

(Model.)

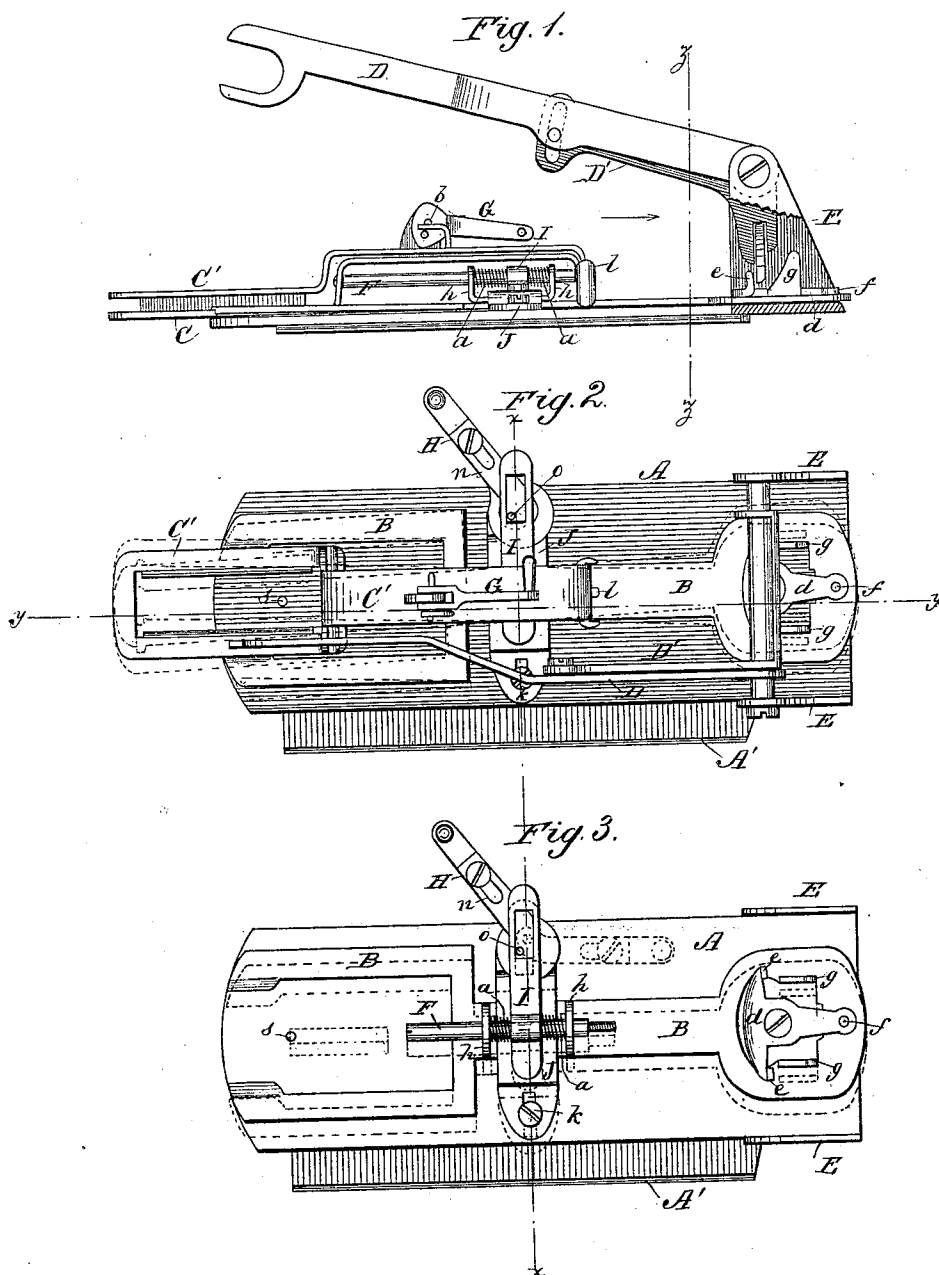
2 Sheets—Sheet 1.

J. K. HARRIS.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 246,764.

Patented Sept. 6, 1881.



WITNESSES:

W. W. Hollingsworth
Edw. W. Byrne.

INVENTOR:

John K. Harris
BY

ATTORNEYS.

(Model.)

2 Sheets—Sheet 2.

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Fig. 4.

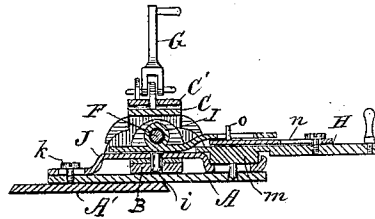


Fig. 5.

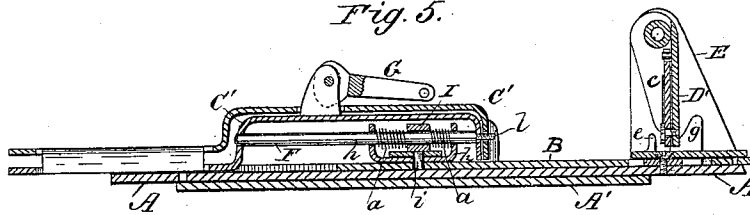


Fig. 6.

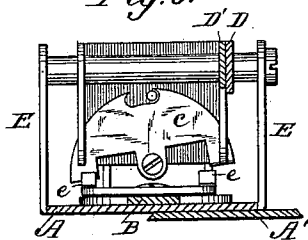


Fig. 7.

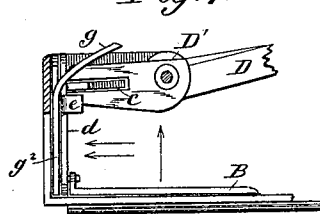


Fig. 8.

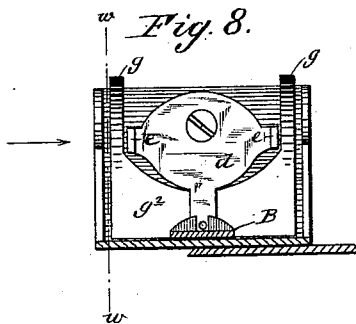
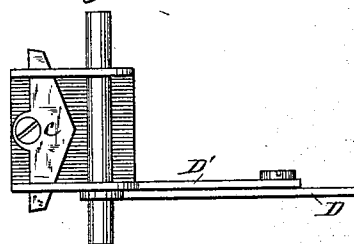


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN K. HARRIS, OF SPRINGFIELD, OHIO.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 246,764, dated September 6, 1881.

Application filed February 23, 1881. (Model.)

To all whom it may concern:

Be it known that I, JOHN K. HARRIS, of Springfield, in the county of Clarke and State of Ohio, have invented a new and useful Improvement in Button-Hole Attachments for Sewing-Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

The invention relates to that class of button-hole attachments where the cloth is held in a clamp and oscillated laterally, and at the same time is given an intermittent longitudinal movement forward and backward under the action of the needle by a lever connecting with the needle-bar.

Heretofore much difficulty has been encountered in obtaining a reliable, adjustable, and durable feed-motion, properly timed with the oscillating movement, so as to act simultaneously with it both forward and backward. For this purpose many devices have been tried, such as double racks and pinion, operated by cog or ratchet wheels, cams, screws, scrolls, &c.; but all have been found too complicated and expensive for general family use.

The object of my invention is to cause an oscillating cloth-clamp to feed itself longitudinally forward and backward—that is, while oscillating on one side of a center line to feed itself intermittently in one direction, and when oscillating on the other side of said center line to feed itself intermittently in the opposite direction—the length of feed being self-regulating and always proportioned to the width of oscillation; also, to better work the ends of the button-hole and to simplify and cheapen the construction of the whole attachment.

To these ends my invention consists in a cloth-clamp having an oscillatory movement laterally to the line of feed and a progressive intermittent feed produced by the indirect contact of said oscillating cloth-clamp against a relatively stationary stop, abutment, or other resistance.

The invention also further consists in the peculiar construction and arrangement of devices for converting the oscillatory movement into an intermittent progressive feed lengthwise the button-hole, for which purpose a friction-clutch and springs are used.

The invention consists, also, in the peculiar

construction and arrangement of the ship-over devices for establishing a new line of feed parallel to the first for working the other side of the button-hole, and in the peculiar construction of the oscillating device. The peculiarities of these latter devices I will first fully describe in connection with the drawings, and then point out in the claims.

Figure 1 is a side elevation of my improved attachment, with a part of the support for the needle-bar lever broken away. Fig. 2 is a plan view, showing in dotted lines the oscillatory movement of the cloth-clamp and its guide. Fig. 3 is a plan view with the cloth-clamp removed, showing in dotted lines the ship-over movement of the cloth-clamp guide for working the other parallel side of the button-hole. Fig. 4 is a vertical cross-section through the line *xx* of Figs. 2 and 3. Fig. 5 is a vertical longitudinal section through the line *yy* of Fig. 2. Fig. 6 is a vertical transverse section through the line *zz* of Fig. 1, looking in the direction of the arrow. Figs. 7, 8, and 9 are views of a modification of the devices for oscillating the cloth-clamp, Fig. 7 being a vertical section through line *ww* of Fig. 8, Fig. 8 being a view looking in the direction of the double arrows in Fig. 7, with the needle-bar lever and its attachments removed, and Fig. 9 being an underneath view of the needle-bar lever and its attachments, looking in the direction of the single arrow in Fig. 7.

A is the bed-plate, having its sides at its rear end turned up to form flanges *EE*, for holding the devices which impart an oscillating movement to the cloth-clamp from the reciprocating needle-bar. The bed-plate A also has a duplicate, *A'*, of the rear shuttle-race slide attached to its under side for connection with the sewing-machine, which slide is provided with a suitable fastening to prevent the slide from slipping back.

The cloth-clamp is carried by and oscillated with a subjacent guide-plate, B, the center of whose oscillation is near the middle of its length, as shown by the dotted lines of Fig. 2. The rear end of this guide-plate is made yoke-shaped, and has two inclines, *gg*, struck up on its opposite sides. Pivoted to the bed-plate A just over this yoke end of the guide-plate is a T-shaped lever, *d*, which at *f* is pivoted to

the guide-plate, and has at its other end upturned lugs *e e*, that lie in front of the inclines *g g*. In a plane between the lugs *e e* and inclines *g g* there rests a crescent-shaped piece, *c*, (see Fig. 6,) which is pivoted to the pendent skirt of the part *D'* of the needle-bar lever. This piece *c* is pivoted to said skirt at its middle lower edge, and is provided with a stop device at the top to limit its oscillation, while its opposite ends play in slots in the skirt of the part *D'*.

Now these devices constitute means for oscillating the guide-plate *B*, and their action is as follows: When the lever *D D'* is oscillated by its forked connection with the needle-bar, the piece *c*, being pivoted to the pendent skirt of the part *D'*, is oscillated at right angles to its plane, to act alternately on lugs *e*, and through lever *d* and its pivot *f* to deflect the guide-plate *B*, the piece *c* being alternately shifted on its pivot to act alternately on the lugs *e e*, which shifting is effected by the inclines *g g*, so that after one end of *c* has acted on a lug, *e*, (to throw the guide-plate in one direction,) on its back stroke this end of *c* strikes on incline *g*, which tilts the piece *c* and throws its opposite end down in a position to act upon the other lug *e* and throw the guide-plate in the other direction. The general structure and principle of operation of these devices for oscillating the cloth-clamp are substantially the same as those shown and described in my prior patent, No. 235,235. The present construction, however, differs from that described in said patent in that the inclines *g g* are located directly on the guide-plate, or have the same movement with the guide-plate in coming into position to strike the ends of the crescent-shaped piece *c*.

As a modification of this part of my invention, I may arrange the crescent-shaped piece *c* to rest in a horizontal plane, as in Figs. 7, 8, 9, instead of in a vertical plane. In such modification the lever *d* is at right angles to the guide-plate, and the inclines *g g* are formed on a separate slide, *g²*, which rests in a vertical plane. This slide *g²*, however, is connected to the guide-plate *B* at the point where lever *d* connects with it, and the inclines therefore have the same movement as the guide-plate, though not made in one piece with it. The guide-plate is made forked at its end opposite the yoke, and such forked end surrounds the needle-holes. Projecting upwardly from about the middle of this guide-plate are two lugs or ears, *h h*, and at a point midway between the two projecting ears said plate is pivoted at *i* to the ship-over slide *J*, (see Figs. 4 and 5,) which in turn is attached loosely to the bed-plate by slots and screws *k* in transverse relation, so that a movement of slide *J* longitudinally will ship over guide-plate *B* to any desired distance on each side of a straight longitudinal central line, as shown in dotted lines in Fig. 3. Let it be distinctly understood that this guide-plate *B* does not travel back and forth, carry-

ing the cloth-clamp, but simply oscillates horizontally on its pivot by means of suitable devices actuated by the needle-bar or other available movements of the sewing-machines.

F is a straight steel bar passing loosely through the ears *h h*, and firmly connected at each end to cloth-clamp *C C'*, both sections of which are bent up over the said bar. Fitted to bar *F*, and sliding freely thereon, is a clutch-lever, *I*, which has a sleeve that encircles the bar and is retained in position exactly over the center of oscillation by means of the two opposite spiral springs *a a*, which surround bar *F* and are held in place by the raised projections *h h* from guide-plate *B*.

The upper plate, *C'*, of the cloth-clamp is connected to the lower at *l*, at which point lugs grasp the shank of the guide-plate, while the front ends or rectangular frames of the cloth-clamp rest between the bifurcations of the guide-plate.

G is a lever for opening or closing the two sections of the cloth-clamp.

Now, it is evident the cloth-clamp, in all its parts, will have the same oscillating movement as is communicated to the guide-plate *B*, and as the former is free to slide back and forth on the latter, it is easily seen how the desired intermittent self-feeding movement of the cloth-clamp both forward and backward, by virtue of its own oscillation, can take place.

For adjusting the ship-over slide *J*, a lever, *H*, having a cam-head, *m*, on its under side, (see Fig. 4,) is made to engage with upturned edges of the ship-over slide, so as to move it longitudinally in one direction or the other, whenever the lever *H* is thrown to one or the other of its positions. On the top of this lever *H* is a pin, *o*, secured to an adjustable plate, *n*, on said lever, and which pin passes through a slot in the end of the clutch-lever *I*. When the lever *H* is thrown in one direction the ship-over slide is shifted, and the pin *o*, by the same movement, is made to bear against one side of the slot in the clutch-lever, and acts as a stop or abutment, against which the clutch-lever is strained for a feed movement in one direction, and which pin *o*, when thrown to the other side of the slot, forms a stop or abutment, against which the clutch-lever is strained, for movement in the reverse direction whenever the position of the lever *H* and ship-over slide is changed. Now, it will be seen that the clutch-lever *I* closely encircles bar *F* of the cloth-clamp, but is held in constant and normal relation to the oscillating guide-plate by the ears *h h* and springs *a a*. When, therefore, the guide-plate is oscillated bar *F* is oscillated, and so would be clutch-lever *I* if it were free to move. As a matter of fact, however, it cannot move in one direction, since it is held by the stop-pin *o*, and the result is that its clutch bites the bar *F*, and said stop-pin, reacting on bar *F*, feeds the same and the cloth-clamp forward, compressing the spring in front of it. Then on the alternate stroke, the gripe being

released, the tension of this spring forces the clutch back to its middle position for a new hold. As the guide-plate and cloth-clamp oscillate again, the same advance feed movement will be produced, and so on until one side of the button-hole is worked. Then on moving the ship-over slide J the stop-pin *o* is brought into position to bear against the opposite side of the slot in the clutch-lever; and as the clutch in the other half of the oscillation now bears against this pin, the longitudinal feed movement of the cloth-clamp will be reversed, the other spring now coming into play, but acting precisely as the first.

15 Instead of one stop-pin *o* working in a slot of the clutch-lever, two such pins may be arranged to work on opposite sides of said lever to produce the same effect.

Among the advantages which characterize my invention may be mentioned the fact that the oscillating cloth-clamp is made self-feeding by causing its oscillation to be converted directly into an intermittent feed, and by which an exact relation always exists between the extent of oscillation and the extent of feed, preserving automatically a proper relation between these two factors for different sizes of button-holes. Another advantage is that the ship-over movement and the change in the direction of the feed are effected by one and the same adjustment. Furthermore, an advantage belonging to the friction-clutch is that it permits of almost infinitesimally small steps of feed, which cannot be had when a definite toothed structure is employed as a means for effecting this step-by-step movement. Again, by having the center of oscillation of the cloth-clamp between the oscillating devices and the needle-hole I am enabled to use a much longer lever for connecting with the needle-bar, which makes an easier strain upon the needle-bar.

Having thus described my invention, what I claim as new is—

1. In a button-hole attachment for sewing-machines, the combination, with an oscillating cloth-clamp, of a stop stationary in relation to said cloth-clamp, and a single device adapted to engage said cloth-clamp and to impinge against said stationary stop, whereby the oscillating movement of the cloth-clamp is directly converted into a progressive right-line movement, substantially as described.

2. In a button-hole attachment for sewing-

machines, the combination of a bed-plate, an oscillating cloth-clamp, a lever pivoted at its rear end to the bed-plate and arranged longitudinally above the cloth-clamp for connecting with the needle-bar, and devices located at the rear end of the cloth-clamp and lever for connecting said lever with the cloth-clamp to oscillate it, the said cloth-clamp having a center of oscillation between the needle-hole and the said oscillating devices, substantially as shown and described.

3. The combination, with the cloth-clamp having bar F, of means for oscillating it, a friction-clutch embracing said bar, springs arranged upon the opposite sides of said friction-clutch, and a stop or resistance adapted for contact with the friction-clutch, to cause the same to feed the cloth-clamp in either direction through its oscillation, as described.

4. In a button-hole attachment for sewing-machines, the combination, with an oscillating cloth-clamp, of a stop stationary in relation to said cloth-clamp, and a friction-clutch adapted to engage said cloth-clamp and to impinge against said stationary stop, substantially as and for the purpose described.

5. The combination, with the bed-plate and the cloth-clamp, of the transversely-adjustable ship-over slide J and the guide-plate B for the cloth-clamp, pivoted to the ship-over slide for a center of oscillation, and adjustable with said slide, as shown and described.

6. The combination, with the cloth-clamp bar F and the friction-clutch I, arranged thereon, as described, of an adjustable lever provided with stop *o*, as and for the purpose described.

7. The combination, with the cloth-clamp having bar F, and the friction-clutch I, of a ship-over device and a stop adapted to be simultaneously adjusted for shifting the goods and reversing the feed, as described.

8. The devices for oscillating the guide-plate, consisting of the pivoted piece *c*, operated by the needle-bar lever, the lever *d*, having lugs *ee* and pivoted to the guide-plate, and inclines *gg*, arranged, as described, to have the same movement as the guide-plate, all combined as shown and described.

JOHN K. HARRIS.

Witnesses:

EDWD. W. BYRN,
CHAS. A. PETTIT.