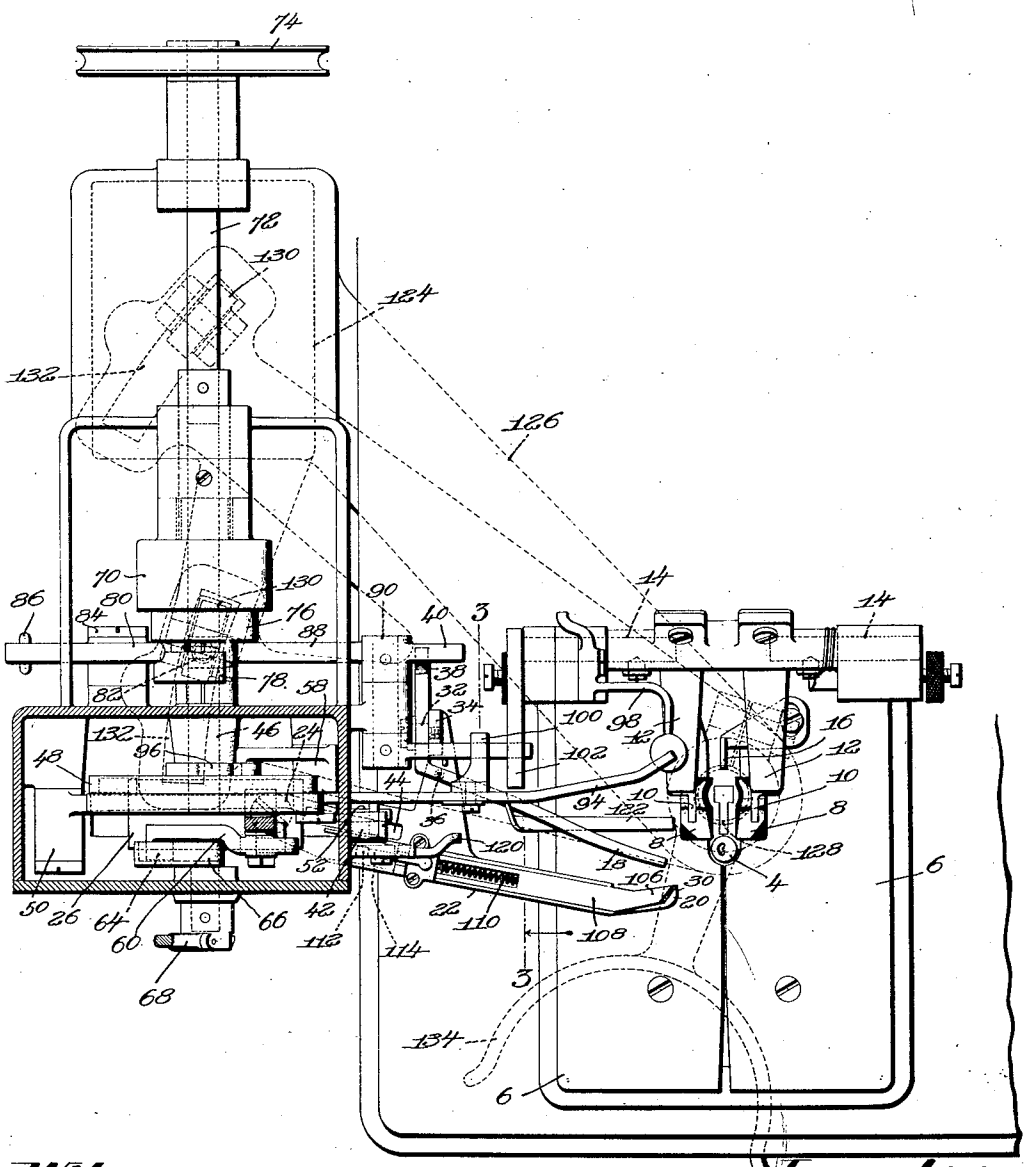
May 26, 1925. 1,539,629

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WORK SPACING MECHANISM FOR BUTTONHOLE SEWING MACHINES

Filed April 16, 1921 3 Sheets-Sheet 1

Fig. 1



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Fig. 3

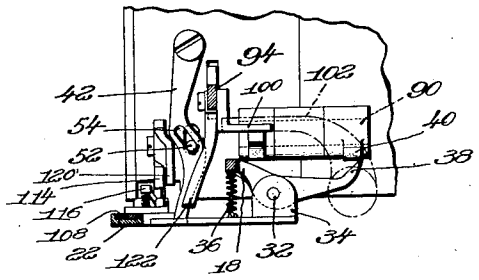


Fig. 2

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Fig. 4

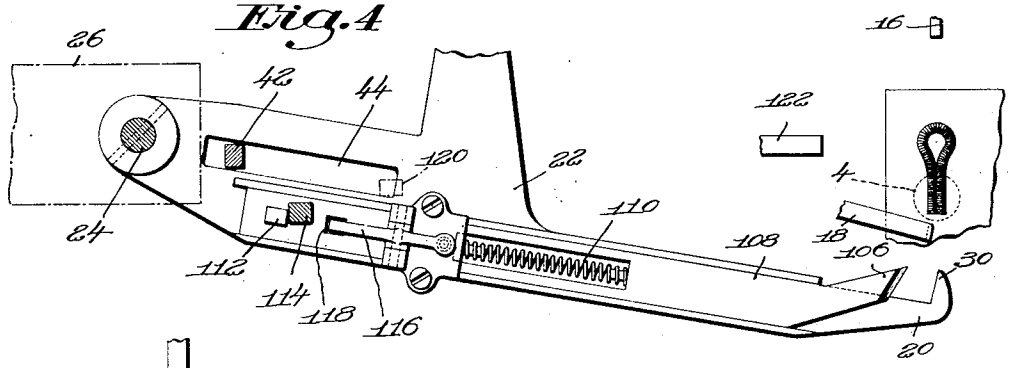


Fig. 5

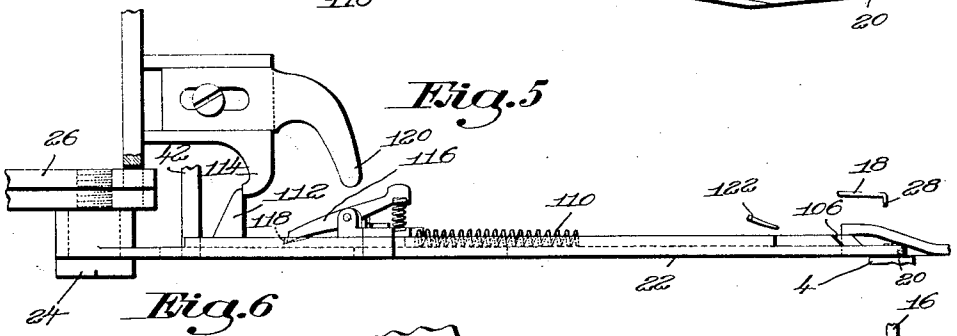


Fig. 6

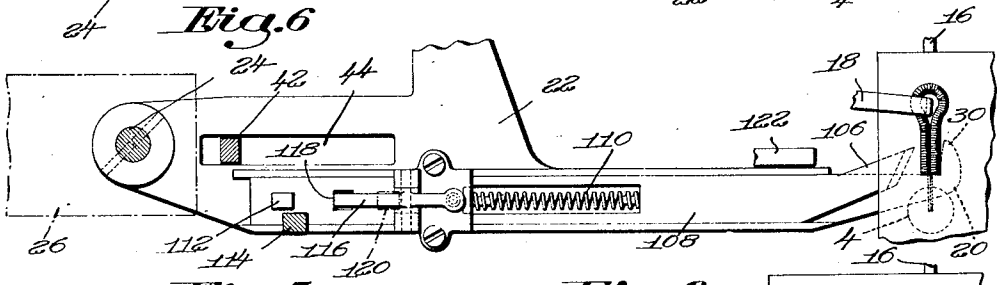


Fig. 7

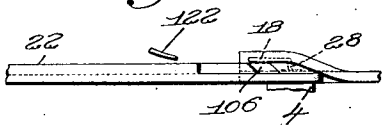


Fig. 8

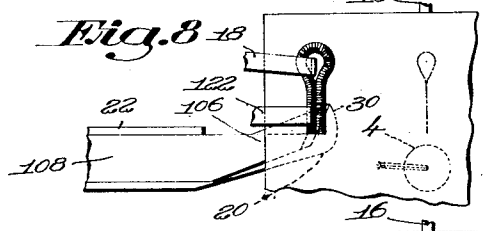


Fig. 9

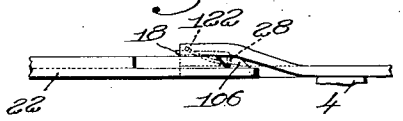


Fig. 11

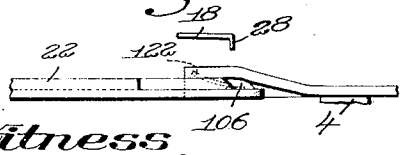
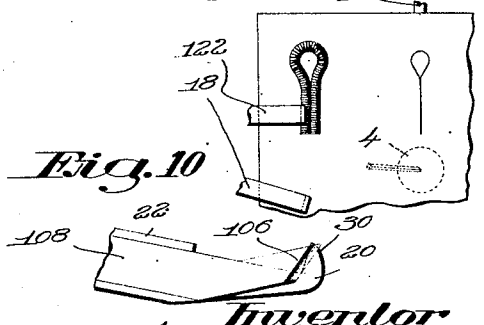


Fig. 10



Witness

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by Thos. Evans Fiske Hildreth & Curry Attys

Patented May 26, 1925. 1,539,629

UNITED STATES PATENT OFFICE.

LEWIS J. BAZZONI, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

WORK-SPACING MECHANISM FOR BUTTONHOLE-SEWING MACHINES.

Application filed April 16, 1921. Serial No. 461,944.

To all whom it may concern:

Be it known that I, LEWIS J. BAZZONI, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Work-Spacing Mechanism for Buttonhole-Sewing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to work spacing mechanism for buttonhole sewing machines.

One object of the invention is to provide a construction which is well adapted for automatically spacing the work between successive buttonhole making cycles in a machine having a work clamp and a rotary stitch-forming mechanism which are relatively movable to sew along the sides and about one or both ends of an eye-ended buttonhole. Another object of the invention is to provide a spacing mechanism which is in the nature of an attachment which may be readily applied to existing machines, although the utility of the invention is not confined to an attachment of this nature. To these ends the invention comprises the features of construction and combination of parts hereinafter described and set forth in the claims.

The various features of the invention will be readily understood from the accompanying drawings and the following detailed description of the mechanism illustrated therein. In the drawings Fig. 1 is a plan view showing a spacing attachment embodying the invention and so much of a buttonhole sewing machine as is necessary to illustrate the application of the invention thereto, Fig. 2 is a front elevation, Fig. 3 is a detailed sectional view on line 3—3, Fig. 1, Fig. 4 is a detailed plan view of the spacing devices, Fig. 5 is an elevation of the same, Fig. 6 is a plan view similar to Fig. 4 showing the parts in different position, Fig. 7 is an elevation of the parts at the right hand end of Fig. 6, Fig. 8 is a plan view of these parts in still a different position, Fig. 9 is an elevation of the same, Fig. 10 is a plan view of these parts in still another position, and Fig. 11 is an elevation of the same.

In the drawings the invention is shown embodied in an attachment applied to the buttonhole sewing machine shown and described in the patent to G. S. Hill, No. 1,063,880, dated June 3, 1913. The buttonhole sewing mechanism of this machine comprises a cutter for cutting the buttonhole slit, a traveling work clamp which is movable lengthwise and laterally of the buttonhole, and a stitch-forming mechanism which is rotated during the sewing about the eye and about the bar end of the buttonhole. The upper needle of the stitch forming mechanism is indicated at 2 and the throat plate below which the under needle and looper mechanisms are located is indicated at 4. The work clamp comprises the work supporting plates 6 and the clamping jaws 8 carried on clamp arms 10 which are pivotally supported on the plates 6 and are engaged by the spring arms 12 carried by the rock-shafts 14. At the beginning of the buttonhole sewing cycle the work clamp is closed by rocking the shafts 14 and at the end of the cycle the clamp is opened by the release of a latch which, during the operation of the stitch-forming mechanism, acts to latch the shaft in clamp closing position. The edge of he work is positioned at the clamping point by engagement with a gage 16 secured to one of the work supporting plates 6.

At the end of the buttonhole sewing cycle the work clamp has been retracted and opened and is in work clamping and buttonhole cutting position. The upper needle thread has been severed by the thread cutter and holder with which machines of this character are usually provided. The work is then automatically spaced by a spacer finger which engages the completed buttonhole and moves crosswise of the buttonhole through a distance corresponding to the desired spacing between successive buttonholes and thus shifts the work through the work clamp into position for the sewing of the succeeding buttonhole. To facilitate the lateral spacing movement of the work, in case the under thread remains unsevered at the end of the buttonhole making cycle, an auxiliary finger is provided which engages the thread between the work and throat plate and moves laterally with the buttonhole engaging finger. The thread engaging finger relieves the work of the drag

which would otherwise be put thereon by the under-thread and insures a uniform movement of both ends of the buttonhole so long as the under-thread remains attached to the work. To avoid waste of lower needle and stay thread in doing certain classes of work means may be, and preferably is, provided for severing the under-thread after the thread finger has drawn sufficient thread through the throat plate to insure the proper formation of the initial stitches of the succeeding seam.

In the construction shown the buttonhole engaging finger 18 and the thread engaging finger 20 are mounted or formed on an arm 22, the rear end of which is pivoted at 24 to a reciprocating slide 26. The finger 18 is provided with a depending end 28 adapted to engage the eye-end of the buttonhole slit, while the finger 20 is provided with a rearward projection or hook 30 adapted to engage the thread leading from the bar end of the buttonhole down through the throat plate. The finger 18 is pivoted at 32 to a vertical lug 34 on the arm 22 so that the finger may be moved vertically to engage it with the buttonhole preparatory to the spacing and to disengage it from the buttonhole after the spacing has been completed. A spring 36 tends to pull the finger downward and it is raised against the tension of the spring by the engagement of a cam surface 38 on its rear end with a substantially fixed lug 40 (Figs. 1 and 3). The arm 22 is moved toward the rear of the machine to bring the fingers into register with the buttonhole and under thread and is returned to normal position through a lever 42, the lower end of which engages a slot 44 in the arm and the upper end of which is pivoted on the spacing mechanism casing. The slide 26 is reciprocated and the lever 42 oscillated by cams on a one-revolution shaft 46 which is thrown into operation at the end of the buttonhole sewing cycle. The lever 42 is oscillated by the cam 48 which engages a roll on a lever 50, the forward end of which is provided with a pin 52 engaging an incline slot 54 in the lever 42. A spring 55 holds the roll on the lever 50 in engagement with the cam 48.

The slide 26 is reciprocated by a cam 56 engaging a roll carried on the lower end of a lever 58. The lower end of the lever is connected with the slide through a bell crank lever 60, the vertical arm of which is forked to engage a pin 62 on the slide, and the horizontal arm of which carries a roll 64 engaging a guideway in an arm 66. The arm 66 is so mounted that it may be swung about an axis in line with the axis of the shaft 46 by an adjusting lever 68, to determine the length of movement given to the slide 26 and consequently the spacing of the buttonholes. The guideway in the arm is so arranged that the roll 64 is moved into line with the shaft 46 at the end of the forward movement of the lever 58, whatever the adjustment of the arm, and the slide is, therefore, advanced to the same point to bring the spacing fingers into register with the buttonhole, whatever the adjustment.

The one-revolution shaft is driven through a clutch 70, the driving member of which is secured to a shaft 72, continuously driven through the pulley 74. The driven member 76 which is connected with the shaft 46 carries the segment 78 which controls the engagement and dis-engagement of the clutch. The segment may be moved into clutch dis-engagement position and the shaft 46 stopped by either of two stop arms 80 and 82. The stop arm 80 is pivoted at 84 and may be swung into or out of active position by the operator through a treadle (not shown) connected with the arm by a rod 86. The stop arm 82 is carried by the inner end of a stop lever 88 which is pivoted at 90 and is acted upon by a spring 92 which tends to hold the stop arm in inactive position. The stop lever is moved into active position through the lever 94 which is actuated by a cam 96 on the shaft 46 and operates the starting trip lever 98 to automatically start the buttonhole sewing mechanism after the spacing of the work has been completed. The stop lever is thus operated from the lever 94 by a rearwardly projecting arm 100 secured to the lever 94. The stop lever is held in active position against the tension of the spring 92 during the operation of the buttonhole sewing mechanism by an arm 102 secured to the clamp closing rock-shaft 14 and arranged to engage the outer end of the stop lever. When the clamp is opened at the completion of the buttonhole sewing cycle the arm 102 is raised so that the stop lever moves into inactive position, thus throwing the driving clutch for the cam shaft 46 into operation to effect the spacing of the work. After the shaft has made a partial revolution and the spacing has been completed the cam 96 rocks the lever 94 against the tension of its spring 104 to return the stop arm 82 to active position and to start the buttonhole sewing mechanism. So long as the stop arm 80 is held out of active position by the operator the automatic sewing and spacing of the buttonholes will continue. If the stop arm 80 is returned to active position then the driving clutch for the cam shaft 46 will be dis-engaged and the cam shaft stopped by this arm immediately after the lever 94 has been operated to start the buttonhole sewing mechanism. The automatic operation of the spacing mechanism and the automatic tripping into action of the buttonhole sewing mechanism will, therefore, be arrested and there will be no actuation of the spac-

ing mechanism after the sewing of the last buttonhole.

The means for severing the under-thread (which may comprise the lower needle thread and stay thread) consists of a knife blade 106 formed on the forward end of a knife slide 108 and arranged to pass over the hook 30 and cooperate with its upper edge in severing the thread. The slide is mounted in a guideway formed on the upper side of the arm 22 and is forced forward by a spring 110. The rear end of the slide is provided with a vertical lug 112 arranged to engage a fixed finger 114 during the movement of the arm 22 toward the right and thus retract the slide. The knife slide is held in retracted position during the spacing stroke of the arm 22 by a spring pressed latching pawl 116 on the arm 22. During the spacing movement of the arm 22 the tail of the pawl strikes a finger 120 and is dis-engaged from the notch 118, thus releasing the knife slide so that it is actuated by its spring 110 to sever the thread leading from the bar end of the buttonhole to the throat plate. The finger 120 may be adjusted to vary the length of thread drawn through the throat plate before the knife is actuated to sever the thread.

The mode of operation of the spacing devices is clearly indicated in Figs. 1 and 4 to 10. When the work clamp is opened at the completion of a buttonhole making cycle the one-revolution shaft is shown into operation to actuate the spacing devices. The slide 26 is moved toward the right to bring the fingers 18 and 20 into the position indicated in Fig. 4. The fingers are then moved in a rearward direction and into the position indicated in Fig. 6 and as they move into this position the finger 18 moves down into engagement with the buttonhole slit, the rear end 38 of the finger riding from under the lug 40 as the end 28 registers with the eye of the buttonhole. The movement of the fingers from the position indicated in Fig. 4 to the position indicated in Fig. 6 carries the edge of the work against the gage 16 in case the work has been released by the clamp before it is brought to this position. The fingers then move to the left, a distance corresponding to the spacing for which the mechanism has been adjusted, as indicated in Fig. 8, the under thread being severed during the spacing by the release of the cutter slide 108 as above described. As the spacing is completed the buttonhole sewing mechanism is tripped into action by the depression of the lever 94 and the fingers 18 and 20 are swung forward into the position indicated in Fig. 10, the finger 18 being raised to disengage it from the buttonhole by the travel of the cam 38 against the lug 40. The work is retained in position while the fingers are moved into the position indicated in Figs. 10 and 11 by a spring finger 122 carried by the lever 94 and arranged to press on the work close to the buttonhole.

In order that the spacing mechanism may act properly in spacing the buttonholes along the curved edge of a piece of work the spacing mechanism is mounted to swing about the clamping point of the work as a center and thus vary the direction of travel of the fingers in spacing the work. By adjusting the spacing mechanism about the clamping point the register of the fingers with the completed buttonhole when in clamping position is insured and the movement of the fingers and consequently of the work through an equal distance whatever the direction of movement will be insured. As shown the work spacing mechanism is mounted upon a standard 124 formed on the outer end of a lever 126 which is secured to the upper end of a shaft 128, the axis of which is substantially in line with the eye of the buttonhole when in clamping position with the edge of the work against the gage 16. The standard is arranged at the left side of the buttonhole sewing machine base and is supported by rolls 130 running on supporting plates 132. The position of the spacing mechanism may be varied by the operator during the sewing of a series of buttonholes to properly space the buttonholes along a curved edge through a knee lever 134 secured to the lower end of the shaft 128.

In order that the spacing mechanism may be swung back to permit the frame of the buttonhole sewing mechanism to be swung up from its base or to permit the ready removal of the left hand work supporting plate 6 the standard 124 is pivoted at 136 to the lever 126 and is retained in normal position by a locking pin 138.

While the specific construction and arrangement of parts shown and described are well adapted for use in an attachment for the machine of the patent above referred to it will be understood that this construction and arrangement is not essential and may be varied or modified as found desirable or best suited to the construction and mode of operation of the machine to which the invention is to be applied or in which it is to be embodied.

What is claimed is:

1. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, and work spacing means including a buttonhole engaging device movable crosswise of the buttonhole.

2. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, a buttonhole engaging device, and mechanism for reciprocating the device crosswise of the buttonhole and for engag-

ing it with and disengaging it from a completed buttonhole.

3. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, a finger adapted to enter a completed buttonhole, mechanism for engaging the finger with the buttonhole, moving it crosswise of the buttonhole a distance corresponding to the spacing between the buttonholes and disengaging it from the buttonhole.

4. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, work spacing means engaging the work and under-thread, and movable crosswise of the buttonhole.

5. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, work spacing means comprising a finger adapted to engage a buttonhole, and a finger adapted to engage the thread leading from the under side of the work.

6. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, work spacing means engaging the work and under-thread, and means for severing the under-thread during the spacing.

7. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, a work spacer, and mechanism thrown into operation by the buttonhole sewing mechanism at the completion of a buttonhole making cycle for engaging the spacer with the work and moving it crosswise of the buttonhole.

8. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, a work spacer, mechanism thrown into operation by the buttonhole sewing mechanism at the completion of a buttonhole making cycle for engaging the spacer with the work and moving it crosswise of the buttonhole, and means operated by the spacer actuating mechanism for starting the buttonhole sewing mechanism at the completion of the spacing.

9. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp, spacing mechanism, and a support for the spacing mechanism adjustable about the work clamping point as a center.

10. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp, a work spacer mounted to reciprocate crosswise of the buttonhole, and a support for the spacer adjustable about the clamping point as a center.

11. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp, work spacing mechanism, a support for the work spacing mechanism mounted independently of the work clamp and movable out of active relation to the buttonhole sewing mechanism.

12. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism, a spacing attachment, a support for the attachment permitting it to be moved into and out of position to cooperate with the buttonhole sewing mechanism.

13. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp and a throat plate, a finger mounted independently of the clamp for engaging the thread between the work and the throat plate at the completion of the buttonhole, mechanism for actuating the finger to draw thread through the throat plate, and means for severing the thread close to the work after a sufficient length has been drawn through the throat plate to insure the starting of the succeeding seam.

14. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp and a throat plate, a finger for engaging the thread between the work and throat plate at the completion of the buttonhole, mechanism for actuating the finger to draw the thread and attached work crosswise of the buttonhole, and means for cutting the thread between the finger and work.

15. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp and a throat plate, a finger mounted independently of the clamp for engaging the thread between the work and throat plate at the completion of the buttonhole, mechanism for actuating the finger to draw thread through the throat plate, and a cutter cooperating with the upper edge of the finger to cut the thread.

16. A buttonhole sewing machine having, in combination, buttonhole sewing mechanism including a work clamp and a throat plate, a finger for engaging the thread between the work and the throat plate at the completion of the buttonhole, mechanism for actuating the finger to draw thread crosswise of the buttonhole through the throat plate, and a cutter cooperating with the upper edge of the finger to cut the thread.

17. A buttonhole sewing machine having, in combination, buttonhole making mechanism, additional work spacing means, and adjusting means for varying the direction of the work spacing movements.

18. A buttonhole sewing machine having, in combination buttonhole making mechanism, additional work spacing means, and adjusting means for varying the direction of the work spacing movements while the machine is in operation.

19. A buttonhole sewing machine having, in combination, stitch forming and work feeding mechanism, work shifting means for engaging a completed buttonhole and moving the work transversely of the seam, and

adjusting means for varying the direction of the transverse movements of the work during the operation of the machine.

20. A buttonhole sewing machine having, in combination, buttonhole making mechanism, including stitch forming mechanism, a slit cutter and a work clamp, an additional work spacer for spacing the work between button hole making cycles, and mechanism thrown into operation by the buttonhole making mechanism for actuating the spacer to intermittently engage and space the work.

21. A buttonhole sewing machine having, in combination, buttonhole making mechanism including stitch forming mechanism, a slit cutter and a work clamp, a work spacing mechanism for intermittently engaging and spacing the work between buttonhole making cycles, means for actuating the spacing mechanism thrown into operation by the buttonhole making mechanism at the completion of the buttonhole making cycle, and means for actuating the buttonhole making mechanism thrown into operation by the spacing mechanism at the completion of the spacing.

22. A buttonhole sewing machine having, in combination, buttonhole making mechanism including stitch forming mechanism, a slit cutter and a work clamp, work spacing mechanism for intermittently engaging and spacing the work between buttonhole making cycles, means for actuating the spacing mechanism thrown into operation by the buttonhole making mechanism at the completion of a buttonhole making cycle, means for actuating the buttonhole making mechanism thrown into operation by the spacing mechanism at the completion of the spacing, and operator controlled means for starting and stopping the spacing mechanism.

LEWIS J. BAZZONI.