

(Model.)

5 Sheets—Sheet 1.

W. SCHOTT.

BUTTON HOLE ATTACHMENT FOR SEWING MACHINES.

No. 310,915.

Patented Jan. 20, 1885.

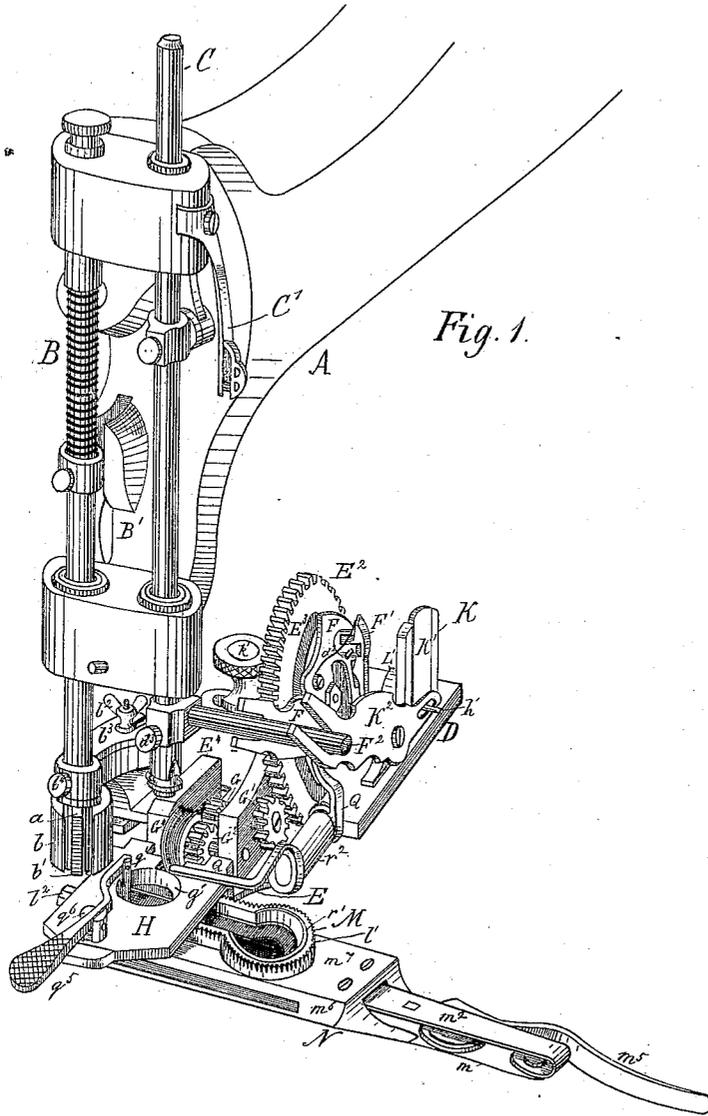


Fig. 1.

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BY

Isaac J. Storer

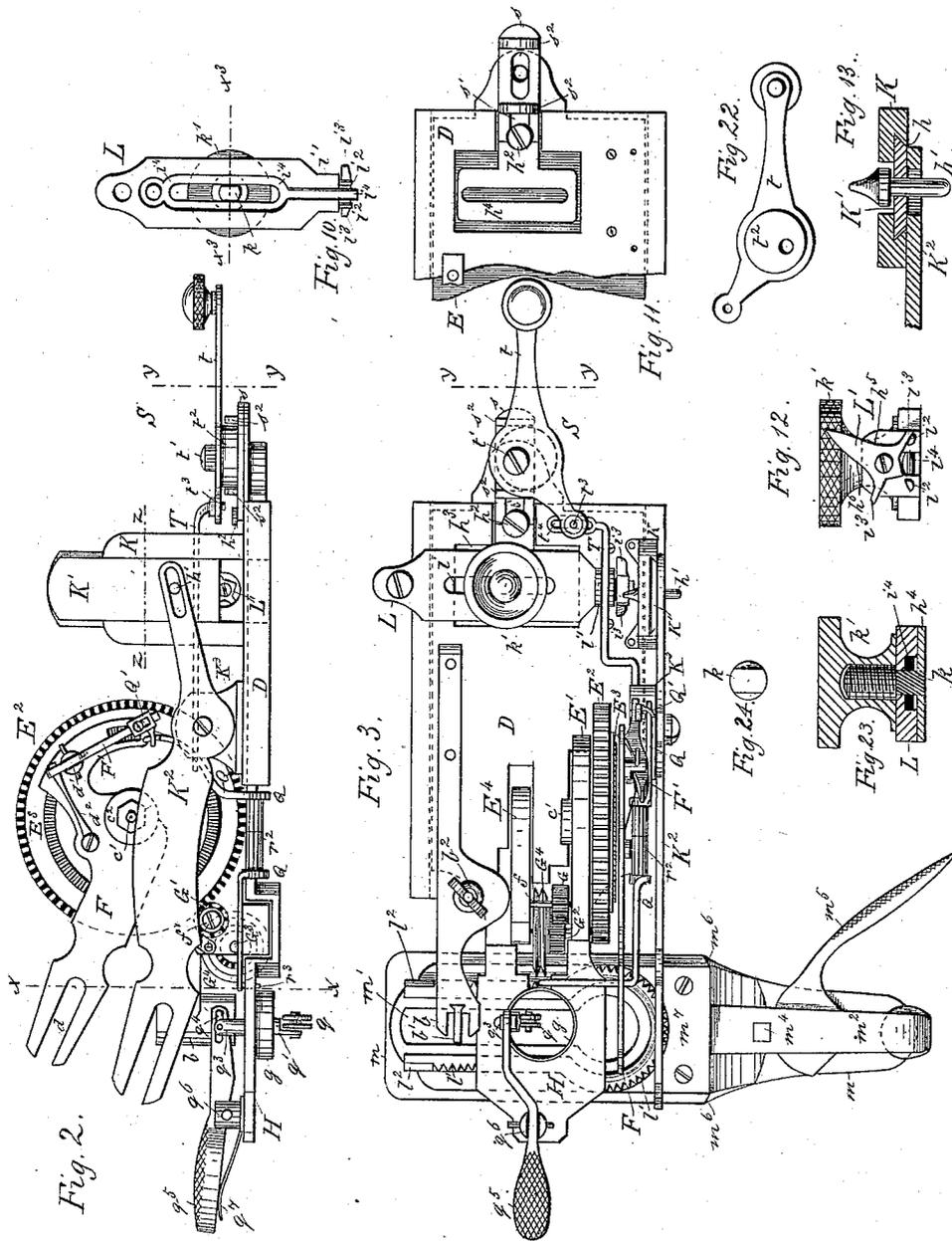
ATTORNEY

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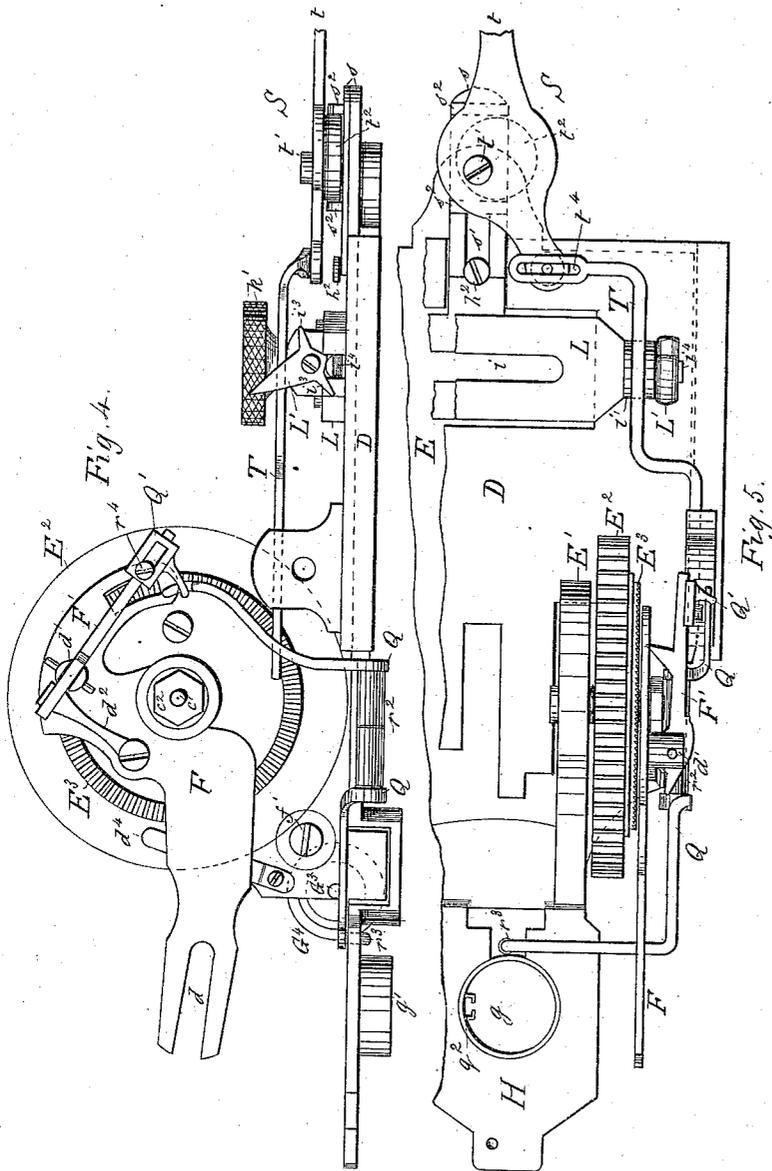
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(Model.)

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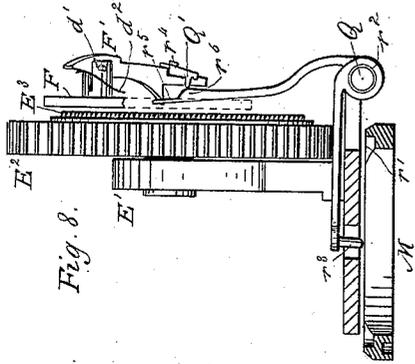


Fig. 8.

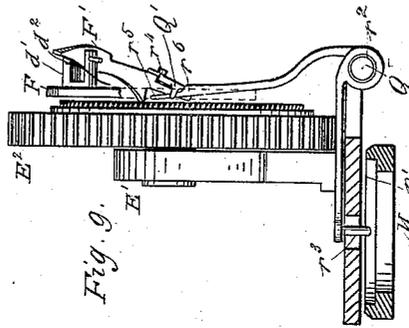


Fig. 9.

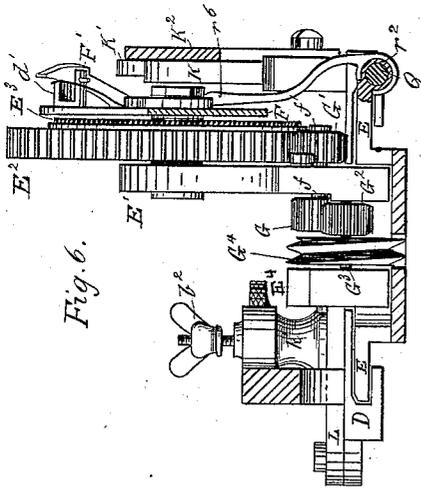


Fig. 6.

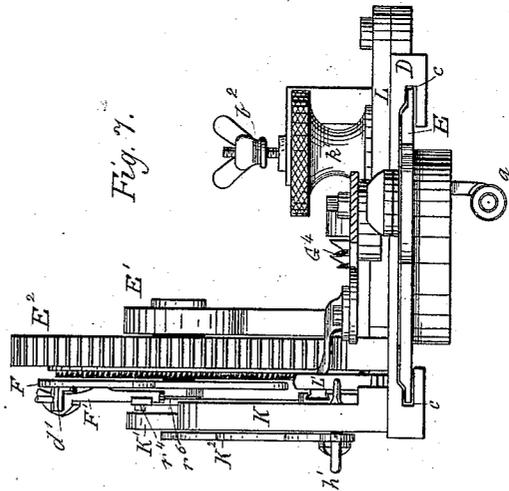


Fig. 7.

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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. 310,915, dated January 20, 1885.

Application filed December 6, 1883. (Model.) Patented in England January 29, 1884, No. 2,313; in France January 29, 1884, No. 159,997; in Belgium January 29, 1884, No. 63,955, and in Canada February 26, 1884, No. 18,712.

To all whom it may concern:

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

This invention is designed as an improvement on the button-hole attachment for sewing-machines for which Letters Patent of the United States, Serial No. 98,778, were allowed me on the 27th of October, 1883.

The objects of this invention are to regulate the speed of the form-plate by automatically-operating mechanism, to provide improved devices for operating the reciprocating plate, to provide an improved device for barring the end of a button-hole, and an improved device for holding and guiding a cording thread or cord, and for assuring an even and regular looped button-hole stitch, and also to provide improved cloth-clamps and button-hole form-plates for such attachments as are respectively designed for light or domestic work and for heavy or manufacturing work.

The invention consists of a lever fulcrumed on the reciprocating foot, and having one end adapted to rest on the upper face of a form-plate, so that said lever shall be operated by reason of the inequalities in the said face, and the other end adapted to make contact with suitable mechanism for throwing out of gear at intervals the ratchet which transmits motion from the needle-bar to the mechanism that feeds or moves the form-plate; and it further consists of a gate adapted to move vertically in a fixed frame, and provided with a suitable device for making connection between the reciprocator-lever and the reciprocating lever, and, further, of a reciprocating lever of novel construction; and it consists, further, of an improved device embracing an eccentric lever and arm, and an adjusting-lever for arresting the feed of the form-plate, and the mechanism for transmitting motion thereto for the purpose of barring a button-hole; and it consists, further, of a revolving thread-holder, guide, and presser-foot, capable of vertical adjustment, fixed on the front of the

device, and designed for holding and guiding a thread or cord for cording a button-hole when desired, and for pressing down the edge of a button-hole, to the end that an even and regular loop-stitch may be made; and it further consists of a combined cloth-clamp and permanently-fixed form-plate of novel design for heavy or manufacturing work, and of a cloth-clamp and form-plates of novel design for light or domestic work, the light form-plates being adapted to be readily substituted or exchanged, one for another, on the light cloth-clamp; and the invention embraces other novel devices or mechanisms designed to make the attachment correct and accurate in all its operations, all of which will be hereinafter fully described.

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

Figure 1 is a perspective view of my improved button-hole attachment fixed on the head of a sewing-machine. Fig. 2 is a side elevation of the attachment. Fig. 3 is a plan of the same. Fig. 4 is an enlarged side elevation of the same, with parts removed to exhibit other parts. Fig. 5 is an enlarged plan of the same, with parts removed to exhibit other parts. Fig. 6 is a sectional front end elevation of the same on line *x x*, Fig. 2. Fig. 7 is a sectional rear end elevation of the same on line *y y*, Fig. 2. Fig. 8 is a cross-sectional elevation, with parts removed to exhibit other parts, showing one position of the mechanism for automatically regulating the speed of the form-plate. Fig. 9 is a cross-sectional elevation, with parts removed to exhibit other parts, showing another position of the mechanism for automatically regulating the speed of the form-plate. Fig. 10 is a plan of the obverse face of the reciprocating lever and attachments. Fig. 11 is a plan of the yoke attached to the reciprocating plate, and designed for transmitting motion to the same. Fig. 12 is an enlarged end elevation of the reciprocating lever and attachments. Fig. 13 is an enlarged cross-section, on line *z z*, Fig. 2, of the vertically-reciprocating slide or gate, with its frame forming the connection between the reciprocator-

lever and the reciprocating lever. Fig. 14 is a partly-reversed plan on an enlarged scale of the leaf m^2 , stud m^4 , and cam-lever m^5 . Fig. 15 is a plan of the same. Fig. 16 is a longitudinal elevation of the same. Fig. 17 is a longitudinal sectional elevation of the button-hole form-plate designed for heavy work. Fig. 18 is an enlarged side elevation of the revolving cord-guide and presser-foot in position. Fig. 19 is an enlarged front elevation of the same in position. Fig. 20 is a plan of the ratchet engaging in the crown ratchet-wheel. Fig. 21 is an edge view of the same. Fig. 22 shows the reverse of the eccentric-lever used when barring button-holes. Fig. 23 is an enlarged sectional elevation on line $x^3 x^3$, Fig. 10. Fig. 24 is a plan of the screw-stud shown in Fig. 23. Fig. 25 is a plan of a brace holding the attachment to a sewing-machine.

In the drawings, A represents the head of a sewing-machine; B, the presser-foot bar with presser-foot removed, and B', the lever by which it is elevated and depressed.

C represents the needle-bar, and C' the ordinary thread-guide. The presser-foot bar B has in its lower end a slot, a , by means of which and a screw (not shown) the ordinary presser-foot is secured thereto.

The carrier-plate D of my improved attachment has for part of its length one side or edge turned up at right angles, and terminating in a vertically-slotted boss, b , in the center of which is rigidly fixed a tongue, b' , and in an overhanging projection from this side of the plate D is a thumb-screw, b^2 .

The button-hole attachment is held to the sewing-machine by the engagement of tongue b' in the slot a , the end of the presser-foot bar entering the slotted boss b , and by means of a brace, b^3 , whose eyed end is held on the presser-foot bar by a set-screw, b^4 , and whose slotted end straddles the shank of the screw b^2 , which is then turned tightly down; hence it will be seen that the attachment may be elevated and depressed by the presser-foot bar of the machine. The reciprocating foot E is held so as to freely move in the grooves c in the under side of the carrier-plate D, 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 foot, as hereinafter described.

Fixed upon the reciprocating foot E is a standard, E^1 , and on a horizontal stud, c' , extending outward therefrom, are set, so as to move freely thereon, a peripherally-cogged wheel, E^2 , and a crown ratchet-wheel, E^3 , that are firmly held together by screws or other suitable devices; and held on the same stud or axle c' by a nut, c^2 , is a bell-crank feed-lever, F, with one end slotted, as shown at d , and having on the other end a lug, d' , in which is pivoted the dog or ratchet F', that is designed to engage in the teeth of the said ratchet-wheel E^3 , said ratchet F' being held in contact with the wheel E^3 by means of a spring, d^2 , that is fixed on the lever F. The reciprocating

motion of the needle-bar C is transmitted to the lever F by means of an arm, F², having one end firmly secured on the said needle-bar by a set-screw, d^3 , while the other end engages in the slot d of the said lever. A brace, d^4 , secured at one end by screw d^5 to the standard E', extends upward in contact with a side of the wheel E², and steadies it and the wheel E³ against lateral motion. Also projecting upward from the reciprocating foot E, through a suitable slot in the carrier-plate, is a standard, E⁴, and journaled in the standards E' E⁴ is a shaft, f , having firmly fixed thereon pinions G G', the latter being held in place on the outside of the standard E' by a screw-nut, f' , as shown. The pinion G' gears with the cog-wheel E², and the pinion G with the pinion G², that is fixed on the worm-shaft G³, which is journaled in standards E' E⁴, and carries the worm G⁴, that is designed to gear into the button-hole form-plate M, and transmit motion thereto.

On the front end of the reciprocating foot E is rigidly secured a forward-projecting plate, H, having an aperture, g , through which the needle is designed to reciprocate when the machine is in operation, and about which is a depending cylindrical lip, g' , that is designed to hold the button-hole form-plate M in operative position and engaged with the worm G⁴, 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 D there rises a vertical standard or frame, K, having a groove, h , for holding and guiding the gate K', which is provided with a horizontal rod, h' , rigidly fixed in it, and extending through and beyond each face thereof. The outward end of this rod h' is designed to be engaged in the closed slotted end of the reciprocator-lever K², that is pivoted on the standard K³, and has its forward open-slotted end engaged over the arm F², as shown.

Adjustably secured by a screw, h^2 , on the reciprocating foot E, beneath a corresponding and larger aperture, h^3 , in the carrier-plate D, is a yoke, h^4 , designed for the engagement with the mechanism designed for moving the said foot E, the shank of said yoke being extended rearward through a suitable depression in the carrier-plate D. The reciprocating lever L, pivoted at one end on the carrier-plate D, is a flattened plate having a central longitudinal slot, i , and on one end a boss, i' , from the face of which protrude two stops or pins, i^2 , and on which is pivoted the reciprocating latch L', provided with opposite lateral arms, i^3 , that are designed, when the device is in operation, to alternately take against the stops i^2 , that thereby arrest the motion of said latch. A spring, i^4 , secured in the under face of the lever L, has its free end bearing up against the inferior points of the said latch L' for the purpose of holding the latter temporarily at whichever angle it may be moved by the downward action of the rod h' when the latter is forced down alternately

upon the opposite inclined planes of the head of the said latch L' . A screw-stud, k , having its head engaged so as to be movable in the slot of the yoke h^4 , and its shoulder in the slot of the vibrating lever L , with its threaded end projecting up through said lever, and provided with a thumb-nut, k' , serves as the adjustable connection between the lever L and the reciprocating foot E . By loosening this nut k' the operator is enabled to move the stud k along the slots of the yoke h^4 and lever L , and thereby adjust—shorten or lengthen—the throw or reciprocation of the foot E , and consequently shorten or lengthen the bite of the stitches, as will be hereinafter more fully set forth.

The button-hole form-plate M , designed for heavy or manufacturing work—such as overcoats, cloaks, coats, &c.—has an open-ended central slot, l , whose inner end is preferably eyelet-shaped, and its beveled upper outer edges are toothed throughout most of their length, as shown at l' , to correspond with the threads of the worm G^4 . On each edge of series of teeth l' terminate at blank spaces l'' , by which the form-plate is prolonged, these prolongations being designed to steady the said form-plate in position when the worm G^4 has ceased to move it, and while the straight cross-bar of the button-hole is being formed, as hereinafter set forth. Said form-plate M is firmly secured on the upper leaf or plate, m^1 , of the cloth-clamp N , over the longitudinal open slot l therein, to insure the synchronous movement of the two when the is in operation.

For button-holes of different sizes in heavy work both form-plates and cloth-clamps of suitable dimensions are designed to be provided and to be substituted at will for those in use.

The cloth-clamp N , designed for heavy work, is constructed of a flat plate or leaf, m , of metal, having a closed central slot, m^1 , of the shape of the button-hole which is to be made. Over this leaf m , and on one end thereof, an open-slotted plate or leaf, m^2 , is riveted by its under curved point, so that said leaf m^2 shall be held normally high enough for the insertion of the article to be operated upon between it and the leaf m . The slot in the leaf m^2 corresponds in position with that of the leaf m , and sharp pins m^3 project downward around its edges to penetrate the material about the button-hole and aid in holding it in position for the stitches.

On the inferior face of the leaf m^2 is fixed a lug, m^4 , and beneath it, on the upper face of the leaf m , is pivoted an eccentric-lever, m^5 , so that when the article to be operated upon is inserted between the leaves m and m^2 it may be immovably held in position by turning the lever m^5 into engagement with the lug m^4 , as shown in Fig. 17, and thereby forcing and holding the leaf m^2 down with all necessary pressure.

On side pieces, m^6 , projecting upward from

the leaf m , is secured by screws or otherwise the upper leaf or plate, m^1 , having the open slot l corresponding in position with the other slots in this clamp.

In the ordinary mechanical stitching of a button-hole, after the hole has been cut in the fabric or other 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-hole, 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 or 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 may be termed a "thread-holder, guide, and presser-foot," and it consists of a grooved roller, q , capable of revolving on a horizontal axle in the lower end of a finger, q' , which is vertically movable in guides q^2 , fixed within the aperture g of the plate H , the upper end of said finger being held by a pin, q^3 , in the slot q^4 of a lever, q^5 , that is pivoted in a post, q^6 , which is fixed on the extreme end of the plate H , and a spring, q^7 , also fixed on said plate, bears upward against the outer end of said lever, and thus keeps the roller q down, as shown in Fig. 2, to rest as a presser-foot on the material to be operated upon.

When it is desired to cord a button-hole, the cord, as represented at r , Figs. 18 and 19, is passed down through the perforated plate q^8 , and in the groove of the roller q , as shown, and said cord being thus held in position along the edge of the button-hole the button-hole stitches are formed over it.

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 sides and along the ends of the button-hole—indispensable to the perfect regularity of the stitches that there be some device for automatically adjusting the speed of the form-plate and its feeding or moving mechanism. To this end the button-hole form-plates are grooved on their upper faces at their closed ends, as shown at r^1 , and journaled in a horizontal bearing, r^2 , which is fixed on an edge of the reciprocating foot E , is the adjusting-lever Q , one end of which, extending forward, is provided with a depending stud, r^3 , designed to rest on the face of the form-plate in use, while the other end of said lever is turned upward toward and nearly in contact with the ratchet F' , on the lower extremity of which is adjustably held by a screw, r^4 , a slotted finger, Q' , having a downward-projecting point, between which and the wheel E^3 the up-reaching end of the lever Q extends. The extremity of this end of the said lever Q is somewhat flattened at r^5 , as shown in Figs. 8 and 9, and just below this flattened end the said lever swells outward to form a shoulder, r^6 .

When the button-hole attachment is in operation the feed-lever F is reciprocated by the

motion of the needle-bar, as above set forth, and the ratchet F' , when in gear with the ratchet-wheel e^3 , gives motion to the same, which motion is transmitted through wheel e^2 and pinions G G' G^2 to the worm G^4 , and thereby to the form-plate. The ratchet F' is normally held in gear with the wheel E^3 by the spring d^2 , as shown, and, consequently, by the upward movement of the lever F , the rear end of the ratchet F' is forced down, and the wheel E^3 , worm G^4 , and intermediate mechanism are made 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 ratchet F' is held in contact with the wheel E^3 throughout the whole of the upward movement of the lever F , the stud r^3 resting all this time in the groove in the end of the form-plate, so that the upper end of the adjusting-lever Q is kept from contact with the slotted finger Q' ; 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 stud r^3 rests on the ungrooved portion of the face of the form-plate, whereby the up-reaching end of the lever Q is forced outward, as shown in Fig. 8; and then, when the lever F makes an upward movement, the ratchet F' keeps engaged with the wheel E^3 for only a portion of the stroke or movement, and consequently transmits comparatively little motion to the form-plate, for when under these conditions the lever F has made part of its stroke, the finger Q' makes contact with the shoulder r^6 of the lever Q , and the toothed end of the ratchet F' is thereby forced outward out of gear with the wheel E^3 , which latter then ceases to move or transmit motion. The finger Q' can be adjusted on the ratchet F' by means of the screw r^4 , so as to lengthen or shorten its periods of contact with the lever Q , 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 located, 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 shown in Figs. 15, 16, and 17, is seen at S , Figs. 2, 3, 4, and 5. This device consists of a flat plate, s , having its forward end slotted, as shown at

s' , and provided with vertical stops s^2 , and pivoted eccentrically on the plate s , between the stops s^2 , by a screw or pivot, t' , is a lever, t , provided with a circular boss, t^2 , projecting downward from its inferior face. This barring device S is adjustably and firmly held by a screw, h^2 , passing through the slot s' on the shank of the yoke h^4 , so that it may be adjusted to correspond with the length of the reciprocation of the foot E , the free end of 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 a screw, t^3 , an arm, T , that extends forward between the up-reaching arm of the adjusting-lever Q and the wheel E^3 . The side facing the lever Q is beveled at its forward end, while the end of the arm T , which is held to the lever t , is slotted, as shown at t^4 , to permit of adjustment, to insure suitable pressure of the arm T outward against the lever Q .

When the open-ended form-plate is used, it is desirable, after the sides and eyelet 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, thus bringing the projecting edge of the boss t^2 against the forward stop, s^2 , that serves as a fulcrum and lock therefor, so that the beveled extremity of the arm T shall make and hold contact with the up-reaching arm of the lever Q , and force and hold it and the ratchet F' outward, thus un-gearing the latter from the wheel E^3 , so that the latter ceases to transmit motion to the worm G^4 and the form-plate. At the same time the reciprocating foot E and its connections continue to be reciprocated through the medium of the reciprocator-lever K^2 , so that the form-plate and cloth-clamp, together with the material being operated on, are reciprocated back and forth under the threaded needle, so that the cross-bar is made.

When the device is in operation, the upward motion of the needle-bar elevates, through the medium of the arm F^2 , the forward end and depresses the rear end of the reciprocator-lever K^2 , thereby forcing down the gate K' and rod h' , so that the inner end of the latter, engaging against one or the other of the inclined planes h^5 h^6 of the latch L' , forces the said latch rearward or forward, as the case may be, and with it and through the medium of the reciprocating lever L , the reciprocating foot E and its attachments. For instance, when the rod h' is forced down on the inclined plane h^5 , the head of the latch L' is thereby inclined rearward and the reciprocating foot E pushed forward. Then on the next downward motion of the needle-bar the rear end of the lever K^2 and the gate and rod $K' h'$ are raised, the latter clear of the latch L' , and on the next upward movement of the needle-bar the rod h' is forced down on the plane h^6 of the latch L' , with the effect of reciprocating the foot E rear-

ward, and thus the foot E and its attachment are reciprocated by and in correspondence with the reciprocation of the needle-bar.

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

1. A button-hole attachment for sewing-machines, containing the following elements: a carrier-plate for supporting and guiding a reciprocating foot, a reciprocating foot supporting the feeding mechanism for moving the button-hole form-plate and cloth-clamp, means for reciprocating the reciprocating foot and regulating the bight of the stitches, comprising a reciprocator-lever operated by the needle-bar, a vertically-moving gate provided with a horizontal rod, a latch having oppositely-inclined planes and an adjustable vibrating lever, a ratchet adapted to be automatically thrown out of gear with the wheel through which motion is transmitted to revolve the form-plate, a lever operated by the moving form-plate to regulate the speed of the latter and the distance between the stitches, a device embracing an eccentric-lever and arm and an adjusting-lever for stopping the feed of the form-plate, and the mechanism for transmitting motion thereto for the purpose of barring a button-hole, a combined thread-holder, guide, and revolving presser-foot, a combined cloth-clamp and permanently fixed open-ended button-hole form-plate, said button-hole form-plate having irregularities in its face for automatically operating a feed-regulating lever, all combined and operating substantially as herein shown and described.

2. In a button-hole attachment for sewing-machines, the combination, with the carrier-plate provided with grooved frame K and reciprocator-lever K^2 , of gate K' , provided with rod h , reciprocating foot E, yoke h' , adjustable vibrating lever L, stud h' , nut h' , spring i' , and latch L' , all constructed, arranged, and operated substantially as set forth.

3. In a button-hole attachment for sewing-machines, as a means for transmitting motion from the needle-bar-operated lever to the mechanism operating the reciprocating foot, the vertically-movable gate K' , provided with suitable attachment, h , in combination with said foot and needle-bar-operated lever, substantially as herein shown and described.

4. In a button hole attachment for sewing-machines, and as a means for imparting a reciprocating movement to the foot E from the needle-bar-operated lever K^2 , the vertically-reciprocating gate K' , carrying the rod h , in combination with said foot E and lever K^2 , the lever L, and latch L' , arranged and operating substantially as described.

5. In a button-hole attachment for sewing-machines, and in combination with the button-hole form-plate, feeding mechanism thereof, and the lever F, carrying the spring-pawl F' , for transmitting motion from the needle-bar to said mechanism, the adjustable finger Q and lever Q, whereby the movement of said feeding

mechanism is regulated, substantially as and for the purposes specified.

6. In a button-hole attachment for sewing-machines, and in combination with the reciprocating foot E, a rod, as q' , constructed and arranged to move freely in and be supported by said foot, and carrying a roller, q , whereby the edges of a button-hole are held down and prevented from following the movement of the needle, substantially as specified.

7. In a button-hole attachment for a sewing-machine, and in combination with the stitch-forming mechanism thereof, as a means for holding and guiding a thread or cord for cording a button-hole, a roller, q , grooved to receive and guide the thread, the support q' , guides q^2 on foot H, and perforated plate q^3 , all arranged substantially as herein shown and described.

8. In a button-hole attachment for sewing-machines, and in combination with the form-plate-feeding mechanism, the lever for operating the same and the button-hole form-plate, a lever, as Q, arranged intermediate of the form-plate and feeding mechanism, one end being in contact with the form-plate and the other end arranged to come in contact with the said feeding mechanism, whereby the connection between the feeding mechanism and the lever operating the same is intermittently broken, substantially as and for the purpose specified.

9. In a button-hole attachment for sewing-machines, and in combination with the button-hole form-plate-feeding mechanism, and a device constructed, substantially as described, for interrupting the movement of said mechanism, means for governing the position of said device and regulating the feeding mechanism, consisting of a form-plate with alternate depressions and elevations, substantially as described.

10. In a button-hole attachment for sewing-machines, the cloth-clamp N, consisting of the plate m and upper plate, m' , both rigidly connected together and parallel with each other, the interposed plate m^2 , and means, substantially as described, for pressing the said plate m^2 downward upon the plate m , as and for the purposes set forth.

11. In a button-hole attachment for sewing-machines, the combination, with the needle-bar, form-plate, and the ratchet transmitting motion from said needle-bar to the mechanism for moving the form-plate, of a pawl provided with an adjustable finger constructed to engage with a stop, as and for the purposes set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 24th day of November, 1883.

WILLIAM SCHOTT.

Witnesses:

JACOB J. STORER,
ALBERT P. MORIARTY.