E, adapted to receive motion from the driving-shaft of the sewing-machine, substantially as shown and described.

4. The combination of the cloth-clamp carrier, its secondary slide, having pin *h*, bridge F, having slot *g*, block *g'*, slide *t*, bell-crank lever H, having one end pivoted to said block *g'*, arranged within the slot, and having its other end pivoted to the slide *t*, and mechanism for automatically operating the slide, whereby the position of the block *g'* in slot *g* is changed whenever the direction of the motion of the carriage is changed, substantially as and for the purpose described.

In testimony that I claim the foregoing I hereunto set my hand and seal this 21st day of September, 1878.

LEOPOLD THOMAS. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.