

(Model.)

4 Sheets—Sheet 1.

W. SCHOTT.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 351,802.

Patented Nov. 2, 1886.

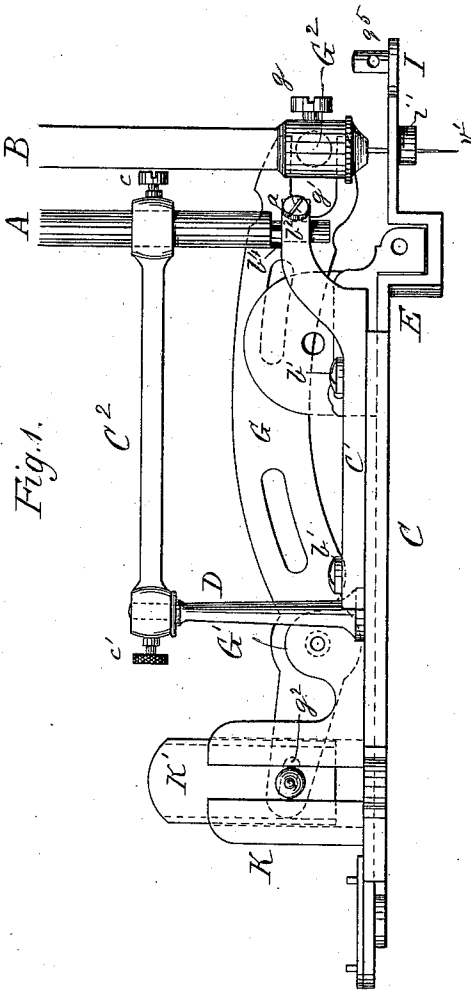


Fig. 1.

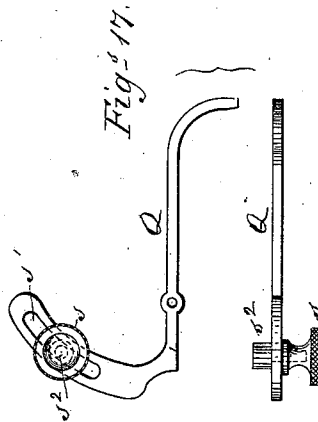


Fig. 17.

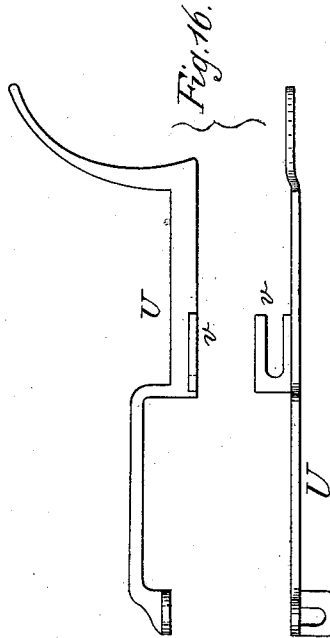


Fig. 16.

WITNESSES
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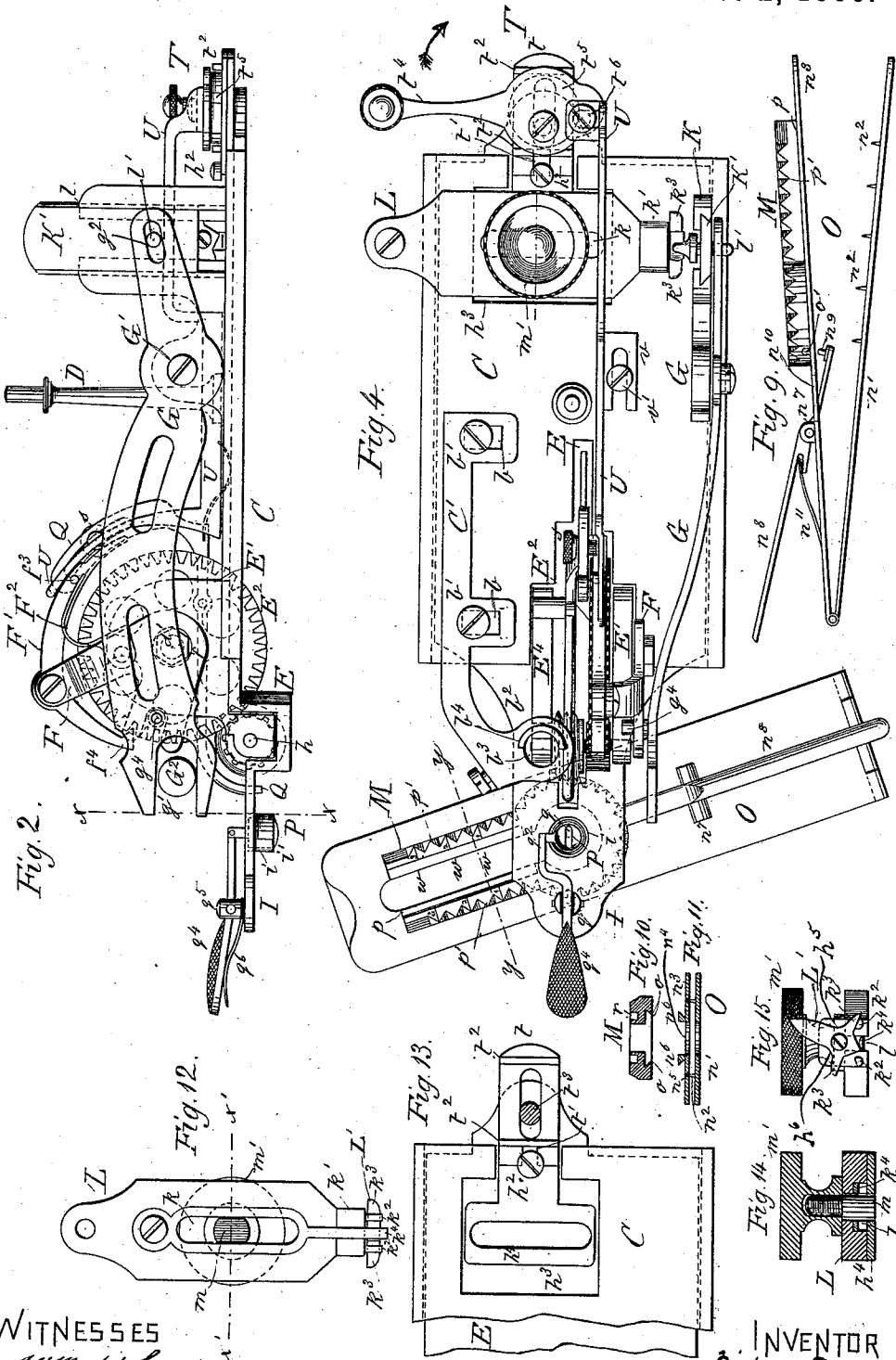
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WITNESSES

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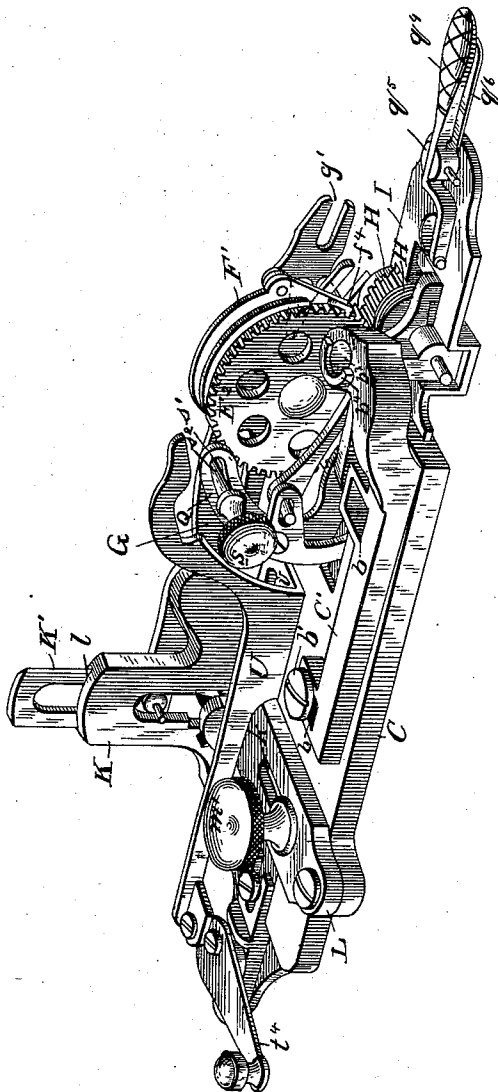
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Fig. 18.



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UNITED STATES PATENT OFFICE.

WILLIAM SCHOTT, OF NEW YORK, N. Y., ASSIGNOR TO THE SCHOTT BUTTON HOLE ATTACHMENT COMPANY, OF NEW YORK.

BUTTON-HOLE ATTACHMENT FOR SEWING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 351,802, dated November 2, 1886.

Application filed June 10, 1884. Serial No. 134,464. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM SCHOTT, a citizen of the United States of America, and a resident of the city, county, and State of New York, have invented a new and useful Improvement in Button-Hole Attachments to Sewing-Machines, of which the following is a specification.

This invention is designed as an improvement on the button-hole attachment to sewing-machines for which I filed an application for Letters Patent of the United States December 6, 1883.

The invention embraces an adjustable side bar for attaching the device to sewing-machines, an improved device for changing the speed or varying the motion of the form-plate, a graduated form-plate, an improved presser-foot, and other novel devices or mechanisms for simplifying the attachment and increasing its efficiency, all of which will be hereinafter fully set forth.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of a portion of my improved button-hole attachment to a sewing-machine, showing the manner of its attachment to a sewing-machine. Fig. 2 is a side elevation of my attachment with form-plate and cloth-clamp and certain other parts removed. Fig. 3 is an elevation of the opposite side of the same with parts removed. Fig. 4 is a plan of the attachment with form-plate and cloth-clamp in position. Fig. 5 is a sectional front elevation on line *x x*, Fig. 2. Fig. 6 is a side elevation of a portion of the device, with form-plate in cross-section, showing the positions of the adjusting-lever and the toothed pawl when the former is engaged in a groove of the form-plate. Fig. 7 is a side elevation of a portion of the device, with form-plate in longitudinal section, showing the positions of the pawl and the adjusting-lever when the latter is resting on the ungrooved portion of the face of the form-plate. Fig. 8 represents views of my improved presser-foot. Fig. 9 is a side elevation of the cloth-clamp with form-plate in position thereon. Fig. 10 is a cross-section of the button-hole form-plate on line *y y*, Fig.

4. Fig. 11 is a cross section of the cloth-clamp on line *y y*, Fig. 4. Fig. 12 is a plan of the obverse face of the reciprocating lever and attachments. Fig. 13 is a plan of the yoke attached to the reciprocating plate and designed for transmitting motion to the same. Fig. 14 is a sectional elevation on line *x' x'*, Fig. 12. Fig. 15 is an end elevation of the reciprocating lever and attachments. Fig. 16 shows side and plan view of the barring arm. Fig. 17 shows side and plan views of the adjusting-lever and adjustable stud. Fig. 18 is a perspective view of the device.

In the drawings, Fig. 1, A represents a presser-foot bar, with the usual presser-foot removed, showing the shoulder *a* on said presser-bar, and B represents a needle-bar, both of which are, relative to each other, in the positions they occupy when parts of a sewing-machine.

C represents the carrier-plate of my improved attachment. A bar, C', provided with slots *b*, is held on the face of the carrier-plate C, along one edge thereof, by screws *b'*, that are engaged in said slots. The front end of this side bar, C', is extended forward and upward, and fashioned into a boss, *b²*, through which is a vertical aperture, *b³*, partially surrounded on its upper rim with a semicircular collar, *b⁴*, as shown in Figs. 1 and 4. By means of this side bar, C', and other devices, hereinafter described, the button-hole attachment is secured to a sewing-machine. The upper face of the side-bar boss *b²* is designed to be of such a height as to be nearly on the same horizontal plane as the point of the presser-foot bar when the latter is elevated, so that as the attachment is drawn forward in the act of applying it to a sewing-machine, the concave face of the collar *b⁴* will serve both as a guide for and a stop against the presser-foot bar, and when the latter is depressed it will be prevented from dropping too far by the contact of its shoulder *a* upon the upper edge of the side-bar collar *b⁴*. By means of the screws *b'* this side bar, C', can be adjusted inward or outward to a sufficient degree to permit of the application of the button-hole attachment to sewing-machines of various sizes or numbers, so that an "attachment" of a given size can be made to fit several sizes of machines, whereby

the necessity of constructing attachments of various sizes for machines of as many sizes is obviated, and a great economy secured in the manufacture of the devices. A post, D, extends upward from about the center of the carrier-plate C, and a horizontal arm, C², having one end held by screw *c* on the presser-foot bar and the other by screw *c'* on the post D, serves to hold the attachment more rigidly to a sewing-machine, as shown in Fig. 1; hence it will be seen that the attachment may be elevated and depressed by the presser-foot bar of the machine.

The reciprocating slide E, for carrying the cloth-clamp, is held so as to freely move in the grooves *d*, as shown in Fig. 5, in the under side of the carrier-plate C, and the latter has several slots or openings made in it for the upward projection of certain of the parts that are fixed on the reciprocating slide, as hereinafter described.

Fixed upon the reciprocating slide E is a standard, E¹, (see Figs. 4 and 5,) and on a horizontal stud, *d'*, extending outward therefrom, is set, so as to move freely thereon, a peripherally-cogged wheel, E², that, preferably, has much of its body cut away, (see Fig. 7,) as shown at *d''*, to decrease its weight and make it run with less applied power.

An elbow-lever, F, (see Fig. 2,) held by a nut, *f*, (see Fig. 7,) on the opposite end of the stud *d'*, carries, secured on its higher arm by a screw, *f'*, (see Fig. 6,) a curved pawl, F¹, whose curve nearly corresponds with that of the periphery of the wheel E²; and an elbow-spring, F², (see Fig. 2,) secured to the lever F by a screw, *f''*, (see Fig. 7,) bears with its upper end against a stud, *f''*, that projects laterally from the said pawl, and thereby holds the terminal front tooth, *f''*, of the latter normally in contact with the teeth of the wheel E². The rear end or tail of said pawl is flattened, whereby a shoulder, *f''*, is formed on it.

The feed or needle bar actuated lever G is pivoted on a standard, G¹, (see Fig. 1,) that rises from a side of the carrier-plate, and its long arm has a terminal open-ended slot, *g'*, while its short arm, extending rearward, has in its end a close-ended slot, *g''*.

The reciprocating motion of the needle-bar B is transmitted to the feed-lever G by means of an arm or pin, G², having one end firmly secured on the said needle-bar by a set-screw, *g*, while the other end engages in the terminal slot *g'* of the said lever; and this reciprocating motion is transmitted to the elbow-lever F by means of a stud, *g''*, (see Figs. 2 and 4,) that projects laterally from the inner face of the forward end of the lever G into the slot or fork of the lever F, as shown.

Projecting upward from the reciprocating slide E, through a suitable opening in the carrier-plate, is a standard, E³, (see Figs. 4 and 5,) and journaled in the front and depending ends of the standards E¹ E³ is a shaft, *h*, (see Figs. 2 and 3,) having firmly fixed thereon a pinion, H¹, (see Fig. 5,) and the worm H, the former

of which gears with the wheel E² and the latter of which is designed to engage with the button-hole form-plate M, (see Fig. 4,) and transmit motion thereto.

On the front end of the reciprocating foot E is rigidly secured a forward-projecting plate I, (see Figs. 1, 2, 3, and 4,) having an aperture, *i*, through which the needle is designed to reciprocate when the machine is in operation, and about which is a depending cylindrical lip, *i'*, that is designed to hold the button-hole form-plate M in operative position and engaged with the worm H, and at the same time to serve as the pivot about which said plate M shall turn.

From the rear end of the carrier-plate C there rises a vertical standard or frame, K, (see Figs. 1 and 4,) having a groove, *k*, for holding and guiding the gate K¹, which is provided with a horizontal rod, *k'*, rigidly fixed in it and extending through and beyond each face thereof. The outward end of this rod *k'* is designed to be engaged in the closed slotted end of the feed-lever G, that is pivoted on the standard G¹, and has its forward open slotted end engaged over the arm G², secured to the needle-bar, as shown.

Adjustably secured by a screw, *k''*, on the reciprocating slide E, beneath a corresponding and larger aperture, *k''*, (see Figs. 4 and 13,) in the carrier-plate C, is a yoke, *k''*, designed for engagement with the mechanism adapted for moving the said slide, the shank of said yoke being extended rearward through a suitable depression in the carrier-plate C.

The reciprocating lever L, pivoted at one end on the carrier-plate C, is a flattened plate having a central longitudinal slot, *l*, and on one end a boss, *l'*, from the face of which protrude two stops or pins, *l''*, (see Fig. 12,) and on which boss is pivoted the reciprocating latch L¹, (see Fig. 15,) provided with opposite lateral arms, *l''*, that are designed, when the device is in operation, to alternately take against the stops *l''*, that thereby arrest the motion of the said latch, and with inclined faces *l''* *l''*, for a purpose hereinafter explained.

A spring, *l''*, secured in the under face of the lever L, has its free end bearing up against the inferior point of the said latch L¹, for the purpose of holding the latter temporarily at whichever angle it may be moved by the downward motion of the rod or pin *l'* when the latter is forced down alternately upon the inclined faces or planes of the head of the said latch L¹.

A screw-stud, *m*, (see Figs. 12 and 14,) having its head engaged, so as to be movable in the slot of the yoke *l''*, and its shoulder in the slot of the lever L, with its threaded end projecting up through said lever and provided with a thumb-nut, *m'*, serves as the adjustable connection between the lever L and the reciprocating slide E. (See Fig. 4.) By loosening this nut *m'* the operator is enabled to move the stud *m* along the slots of the yoke *l''* and lever L, and thereby adjust—shorten or lengthen—

the throw or reciprocation of the slide E, and consequently shorten or lengthen the bight of the stitches.

The button-hole form-plate M has an open-ended central slot, *p*, (see Fig. 4,) whose inner end is preferably eyelet-shaped, and its beveled upper outer edges are toothed throughout their length, as shown at *p'*, to correspond with the threads of the worm H.

The cloth-clamp O is like that described in my former application above alluded to, and consists of two thin plates of metal hinged together at one end, (see Fig. 9,) the lower plate, *n*, having a slot, *n'*, (see Fig. 11,) and cloth-holding pins *n²*, projecting upward from about the edges thereof, while the upper plate, *n³*, has a corresponding slot, *n⁴*, about which are sockets *n⁵*, designed to receive the ends of the pins *n²* when the clamp is closed. On either side of the slot *n⁴*, on the upper face of the plate *n³*, are fixed metal strips *n⁶*, undercut on their outer edges, as shown in Fig. 11, and rearward of the slot *n⁴* is hinged in lugs *n⁷* (see Figs. 4 and 9) a lever, *n⁸*, one end of which, provided with an upward-projecting stud, *n⁹*, (see Fig. 9,) extends through a suitable slot, *n¹⁰*, beneath the plate *n³*, while the other end extends above it and rearward for the convenient manipulation of the operator.

On its inferior side the form-plate M has strips *o*, (see Fig. 10,) applied to engage with the strips *n⁶* of the cloth-clamp, and said plate is provided with a hole, *o'*, (see Fig. 9,) corresponding with the stud *n⁹*. The form-plate M is held in operative position on the cloth-clamp by sliding it over the strips *n⁶* until the hole *o'* comes opposite the stud *n⁹*. Then the spring *n¹¹*, which is fastened on the cloth-clamp and bears up against the arm of the lever *n⁸*, forces the said stud *n⁹* into the hole *o'*.

In the ordinary mechanical stitching of a button-hole, after the hole has been cut in the fabric or material it has been found difficult, if not impossible, to bring or form the loops of the stitches evenly along the edges of the button-holes, because of the frequent lifting or pulling up of the edges by the upward movement of the needle; hence the importance of having with a button-hole-attachment machine a device for holding down the edges of the material about the button-hole while the latter is being stitched. The device I apply for this purpose is the improved presser-foot P, (see Fig. 8,) which consists of a short cylinder, open at its top and having an outwardly-convex bottom, in which is a slot, *q*. A handle or strap, *q'*, (see Fig. 3,) extending upward, completes this presser-foot, and by means of the handle *q'* and a pin, *q²*, the said device is secured to a lever, *q⁴*, (see Fig. 2,) which is pivoted in a post, *q⁵*, that is fixed on the extreme end of the plate I; and a spring, *q⁶*, also fixed on said plate, bears upward against the outer end of said lever, and thus normally keeps the presser-foot P down in the aperture *i*, as shown in Figs. 2, 3, and 4, to rest on the material to be operated on, and

hold it evenly and smooth beneath the needle.

In mechanically stitching a button-hole it is indispensable that the form-plate should be moved at different rates of speed when stitches are being made along the edges and along the ends of the button-holes. It is also indispensable to the perfect regularity of the stitches that there be some device for automatically adjusting the speed of the form-plate or its feeding or moving mechanism. To this end the button-hole form-plate is longitudinally grooved on its upper face, as shown at *r*, Figs. 6 and 10, on both sides of its opening, and journaled in a horizontal bearing, *r'*, which is fixed on or is an integral part of the reciprocating foot E, is the adjusting-lever Q, one end of which, drawn to a point and extending forward, is curved downward over the worm H, (see Fig. 2,) so as to rest on the face of the form-plate in use, where it is held by a spring, *r²*, (see Fig. 7,) that is fixed in said lever Q, and bears down on the reciprocating foot E. The other and slotted end of said lever Q is curved upward a little rearward of and parallel with the face of the wheel E². Held by a thumb-screw, *s*, in the curved slot *s'* of this adjusting-lever Q, is a stud, *s²*, which projects about half-way over the pawl F', so that it may be brought in contact therewith. The pawl F' is normally held with its tooth in gear with the wheel E² by the spring F², as shown in Figs. 2, 6, and 7, and consequently by the upward movement of the long arm of the feed-lever the pawl is moved upward and rearward, thereby causing the wheel E², pinion H', and worm H to partially revolve and to transmit the motion to the form-plate, which is thereby moved a proper distance for the next stitch that will be made on the downward reciprocation of the needle-bar.

When the eyelet or rounded end of a button-hole is to be stitched, it is requisite that the form-plate should be moved rapidly, in order that the stitches should be formed at suitable distances apart and not overlap each other; hence the depending point of the lever Q, being then in contact with the plane surface of the form-plate, about the rounded end of the same, the rear end of said lever Q is kept down in opposition to the tension of the spring *r²*, as shown in Fig. 7; but when the sides of a button-hole are to be stitched, the form-plate must be moved more slowly or through shorter distances at each upward movement of the needle-bar; in order that the stitches may not be too far apart, and at such times the depending point of the lever Q rests in the grooved portions of the face of the form-plate, whereby the rear upreaching end of the said lever is forced upward and forward by the spring *r²*, as shown in Figs. 3 and 6, and the stud *s²*, being suitably adjusted in the slot *s'* of the lever Q and held by screw *s*, will make contact with the tail of the pawl F' during a portion of the stroke or movement of the feed-lever and force said tail down, with the effect of disengaging the tooth of said pawl from the

wheel E² during that portion of the stroke, which latter then ceases for the time to move or transmit motion.

If the stud s² be adjusted and held in the upper end of the lever-slot s', it will, during the upward movement of the feed-lever, sooner make contact with the shoulder f³ of the pawl F', and thereby sooner disengage the pawl-tooth from the wheel E², and consequently cause the movement of the form-plate to be arrested sooner in each upward reciprocation of the needle-bar, so that at each reciprocation the form-plate will be moved but little, and the stitches consequently will be close together.

Should it be desired to make the stitches farther apart, to increase the distance between them, the stud s² will be adjusted in or toward the lower end of the slot s', so that said stud shall not make contact with the pawl-shoulder until later in the stroke of the needle-bar, or shall not make contact at all; hence it will be seen that the stud s² can be adjusted, by means of the screw s, so as to lengthen or shorten its period of contact with the pawl F', whereby the distance through which the form-plate is fed or moved at each reciprocation of the needle-bar is increased or diminished.

The grooves r in the form-plate are so formed or graduated, and the ungrooved portions of the face of the form-plate are so relatively proportioned, that the stitches made about the button-hole are as even and regular as can be made by hand.

A special device for the straight barring of the end of a button-hole, and used only in combination with the open-ended form-plate, is seen at Figs. 2, 3, 4, and 13, and is like that described in my former application, above alluded to. This device consists of a flat plate, t, (see Fig. 13,) having its inner end slotted, as shown at t', and provided with vertical stops t²; and pivoted eccentrically on the plate t, between the stops t², by a screw or pivot, t³, is a lever, t', (see Fig. 4,) provided with a circular boss, t⁴, (see Fig. 2,) projecting downward from its interior face. This barring device T is adjustably and firmly held by a screw, h², passing through the slot t' on the shank of the yoke h', so that it may be adjusted to correspond with the length of the reciprocation of the slide E, the free end of the said lever t' being extended rearward for the convenience of the operator.

To the opposite end of the lever t' is firmly and adjustably secured, by screw t⁵, an arm, U, provided with a slotted lug, v, (see Fig. 16,) that extends forward and has its free end curved upward over the tail of the pawl F'. A screw or stud, v', passing down through the slot of the lug v into the reciprocating slide, (see Fig. 4,) serves to steady and guide said arm in its movements.

When the open-ended form-plate, as shown, is used, it is desirable, after the sides and rounded end have been stitched, to stitch a straight bar across the open end of the button-hole; hence, when this point is reached in

the operation, the operator moves the outer end of the lever t' laterally to the right, as shown by the arrow in Fig. 4, thus bringing the projecting edge of the boss t⁵ against the forward stop, t², that serves as a fulcrum and lock therefor, so that the curved extremity of the arm U shall make and hold contact with the tail of the pawl F' and force it down, thus unengaging the pawl-tooth from the teeth of the wheel E², so that said wheel ceases for the time to move and to transmit motion to the worm and form plate. At the same time the reciprocating slide E and its connections continue to be reciprocated through the mechanism of the feed-lever G and its connections, so that the form-plate and cloth-clamp, together with the material being operated on, are reciprocated back and forth under the threaded needle, whereby the cross-bar is made.

When an open-ended button-hole form-plate is used with a button-hole machine or a button-hole attachment to a sewing-machine, it has been found difficult to make both sides of the button-hole precisely of the same length, or to make a series of button-holes all of equal length in a garment. To overcome this difficulty, I impress certain lines and figures on both sides of the face of the form-plate, and graduate the sides, as shown at w, Fig. 4, so that the operator can always accurately measure the length of the button-holes.

When the device is in operation, the upward motion of the needle-bar depresses the rear end of the gate K' and rod l', thereby forcing down the gate K' and rod l', so that the inner end of the latter, engaging against one or the other of the inclined planes h⁵ h⁶ of the latch L', forces the said latch backward or forward, as the case may be, and with it and through the medium of the lever L the reciprocating foot E and its attachments. For instance, when the rod l' is forced down on the inclined plane h⁵, the head of the latch L' is thereby inclined rearward and the reciprocating slide E pushed forward. Then on the next downward motion of the needle-bar the gate and rod K' l' are raised, the latter clear of the latch L', and on the next upward movement of the needle-bar the rod l' is forced down on the plane h⁶ of the latch L', with the effect of reciprocating the slide E rearward, and thus the slide E and its attachments are reciprocated by and in correspondence with the reciprocation of the needle-bar.

The needle y being fixed in place and threaded, and the device being in position, the sewing-machine is set in operation in the usual manner, and through the mechanism hereinbefore described the form-plate and cloth-clamp, carrying the material to be operated upon, are together moved, revolved, and reciprocated beneath the needle as the latter reciprocates up and down in making the stitches.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. In a button-hole attachment to a sewing-machine, and as a means for attaching a de-

vice to a sewing-machine, the side bar, C', having one end extended forward and upward and provided with a collar to form a guide and stop for the presser-bar and provided with slots, as shown, combined with the carrier-plate C, and set-screws passed through the said slots into the carrier-plate, substantially as and for the purpose specified.

2. In a button-hole attachment to a sewing-machine, the combination, with the form-plate and cloth-clamp, a worm adapted to engage in the button-hole form-plate to give motion thereto, and a toothed wheel and pinion geared together for transmitting motion unto said worm, and a feed-lever adapted to be connected with the needle-bar and to receive motion therefrom, of an elbow-lever and spring-actuated toothed pawl pivoted thereto, the former arranged to receive motion from the feed-lever and the latter arranged to receive motion from the elbow-lever and to transmit motion to the toothed wheel, all arranged and operating as set forth.

3. In a button-hole attachment to a sewing-machine, as a means for transmitting motion from the feed or needle bar operated lever to the mechanism operating the form-plate, the combination, with the cogged wheel E², of the slotted elbow-lever F on the shaft of said wheel, curved toothed pawl F', carried by said lever and provided with stud f³ and shoulder f⁵, and elbow-spring F², all arranged and operating substantially as herein shown and described.

4. In a button-hole attachment to a sewing-machine of the character herein described, and in combination with the face-grooved form-plate and its feeding mechanism, as a means for interrupting the movement of the mechanism

transmitting motion to the form-plates, the adjusting-lever Q, provided with the spring q², constructed and arranged, substantially as herein shown and described, with its pointed end curved downward to rest on the form-plate, and with its slotted end curved upward and carrying an adjustable stud, s², as set forth.

5. In a button-hole attachment to a sewing-machine, constructed substantially as herein shown and described, as a means for holding down the material about a button-hole while the latter is being worked, the combination, with the reciprocating foot E, its sustaining-plate, and the form-plate and cloth-clamp, of a spring-actuated cylindrical presser-foot, as P, having a slot, q, in its convex bottom, and attached by handle q', pin q², lever q⁴, and post q³ to the front end of the attachment, as set forth.

6. In a button-hole attachment to a sewing-machine, constructed substantially as herein shown and described, as a means for arresting the feed of the form-plate, the combination, with the feeding mechanism thereof and with the barring device T, of the arm U, provided with slotted lug v, attached to said device, and having its free end curved upward in position to make contact with a portion of the feeding mechanism and interrupt its action at the will of the operator, as set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 14th day of May, 1884.

WILLIAM SCHOTT.

Witnesses:

C. W. ZERWICK,
JACOB J. STORER.