

(No Model.)

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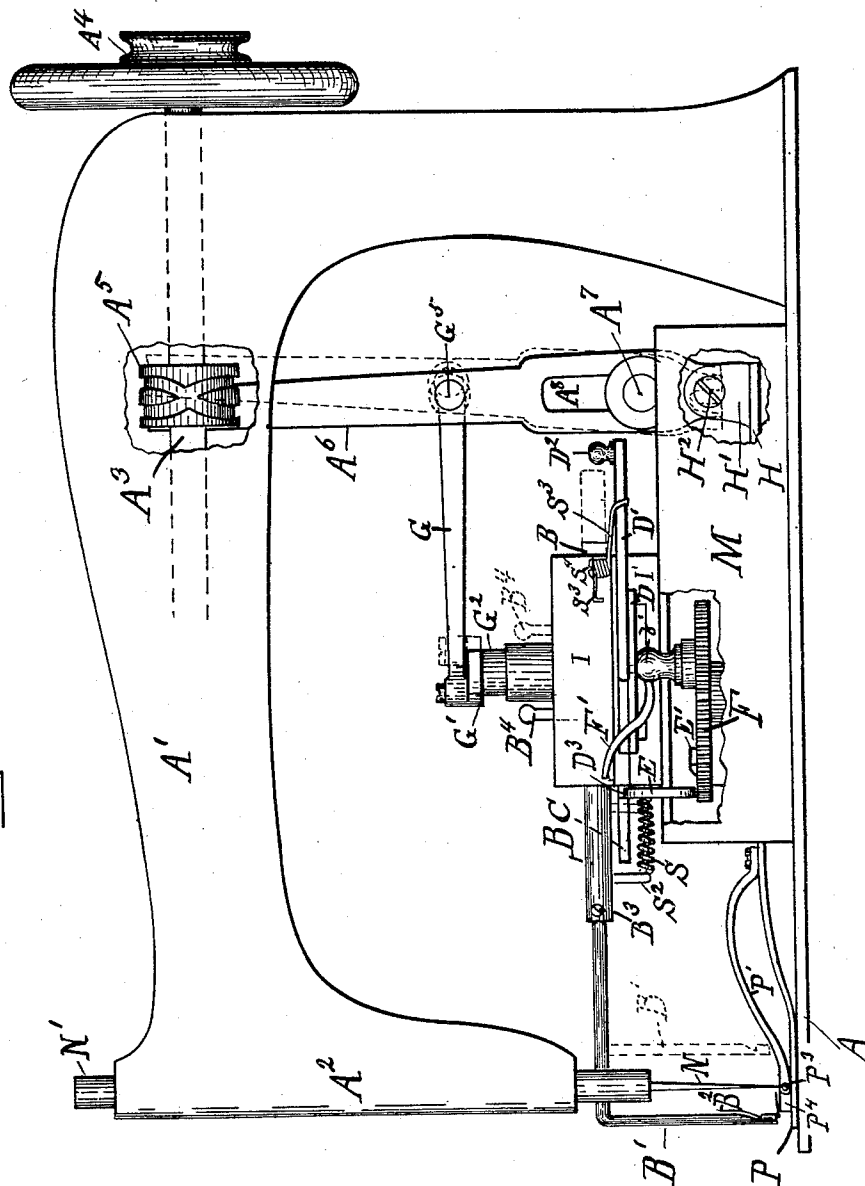
J. T. HOGAN.

SEWING MACHINE FOR STITCHING BUTTONHOLES.

No. 472,501.

Patented Apr. 5, 1892.

Fig. 1



WITNESSES

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INVENTOR

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(No Model.)

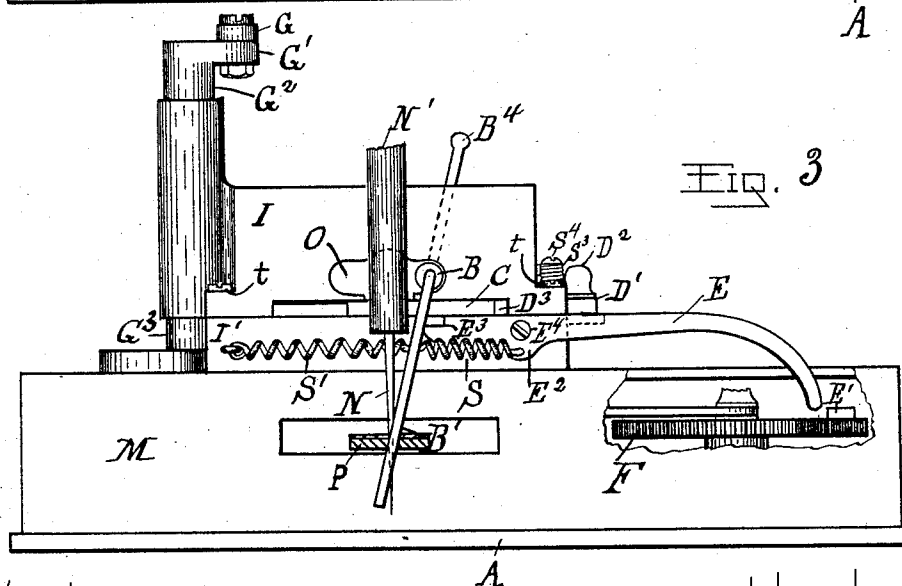
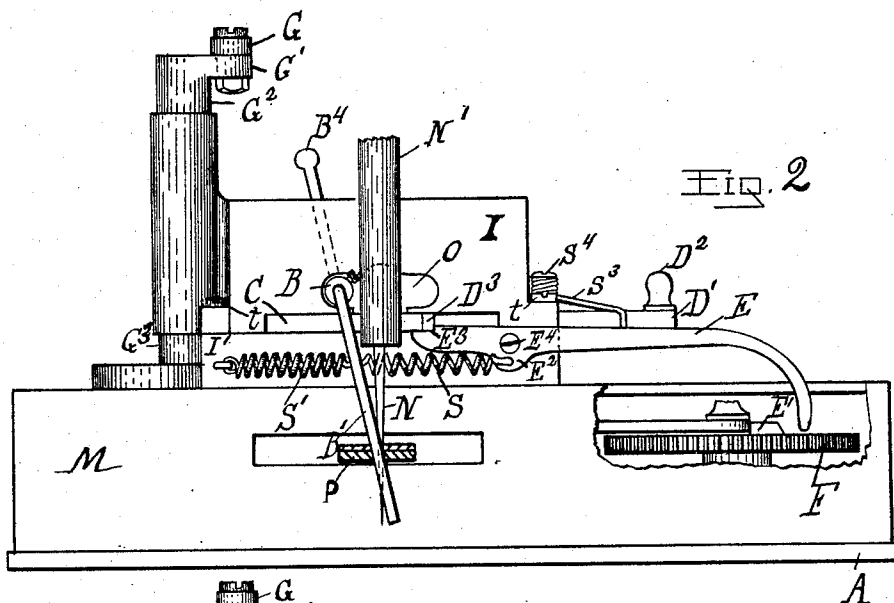
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WITNESSES

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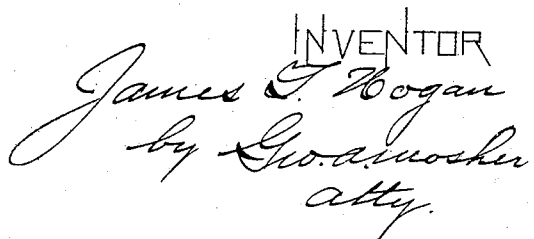
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## SEWING MACHINE FOR STITCHING BUTTONHOLES.

Patented Apr. 5, 1892.



(No Model.)

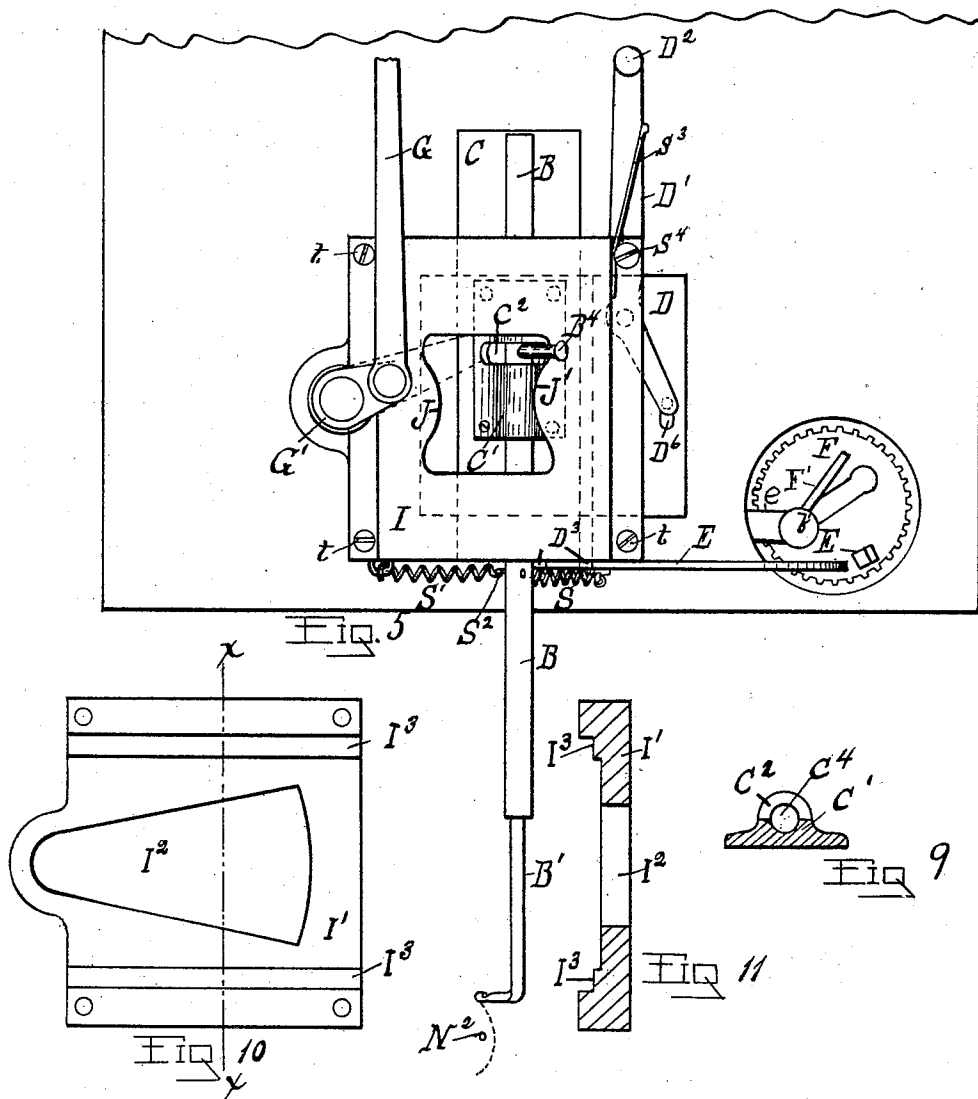
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SEWING MACHINE FOR STITCHING BUTTONHOLES.

No. 472,501.

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# UNITED STATES PATENT OFFICE.

JAMES T. HOGAN, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO THE  
NATIONAL MACHINE COMPANY, OF TROY, NEW YORK.

## SEWING-MACHINE FOR STITCHING BUTTONHOLES.

SPECIFICATION forming part of Letters Patent No. 472,501, dated April 5, 1892.

Application filed June 22, 1887. Serial No. 242,100. (No model.) Patented in England June 15, 1887, No. 8,628.

### *To all whom it may concern:*

Be it known that I, JAMES T. HOGAN, a resident of Jersey City, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Sewing-Machines for Stitching Buttonholes, (which invention was patented in Great Britain, No. 8,628, dated June 15, 1887;) and I do hereby declare that the following is a full, clear, and exact description of the invention, that will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

Similar letters refer to similar parts in the several figures therein.

My invention relates to improvements in sewing-machines for stitching buttonholes, and is essentially applicable to sewing-machines provided with an attachment for imparting to the fabric intermittingly-progressive movements and to the fabric or needle to and fro movements, such as described in United States Patents No. 203,287, dated May 7, 1878; No. 252,052, dated January 10, 1882; No. 273,727, dated March 13, 1883, and No. 319,800, dated June 9, 1885, to which reference may be had for a description of the attachments as well as movements.

My invention consists of the novel construction and combination of parts hereinafter described, and pointed out in the claims, and is an improvement upon some of the devices shown and described in United States Patent No. 310,677, dated January 13, 1885, especially those devices which are employed to introduce a purling thread, as and for the purposes therein set forth. The purling devices described in said Patent No. 310,677 were peculiarly adapted to the buttonholing and eyeletting attachment for sewing-machines described in said Patent No. 273,727, in which the cloth-clamp had a rotary as well as zigzag intermittingly-progressive movements, by which the edge of the fabric forming the buttonhole was intermittingly fed toward the needle in the same general direction from one end of the buttonhole around the other end and back to the place of beginning, the fabric be-

ing turned around, so as to always approach the needle from one and the same side, which rendered it unnecessary to vibrate the purling-thread carrier on more than one side of the needle; but when the buttonholing attachment described in said Patent No. 252,052 is employed the fabric is fed the length of the buttonholes by zigzag intermittingly-progressive step-by-step movements toward one side of the needle, and back again along the opposite side of the buttonhole by similar movements, and toward the opposite side of the needle, as herein described. The latter may be termed "retrogressive" when compared with the progressive movements. It is evident, therefore, that the purling-thread carrier is required to vibrate to and fro on one side of the needle while one side of the buttonhole is being stitched, and on the opposite side of the needle while the opposite side of the buttonhole is being stitched.

The object of the present invention is to provide a purling-thread carrier that can be operated on opposite sides of the needle and means for operating the same, and means for changing the operating-fields of the carrier from one side of the needle to another side during the operation of stitching, whether by hand-lever or automatically.

Figure 1 of the drawings is a side elevation of a buttonhole sewing-machine with my improved purling device attached. Figs. 2 and 3 are front elevations of a portion of the parts shown in Fig. 1, Fig. 2 showing the slide-bar which supports the purling-thread carrier, located on one side of the needle-bar, and Fig. 3 showing the slide-bar located on the opposite side. Figs. 4 and 5 are top plan views of the purling devices, Fig. 4 showing the slide-bar at the limit of its longitudinal vibration toward the needle-bar and at the limit of its lateral vibration to one side of a plane passing through the needle, Fig. 5, showing the limit of its respective vibrations in the opposite directions. Fig. 6 is a plan view of the devices, constituting together a preferred buttonhole attachment, such as described in said Patent No. 252,052. Fig. 7 is a plan view of the slide-plate which supports the slide-bar bearing, showing the arm which vibrates it longitudinally. Fig. 8 is a plan view of the

slide-carrier which vibrates the slide plate and bar laterally and is provided with a slideway in which the plate slides longitudinally. Fig. 9 is a cross-sectional view of the slide-bar bearing-block C', taken through slot C<sup>2</sup>. Fig. 10 is a plan view of bed-plate I with other parts removed to show slideway for carriage D. Fig. 11 is cross-section taken at broken line X X in Fig. 10.

In Fig. 1 are shown some of the well-known parts of a sewing-machine, as bed-plate A, bracket-arm A', head A<sup>2</sup>, supported thereby, driving-shaft A<sup>3</sup>, and drive-wheel A<sup>4</sup>. The driving-shaft A<sup>3</sup> is provided with a switch-cam A<sup>5</sup>, fixed thereon for operating the lever A<sup>6</sup>, pivoted upon a fixed support. This lever is pivoted at its lower end at H<sup>2</sup> upon a lug H', projecting from the slide-plate H, which plate operates the mechanism for imparting to the feed-bar P, provided with plate P', having cloth-clamp P<sup>2</sup>, pivoted thereon at P<sup>3</sup>, to-and-fro movements and relatively-transverse step-by-step progressive and retrogressive movements to produce a zigzag overedge buttonhole stitch, substantially as shown and described in said Patent No. 252,052, to which reference may be had for a full description of the mechanism employed, the principal parts of which I have shown in Fig. 6, in which it will be seen that the plate H is adapted to slide to and fro between the ways T' and T<sup>2</sup> on the bed-plate K, which rests when in use upon the bed-plate of the main plate A. (Not shown in Fig. 6.)

The plate R, provided with the slot q, is adjustably secured to the plate H by the adjusting-screw q', passing through said slot, being guided by the ways T, secured to or forming part of plate H. The plate R is also provided with transverse guideways R' for the slide or follower R<sup>2</sup>, to which the feed-bar P is attached, whereby the bar, partaking of the vibratory movements of plate H, can also be given a relatively transverse step-by-step movement by means of the pitman e, connecting the follower R<sup>2</sup>, secured to the feed-bar with crank-pin b', radially adjustable on the rotary crank-wheel F, and provided with a handle F', by which the crank-wheel may be rotated by hand, when desired. The crank-wheel F is also provided with means for imparting to it regular intermittent movements, by which the wheel is given a complete revolution during the operation of stitching each buttonhole. Said means consist of the drive-wheel L, provided with crank-pin m, which has a follower n fitting in the radially-slotted guide fast on the wheel k, toothed to engage with wheel F.

The drive-wheel L is provided with ratchet-teeth and a concentrically-pivoted lever L', carrying a drive-pawl L<sup>2</sup>, adapted to engage with the ratchet-wheel and having a toothed arc (shown in dotted lines) adapted to engage with a similar toothed arc l on the lever p, that is pivoted to the plate H, and connected with the bed-plate K by a fulcrum-arm Q,

which is adjustable in guides Q' by a screw Q<sup>2</sup> on the bed-plate, as fully shown and described in said Patent No. 252,052.

The foregoing mechanism is referred to and briefly identified as a preferred known means for imparting to the fabric-holder of a sewing-machine to-and-fro movements and relatively-transverse step-by-step progressive and retrogressive movements, the progressive movements taking place during one-half a revolution of the crank-wheel F and the retrogressive movements during the remaining half-revolution, although any known mechanism for producing such movements may be employed, also, as a preferred means for automatically determining the field of operation to be occupied by the purling-thread carrier, as will hereinafter be more fully explained.

The mechanism shown in Fig. 1 is concealed from view in other figures by the cover M, which rests upon bed-plate A. The feed-bar P projects through a slot in the front side of the cover, and the crank-wheel F is accessible through an opening in the top of the cover, as shown.

The slide-bar B, which supports the purling-thread carrier B', is rotary in a bearing-block C', secured to a slide-plate C, which plate is guided by ways D<sup>3</sup> and D<sup>4</sup>, secured to the slide-carriage D. The slide-carriage is guided by ways I<sup>3</sup> on the bed-plate I', which rests upon the top of cover M, and is secured thereto by screws t, passing down through screw-holes in the corners of the plate and its cover I.

The slide-carriage is reciprocated by a lever D', fulcrumed upon the plate I' upon a pivot D<sup>7</sup>, (shown by dotted lines,) and provided at one end with an operating-handle D<sup>2</sup>, and at the other with a pin adapted to engage with the carriage in slot D<sup>6</sup>. The lever is also provided with an actuating-spring S<sup>3</sup>, having a fixed support S<sup>4</sup>.

The vertical rock-shaft G<sup>2</sup> has its supporting-bearing in an offset from the cover I and is connected through crank-arm G' at its upper end by link G with the cam-actuated lever A<sup>6</sup> at G<sup>5</sup>. The rock-shaft is provided at its lower end with the arm G<sup>3</sup>, which rests in the opening I<sup>2</sup> in bed-plate I', and is provided at its end with a vertical pin G<sup>4</sup>, projecting up through the opening D<sup>5</sup> in the slide-carriage into the transverse slot C<sup>5</sup> in the slide-plate C, the transverse walls of the slot serving as tappets for reciprocating the slide when acted upon by the pin.

The bearing-block C' is secured to the top of slide-plate C, in the position shown, and is provided on its upper side with the central transverse slot C<sup>2</sup>, through which projects the tappet-arm B<sup>4</sup>, fixed upon the slide-bar B. This arm is of sufficient length to project up through the central opening, (shown in cover I,) and may be provided on its projecting end with a handle, by which the slide-bar B can be wholly controlled and operated by the hand.

As a preferred means for controlling the rotary movements of the slide-bar, I provide the

guides J J', which may be the edge walls of the central opening in the cover I, as shown. The slide-bar is provided with a downwardly-projecting arm S<sup>2</sup> fixed thereon, the projecting end of which is connected with one side of bed-plate I' by spring S and with the opposite side by spring S', as shown. The carrier B', which carries the purling-thread B<sup>2</sup>, is adjustably secured in a socket in the end of the slide-bar by set-screw B<sup>3</sup>.

The carriage-plate D is moved from the position shown in Figs. 5 and 3 to that shown in Figs. 4 and 2 by means of the lever D', and is secured in the position shown in Figs. 4 and 2 by means of the trip-latch E, pivoted upon plate I' at E<sup>4</sup> and provided at one end with the stop E<sup>3</sup>, adapted to engage with the projecting end of the way D<sup>3</sup>, secured to plate D, the other end of the latch dropping down upon the crank-wheel F.

The spring S is preferably attached at one end to a short arm E<sup>2</sup> of the latch to facilitate the engagement. Whenever the latch is tripped, as by the lug or trip E' projecting upward from the face of the rotary crank-wheel in the path of the latch, the resiliency of the spring S<sup>2</sup> forces the carriage D back again to the position shown in Figs. 5 and 3. As the carriage-plate slides back and forth, it is evident the slide-plate C is carried back and forth with it, the pin G<sup>4</sup> occupying first one end and the other of slot C<sup>5</sup> in the plate C.

When the devices are to be operated automatically, the method is as follows: The slide-carriage D is first forced over into the position shown in Figs. 4 and 2 by the operator, where it is locked by the latch E. The mechanism of the buttonhole-sewing machine is then put in operation, which vibrates the lever A<sup>6</sup>, and through the connecting parts heretofore described imparts to the cloth-holder and the slide-plate C simultaneous to and fro movements in opposite directions. During both the to and fro movements the bearing-block C' acts upon the tappet B<sup>4</sup> to communicate its to-and-fro slide movements to the rotary bar B, wherefore I term the bar a "rotary slide-bar." The purling-thread carrier being fixed upon this bar, partakes of all its movements and carries the purling-thread B<sup>2</sup> to and fro from one side of the needle N to the opposite side. This movement of the depending leg B' of the carrier is shown by dotted lines in Fig. 1. The two extreme positions are also shown in solid lines in Figs. 4 and 5. The course taken by the head of the carrier around the needle or needle-hole N<sup>3</sup> is also shown in the two latter figures by the curved broken line. The to and fro movements in front of the needle are obtained from the slide movements of the bar and carrier, and the back-and-forth movement which curves the course of the carrier is effected by the guide J, upon which the tappet B<sup>4</sup> rides, being held in contact therewith by the spring S, acting through arm S<sup>2</sup>.

The course followed by the head of the carrier will depend upon the form of the guide J, and can be varied as desired. When the crank-wheel F has made a half-revolution, the pitman e is in line with the crank and axis of the wheel, and the step-by-step progressive movements of the cloth-holder will stop, and as the wheel continues to rotate the retrogressive step-by-step movement commences and continues during the remaining half-revolution. As the cloth during the retrogressive movements travels in the opposite direction, that which was the front of the needle during the progressive movements of the cloth-holder becomes the back during the retrogressive movements. It becomes necessary, therefore, to change the field of operations of the thread-carrier from the side of the needle occupied during the progressive movements to the opposite side during the retrogressive movements. To accomplish this change, I prefer to make use of the trip E', which is so located upon the crank-wheel as to pass under the lever E and lift it sufficiently to release the stop D<sup>3</sup>, whereupon the spring S<sup>2</sup> immediately slides the carriage D from the position shown in Figs. 4 and 2 to that shown in Figs. 5 and 3, which changes the plane of vibration of the slide-bar from one side of the needle to the opposite, and by releasing or greatly diminishing the tension upon spring S and greatly increasing that upon spring S' the tappet B<sup>4</sup> is thrown over to the other side of the opening in cover I and forced to engage with the guide J', similar in form to J, whereby the carrier is caused to travel over a course similar to that traversed before, except that the backward curve is reversed, as will appear by inspection of the curved broken lines in Figs. 4 and 5 around the needle-hole. As one side of the buttonhole is formed during the progressive movements and the opposite side during the retrogressive movements the work is completed at the end of the latter movements and the operation may be repeated upon successive buttonholes as often as desired.

It is evident that all the required movements of the purling-thread carrier may be obtained by operating the rotary slide-bar by the hand without recourse to any of the mechanisms for accomplishing the same movements automatically.

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

1. In a buttonhole sewing-machine, the combination, with the stitch-forming mechanism, of a depending purling-thread carrier, a horizontal carrier-supporting bar movable longitudinally and axially in bearings, bearing-supports, and means for communicating to the bar longitudinal and axial movements, substantially as described.

2. In a buttonhole sewing-machine, the combination, with the stitch-forming mechanism, of the purling-thread carrier, means for oscillating the same from side to side, and

further means whereby the path of its traverse may be altered at each end of the buttonhole, substantially as described.

3. The combination, with a buttonhole sewing-machine provided with means for imparting to the cloth-clamp to-and-fro movements and relatively-transverse step-by-step progressive and retrogressive movements, of a purling-thread carrier supported by a rotary slide-bar, a slideway for said slide-bar secured to a carriage movable transversely to the movements of the slide-bar, a carriage-actuating spring, and a carriage-restraining latch, as and for the purposes set forth.

4. The combination, with a buttonhole sewing-machine provided with means for imparting to the cloth-clamp to-and-fro movements and relatively-transverse step-by-step progressive and retrogressive movements, of a purling-thread carrier supported by a rotary slide-bar, a slideway secured to a spring-actuated latch-controlled carriage movable trans-

versely to the movements of the slide-bar, said actuating-spring and restraining-latch, and means, substantially as described, for automatically tripping the restraining-latch and releasing said carriage at the end of said step-by-step progressive movements, as and for the purposes set forth.

5. The combination, with a buttonhole sewing-machine, of a rotary slide-bar provided with a depending purling-thread carrier, and devices for automatically imparting to said bar reciprocatory rotary and slide movements consisting of spring S, tappet B<sup>5</sup>, guide J', and rock-shaft G<sup>3</sup>, linked to a lever actuated by a switch-cam upon the main shaft of the sewing-machine, substantially as described.

In testimony whereof I have hereunto set my hand this 17th day of June, 1887.

JAMES T. HOGAN.

Witnesses:

E. O. HOUSE,

J. P. HALLENBECK.