

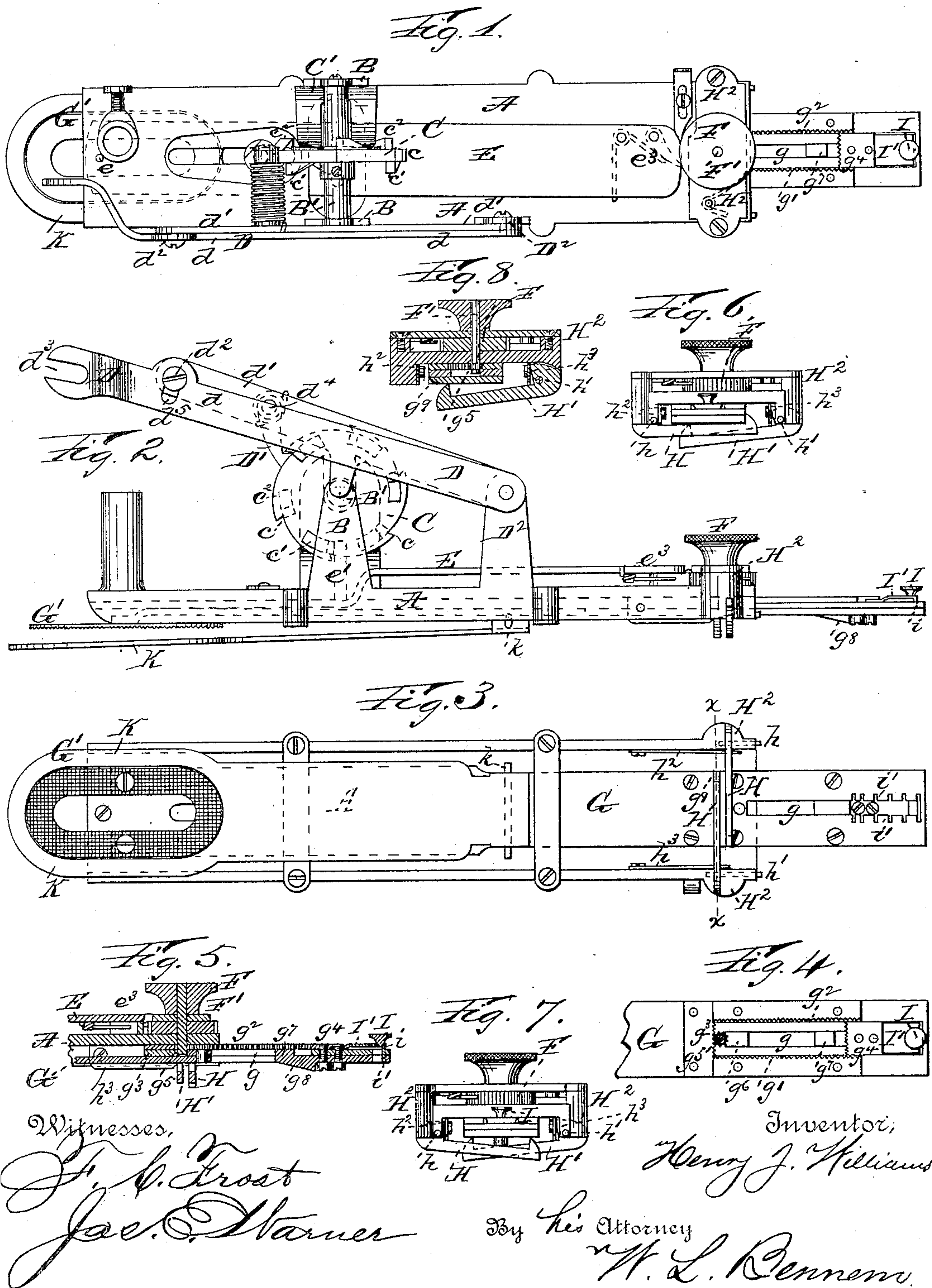
(No Model.)

H. J. WILLIAMS.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 399,304.

Patented Mar. 12, 1889.



UNITED STATES PATENT OFFICE.

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TON HOLE ATTACHMENT COMPANY, OF SAME PLACE.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 399,304, dated March 12, 1889.

Application filed November 29, 1887. Serial No. 256,394. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. WILLIAMS, of the city, county, and State of New York, have invented a new and useful Improvement in
5 Button-Hole Attachments for Sewing-Machines; and I hereby declare the following to be a full and clear description thereof.

This invention relates to improvements in (as described in my application, Serial No. 10 239,260, filed May 24, 1887) a somewhat similar mechanism heretofore invented by myself; and it consists in certain mechanisms for adjusting the machine to different lengths of button-holes, and in certain improvements in
15 the construction of the operating-lever and attached mechanisms, all of which are hereinafter specifically described.

The invention will be readily understood by reference to the accompanying drawings, of
20 which—

Figure 1 is a general plan of the improved button-hole attachment. Fig. 2 is a side elevation of it. Fig. 3 is a bottom plan of it. Fig. 4 is a detailed plan view of the adjust-
25 ing mechanism of the feed-plate to regulate it to the length of button-hole required. Fig. 5 is a horizontal sectional elevation of the parts shown in Fig. 4. Fig. 6 is an end elevation of the rear end of the machine,
30 showing only the ends of the adjusting and feed plates and the attachments thereto belonging, and with one of the laterally-adjusting hooks engaged with the edge of the feed-plate to hold it in one of its peculiar lateral
35 positions. Fig. 7 is a similar view to Fig. 6, except that both of the lateral hooks are disengaged. Fig. 8 is a transverse section on the line *x x* of Fig. 3.

The primary mechanisms of this improved
40 attachment are quite similar to the corresponding parts in the machine heretofore invented by me, and described in application, Serial No. 239,260, filed May 24, 1887, and consists of the common bed-plate A, to which the other
45 parts are assembled, and attached to the presser-foot bar of the sewing-machine in any suitable manner, and in connection therewith the following-described parts: To this bed-plate is attached upwardly-projecting arms
50 B, which form an abutment or lug for the attachment and support of the axle B', on

which is mounted the driving-wheel C, which constitutes the principal feed-operator of the machine, and also the actuating vertically-vibrating lever D, by means of which the
55 said ratchet-wheel is operated. The said lever D is made of two pieces, *d* and *d'*, placed side by side and in contact with each other, and held together by an assembling-screw, *d²*, so that the said pieces *d* and *d'* may
60 be adjusted so as to make the said lever D throw more or less up or down for the purpose of adapting it to a higher or lower needle-bar, and thereby adapting the button-hole mechanism to any required sewing-ma-
65 chine. The forward or free end of the said actuating-lever D is bifurcated or slotted at *d³*, for attachment to the needle-bar of the sewing-machine to which it is to be attached by any
70 suitable lug formed on or attached to the said needle-bar of the sewing-machine, it being readily adapted to enter into the said notch *d³*, and thereby move the said actuating-lever of the button-hole attachment or mechanism
75 up and down with the corresponding movements of the said needle-bar. The ratchet-wheel C has teeth or serrations *c* formed on its periphery, and also serrated teeth or lugs
80 *c'* and *c²* formed on its sides near its periphery. The pawl-D' is pivoted at or near one of its ends to the piece *d'* of the lever D by the pin *d⁴*, and is provided at or near its said
85 pivot-pin with a suitable engagement-spring, and at its other end it is made to engage with the teeth or serrations *c* of the wheel C, and so move the said ratchet-wheel forward in a
90 series of intermittent movements as the actuating-arm D is moved up and down by the successive strokes of the needle-bar, as above described. The ratchet-wheel C in its move-
95 ments is controlled more or less by a tension-spring, C', which presses against its side and retains it in position for the next succeeding stroke of the actuating-arm D. A laterally-vibrating lever, E, is pivoted to the bed-plate
100 at *e*, and in its central part carries upwardly-projecting arms *e'*. The upwardly-projecting ends of the vertical arms *e'* are arranged to embrace the lower part of the ratchet-wheel C. At each movement of the said wheel C one of the lugs *c'* or *c²* (they being placed al-
ternately on opposite sides of the said wheel

for this purpose) engages with the said lever E e' , and moves it first toward one side and then toward the other side in a reciprocating movement coinciding with the vertical strokes of the needle-bar of the sewing-machine attached to the actuating-lever, as above described. This reciprocating movement of the vibrating lever E is transmitted, through a spring-pawl, e^3 , to a horizontally-rotating feed ratchet-wheel, F, mounted on a vertical axle or post, F', seated in the inner end of the plate A. These movements are utilized to produce the forward and backward and zig-zag movements of the feeding-plate G and its presser-foot G', suitable and requisite for forming the button-hole work in the manner hereinbelow described. The said feeding-plate G is an elongated metal plate, somewhat longer and narrower than the plate A, below which it is seated, and to which it is held by an assembling-screw or pivot-pin, which permits the said feed-plate a laterally-vibrating movement, and also a horizontally-sliding movement.

All of the above-described parts are quite similar to the corresponding parts in my former machine above alluded to and described in application Serial No. 239,260, filed May 24, 1887; and the improvements consist in the adjustment devices hereinbelow described as belonging to the adjustment devices for the limit of movement of the feeding-plate G to regulate the length of the button-hole to be worked, and also to the construction and mechanism of the operating-lever D.

The rear end of the feed-plate G is provided with two parallel toothed racks, g' and g^2 , placed a short distance apart, as in Figs. 1 and 4, so as to form an open space or aperture, g , between them.

A fixed rack-piece, g^3 , joins the front ends of the racks g' and g^2 , so as to form a continuous rack at the front end of the said aperture, and a sliding rack-piece, g^4 , is made to move horizontally between the said pieces g' and g^2 , so as to lengthen or shorten the space g . With the sliding piece g^4 placed in any of its positions of adjustment, the teeth of the said rack-pieces g' g^2 g^3 g^4 form a continuous cogged rack about a rectangular space, g , and into this cogged rack a small pinion, g^5 , gears. This cogged pinion is mounted on the spindle F', and is rotated by the pawl e^3 and ratchet F. As the said pinion g^5 is rotated, it feeds along the cogged racks g' g^2 g^3 g^4 , and carries or moves the said feed-plate G around the contour of the button-hole in a series of intermittent movements, each the required length of a button-hole stitch. The spindle of the said pinion g^5 occupies a relatively-fixed position, so that by its rotation it moves the said cogged racks g' , g^2 , g^3 , and g^4 about it, thus giving to the presser-foot G' a corresponding movement, as it is fixed to the opposite end of the laterally-vibrating feed-plate G. Just below the said rack-plates, which are screwed to the top face of the said feed-

plate G, appear the edges of the slotted part of the said feed-plate G in Fig. 4, and against these edges rests the shank of the spindle F', below the said pinion g^5 , and this forms a guide for the said spindle to run on. Guiding-blocks g^6 and g^7 guide the other side of the said spindle in turning the ends of the slot g , so as to keep the pinion up to its work on the said racks. As the pinion moves along the end racks, g^3 and g^4 , it throws the feed-plate G to one side or the other, as the case may be, and thus adjusts the presser-foot G' to one side or the other of the button-hole to be worked. When thrown over thus to one side or the other, the feed-plate is held in that position, while the rack g' or g^2 (as the case may be) is being traversed by the pinion g^5 , by means of one of the lateral holding-hooks, H or H', as shown in Figs. 6 and 7. These hooks are respectively pivoted to the transverse plate-frame H² at h and h' , and they are provided, respectively, with actuating-springs h^2 and h^3 , to throw them into contact with and hook over the said plate G, as in Fig. 6. The sliding block g^7 , which regulates the length of the aperture g , is attached to the plate G, as shown in Fig. 5, and at its outer end it is provided with an operating-knob, I, and a spring-clutch, I', which said clutch has a downwardly-projecting tooth, i , which engages with one of the notches i' of the feed-plate, as shown in Figs. 3 and 5. By lifting the knob I up the tooth i is disengaged from the notch i' , and then the block g^7 may be moved along, so as to shorten or lengthen the guiding-recess g , as and for the purpose above described.

The lever D in this machine is fulcrumed at its rear end to a supporting lug or post, D², attached to the bed-plate A, and its adjustable section d' is movable up or down by means of the adjusting-screw d^2 moving up or down in the slot d^3 . This mechanism enables me to place the said lever at one side of the machine, as shown in Fig. 1, and obviates the necessity of slotting it for the axle B', as in my former machine.

The lateral holding-hooks H H' are disengaged from the edge of the feed-plate G in the following-described manner: When the said feed-plate is moved forward by the pinion g^5 to the forward limit of its movement, the inclined plane or wedge-piece g^8 , (shown in Fig. 2,) affixed to the bottom of the plate G, slides over the shank of the hook H and forces it down, so as to release its hold from the edge of the piece G, thereby allowing the said feed-plate G to move freely to the other side as the pinion g^5 moves along the rack g^4 . At the other or backward limit of the movement of the feed-plate G the edge of the plate G is rounded off, as at g^9 in Fig. 8, and as soon as this rounded-off space is moved opposite the hook H' the said hook automatically slides down and off of the said rounded or beveled edge, and thus the feed-plate is released at that end of the stroke, and the said

pinion g^5 is thus allowed to move the feed-plate laterally along the cogged rack g^3 . Thus a continuous forward and backward and lateral movement of the feed-plate is maintained
 5 by the aforesaid movements of the actuating-pinion g^5 so long as it is in gear with the said racks.

A cloth-holder, K, is attached to a lug, k , fixed to the bottom of the bed-plate A near its
 10 center, and extends thence forward to the presser-foot, for the reception of which it is slotted, as in Fig. 3, thereby forming a perfect cloth-holder in a single piece, in combination with the said presser-foot G' .

15 Having described my invention, I claim—

1. In a button-hole attachment for sewing-machines, the combination, substantially as hereinbefore set forth, of the bed-plate, the feed-plate having a longitudinal slot, g , at its
 20 rear end, the toothed rack above the slot and around its edge, the driving-pinion engaging with the rack, the guide-blocks at each end of the slot, and the hooks hinged to the bed-plate and engaging with opposite sides of the feed-plate, for the purpose specified.

25 2. In a button-hole attachment for sewing-machines, the combination, substantially as

hereinbefore set forth, of the bed-plate, the feed-plate, the toothed rack on the feed-plate, the driving-pinion engaging therewith, means 30 for driving the pinion, and the hooks hinged to the bed-plate and engaging with opposite sides of the feed-plate for holding the pinion in engagement with the rack.

3. In a button-hole attachment for sewing- 35 machines, the combination, substantially as hereinbefore set forth, of the bed-plate, the feed-plate, the toothed rack on the feed-plate, the driving-pinion engaging with the rack, the hooks hinged to the bed-plate and engag- 40 ing with opposite sides of the feed-plate, the block having an inclined lower face, g^8 , secured to the feed-plate for disengaging the hooks at one extremity of the longitudinal movement of the feed-plate, said feed-plate 45 being provided with a curved or rounded end to allow the hooks to disengage themselves at the other extremity of its longitudinal movement.

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Witnesses:

W. L. BENNEM,
 F. C. FROST.