

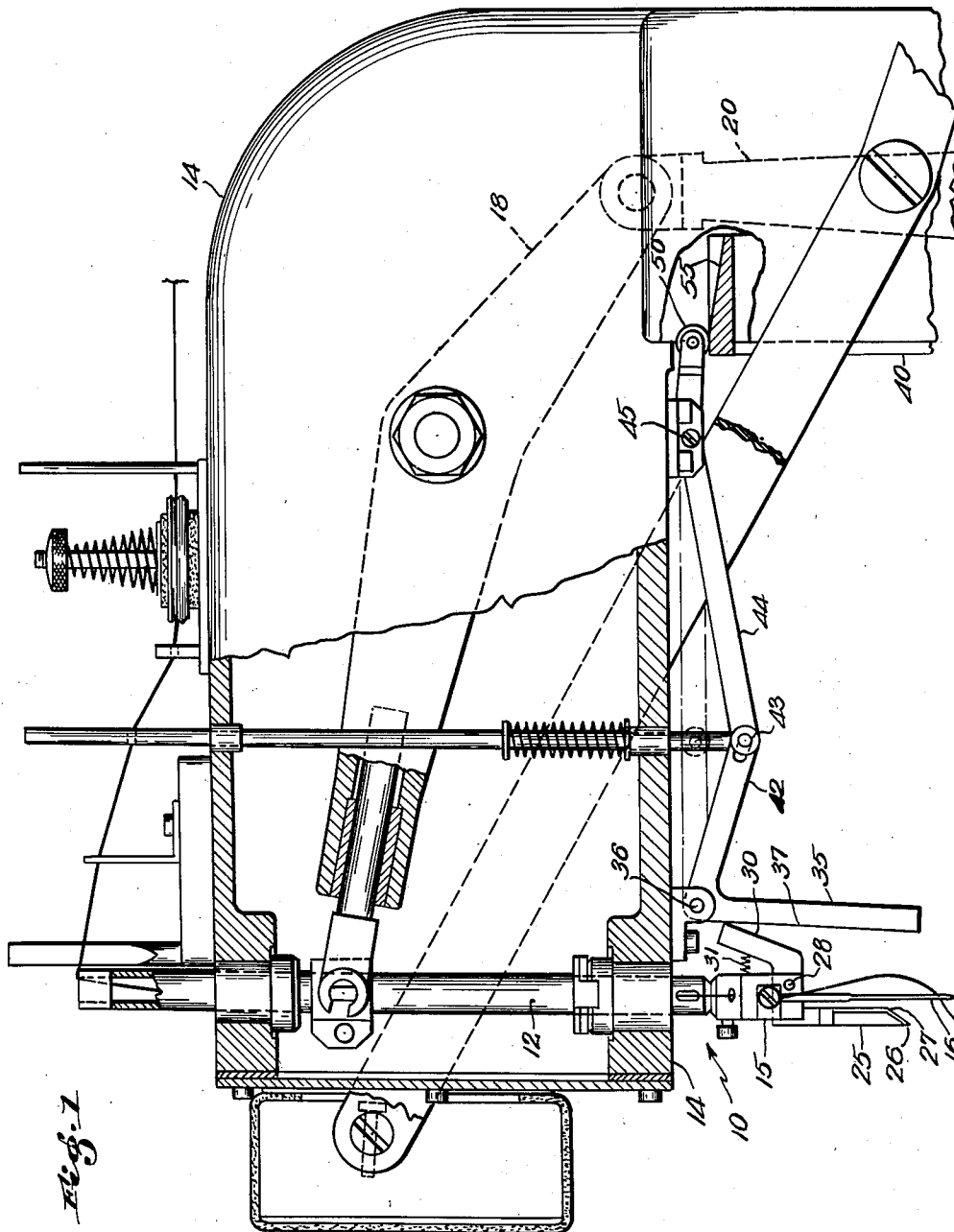
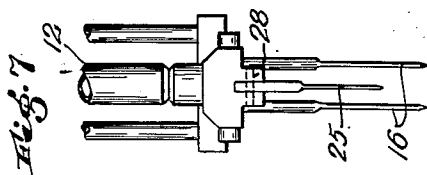
Jan. 1, 1952

M. C. RICH
SEWING MACHINE

2,581,046

Filed Feb. 23, 1949

2 SHEETS—SHEET 1.



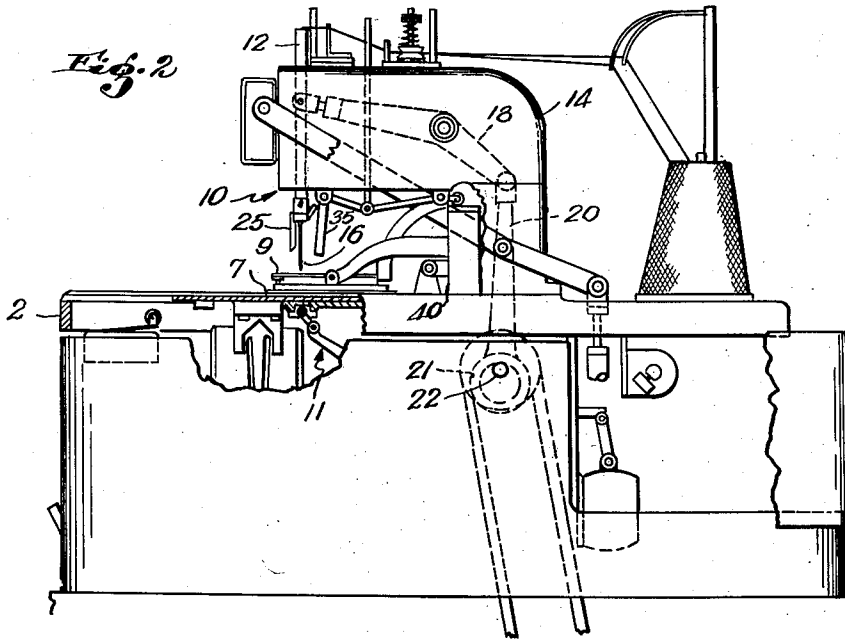
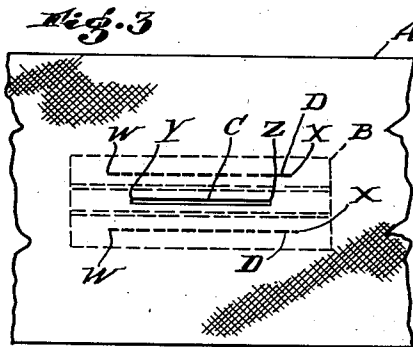
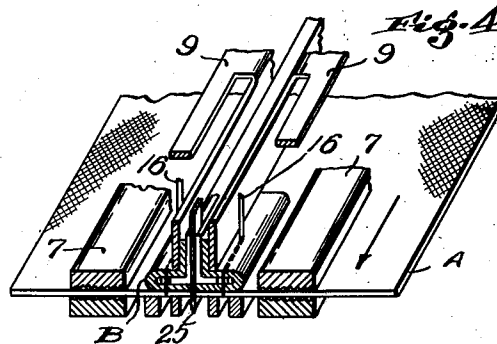
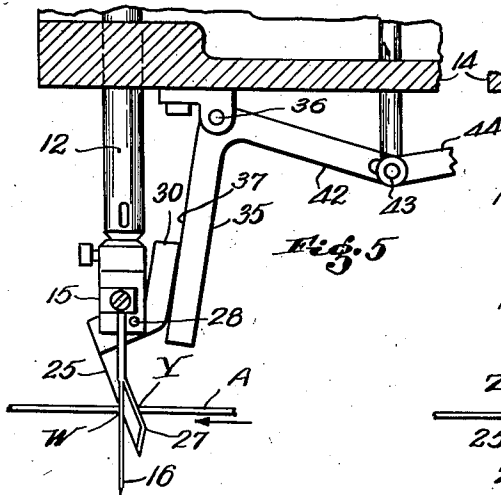
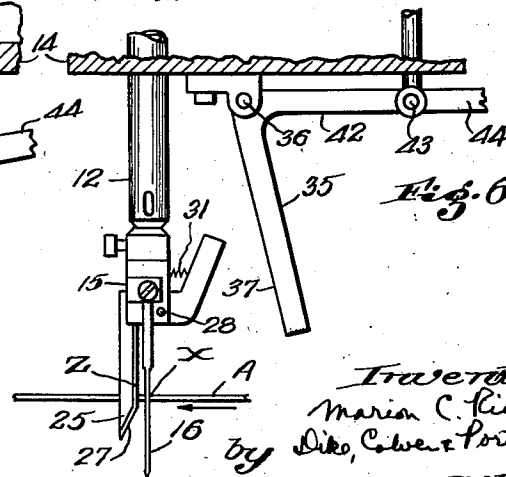
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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SEWING MACHINE

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tion of Massachusetts

Original application January 8, 1949, Serial No.
69,858. Divided and this application February
23, 1949, Serial No. 77,957

8 Claims. (Cl. 112—68.)

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This is a division of my co-pending application Serial No. 69,858, filed January 8, 1949, now Patent No. 2,573,359, dated October 30, 1951, for Button Hole Sewing Machine and fully describing and illustrating but not claiming the subject matter claimed herein.

This invention relates to sewing machines and more particularly in connection with sewing to the formation of slits such as buttonhole slits, pocket slits, belt hole slits and the like in fabric, leather and similar material.

In many applications it is desirable to form slits in material in connection with forming one or more rows of stitches in the material in which the length of the slit has a predetermined relationship to the length of the row of stitches being formed, and in which the ends of the slit may be spaced at predetermined and adjustable distances from the ends of the stitching. It is also desirable in many cases to form slits of lengths which vary according to the length of the row of stitches being formed but whose ends are always at a predetermined spaced distance from the ends of the rows of stitches. In such cases, it may be required that the slit over-extend the stitching or it may be desirable to have the stitching over-extend the slit.

One specific application of these requirements and objects is illustrated in the formation of piped buttonholes as set forth in the application of Bradford, Dunnell and McAvinney, Serial No. 28,464, filed May 21, 1948, now Patent No. 2,529,072, dated November 7, 1950; and in my co-pending application, Serial No. 69,858, filed January 8, 1949, and also in Fig. 3 in the drawings herein showing a bottom plan view of a piped buttonhole being formed in base material A at one stage of its formation in which a buttonhole slit is indicated at C and two over-extending rows of stitches are indicated at D. It will therefore be seen that in such applications the position and length of the slit bears a definite relationship to the position and length of the stitching and usually varies in length in proportion to varying length of the rows of stitches. It is therefore desirable to provide a slit cutter to form the slit progressively with the formation of the stitching and at the same time to vary the position of the cutter relative to the stitching mechanism as the latter feeds relative to the work so that the cutter while operating cooperatively with the stitching mechanism, cuts a slit whose length may be different from the length of the row of stitches.

Accordingly I have provided such a slit cutter for a sewing machine which is conveniently illus-

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trated in its preferred embodiment in a machine for forming piped buttonholes, complete details of which are described in my said co-pending application Serial No. 69,858 of January 8, 1949:

The above and other objects are accomplished by my invention which is more particularly described in the following specification and the accompanying drawings which are intended to be illustrative and not to limit the scope of the invention beyond the requirements of the prior art.

In the drawings:

Fig. 1 is a side view of part of a machine for forming piped buttonholes showing the mechanism of this invention in detail;

Fig. 2 is a general side elevation view partly broken away and in section of a machine for forming piped buttonholes including the mechanism of this invention;

Fig. 3 is a bottom plan view of a piped buttonhole being formed in material at an intermediate stage of the operation;

Fig. 4 is a perspective view partly in section of some of the operative parts of the machine illustrated including the slit cutter of the invention in the process of forming a piped buttonhole;

Fig. 5 is a side elevation view in detail of part of the mechanism of the invention in one operative position, and

Fig. 6 is a view similar to Fig. 5 showing the mechanism in another operative position.

Fig. 7 is a partial front elevation view in detail of the mechanism of the invention.

In the drawings the upper stitching mechanism of a machine for forming piped buttonholes is indicated at 10 and it includes a vertically reciprocating needle bar 12 supported in an upper housing 14, a needle clamp 15 on the lower end of the needle bar, a pair of sewing needles 16 for forming simultaneously two lines of stitches D, Fig. 3, and held in the clamp, both needles being shown in Figs. 4 and 7, needle bar reciprocating linkage including the oscillating and reciprocating members 18 and 20 connecting the needle bar 12 and an eccentric 21 on a drive shaft 22 to actuate the needles for sewing in cooperation with lower stitching mechanism of the usual type indicated at 11 and also driven from the shaft 22.

A slit cutter 25 is pivotally mounted at 28 on the needle clamp, in this case midway between the needles 16, and it is pivotally movable between the limits illustrated in Figs. 5 and 6. It has a cutting point 26 and a cutting edge 27 adapted to cut fabric or other material such, for instance, as base material A and a patch B as

it moves up and down and also feeds relative to the work with the needles 16, Fig. 4. It has an upper arm 30 between which and the needle clamp 15 a spring 31 is positioned to urge the cutter 25 in a clockwise direction to one operative position as shown in Figs. 1 and 6. A pivotally movable cam arm 35 pivotally mounted at 36 under the upper housing 14 has a cam surface 37 abutting the upper arm 30 of the cutter 25. When the cam arm 35 is positioned to the left as shown in Fig. 5, it guides the cutter 25 during descent of the needle bar 12 so that the cutting edge 27 of the cutter 25 is to the right of the needles 16 when these parts descend into the work A. When the cam arm 35 is to the right, as shown in Fig. 6, the cutting edge 27 of the cutter 25 descends into the work A to the left of the needles 16.

In the machine illustrated, the stitching mechanisms 10 and 11 are fixed in a fore and aft direction to the bed plate 2 of the machine, and the work comprising base material A and a piping patch B to be simultaneously fastened together by two rows of stitches D is held in a work clamp 7 and a pair of patch folders 9 which, in turn, are fed intermittently during sewing relative to the stitching mechanisms 10 and 11 for forming the two rows of stitches D simultaneously. For this purpose the work clamp 7 and the patch folders 9 are supported on a structure 40 which is slidable in a fore and aft direction relative to the bed plate 2 as described in detail in my said copending application. To understand this invention it is only necessary to know that the work A and B, the work clamp 7 and the structure 40 are fed intermittently to the left relative to and in time with the operation of the stitching mechanisms 10 and 11 while the needles 16 reciprocate up and down in the work to form the rows of stitches D. While the stitching is being formed, the cutter 25 also progressively forms the slit C through the work A and B.

Referring to Figs. 3, 5 and 6, the needles commence forming the stitches D at points W and when the work has moved to the left until the needles 16 reach points X, the rows of stitching of desired length have been formed. Fig. 5 illustrates the relative position of the needles 16 and the cutter 25 when they first descend into the work A, the needles entering at point W. The cutter 25 being to the right of the needles 16, enters the work and starts the slit C at point Y. As seen in Fig. 6, when the needles 16 reach points X at the end of stitching, the cutter 25 has been pivotally moved to the left side of the needles and it has finished the slit C at point Z. While the needles 16 were sewing the stitches D between points W and points X, the cutter 25 was cutting the slit C progressively between the points Y and Z, and its operative position as it descended into the work was determined by the progressively changing position of the cam arm 35. During sewing, the cam arm 35 moved from its position to the left, Fig. 5, to its position to the right, Fig. 6.

To accomplish the movement of the cam arm 35, it has a crank arm 42 operatively connected at 43 to a lever arm 44 pivotally mounted at 45 to the underside of the housing 14, and having a cam follower roll 50 on its right hand end which rests on a sloping cam 55 which moves with the work A and B to the left during sewing and for this purpose is mounted on the slidable structure 40.

At the beginning of sewing the work A and B and the cam 55 are in their extreme right hand

position and the cam roll 50 is at the high point of the cam 55, moving the crank arm 42 down and the cam arm 35 to the left as shown in Figs. 1 and 5. When the needles 16 and cutter 25 are in their uppermost and inoperative position, as shown in Fig. 1, the cutter 25 is positioned to the left of the needles 16. However, as the needles 16 and cutter descend toward the work and before they enter it, the upper arm 30 of the cutter is moved to the left or in counter-clockwise direction positioning the cutter to the right of the needles 16. As the needles take their first stitch at the point W, the cutter 25 starts the slit C at point Y. As sewing progresses, the work A and B and cam 55 moves intermittently to the left. The cam roll 50 rolls down the surface of the cam 55, and the cam arm 35 gradually moves to the right until at the end of stitching and when the needles 16 have reached the points X the cutter 25, no longer in contact with the cam arm 35, stops cutting the slit C at point Z.

It will be apparent that once the point 26 of the cutter 25 has pierced the work at point Y, the cutting of the slit C is a progressive cutting operation effected by the cutting edge 27 which is cooperative with and associated with the action of the needle bar 12. The spacing between the ends W and X of the rows of stitching and the ends Y and Z of the slit or the amount which one over-extends the other may be variably predetermined. The machine is adjustable to sew rows of stitches D of various predetermined lengths with automatically constant spacing between the ends W and X of the rows of stitches and the ends Y and Z of the slit C for such various lengths if desired.

I have thus provided a slit cutter which operates progressively with the operation of the stitching mechanism and whose position relative to the stitching mechanism is adjustable and also variable during its operation in a predetermined manner for various requirements with the result that the machine can cut a slit of a predetermined length which may be different from the length of the row of stitches being formed and whose position or spacing relative to the stitching may be predetermined.

I claim:

1. In a sewing machine comprising stitching mechanism and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter, actuating means for the slit cutter moving said cutter to cut the slit as the stitching progresses and means actuated in predetermined relation to the change in position of the needle and the work clamp changing the position of the cutter with respect to the needle progressively during the sewing of the stitches and thereby to cut a slit which may be different in length from the length of the row of stitching put in the work by the stitching mechanism.

2. In a sewing machine comprising stitching mechanism including a needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter mounted on and reciprocating with said needle bar to cut the slit as the stitching progresses and means actuated in predetermined relation to the change in position of the needle and the work clamp changing the position of the cutter with respect to the needle and thereby to cut a slit which may be different in length from the length of the row of stitching put in the work by the stitching mechanism.

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3. In a sewing machine comprising stitching mechanism including a reciprocating needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter pivoted on said needle bar and adapted to cut a slit in said material progressively with the action of the stitching mechanism, and means moving the cutter pivotally as the stitching progresses and thereby predetermining the length of the slit with respect to the row of stitching put in the work by the stitching mechanism.

4. In a sewing machine comprising stitching mechanism including a reciprocating needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter associated with said needle bar and adapted to cut a slit in said material and positioning means actuated by the relative movement between the work clamp and the stitching mechanism progressively to vary the position of the cutter relative to the needle bar as it enters the material whereby it cuts a slit whose longitudinal position is predetermined relative to the row of stitches.

5. In a sewing machine comprising stitching mechanism including a reciprocating needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter mounted on said needle bar and adapted to cut a slit in said material progressively with the action of the stitching mechanism and positioning mechanism controlling the cutter to cause it to cut the material a different length than the length of the stitching.

6. In a sewing machine comprising stitching mechanism including a reciprocating needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter pivoted on said needle bar and adapted to cut a slit in said material progressively with the action of the stitching mechanism, cam means moving in accordance with the relative movement of the stitching mechanism and the work clamp, said cam means changing the pivotal operative position of the

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slit cutter as the stitching progresses and thereby predetermining the length of the slit with respect to the length of the row of stitches put in the work by the stitching mechanism.

7. In a sewing machine comprising stitching mechanism including a reciprocating needle bar and a work clamp movable relatively to each other to sew a row of stitches in material in said work clamp, a slit cutter pivoted on said needle bar and adapted to cut a slit in said material progressively with the action of the stitching mechanism, cam means moving in accordance with the relative progressive position of the stitching mechanism and the work clamp and cam follower means operated by said cam means and operatively engaged to said slit cutter and changing the pivotal operative position of the slit cutter as the stitching progresses and thereby predetermining the length of the slit with respect to the length of the row of stitches put in the work by the stitching mechanism.

8. A sewing machine comprising stitching mechanism and a work clamp movable relatively to each other, said stitching mechanism including a reciprocating needle bar, a pair of needles on said needle bar for simultaneously sewing two rows of stitches in material in said work clamp, a slit cutter pivotally mounted on said needle bar and adapted to cut a slit in said material between said rows of stitches progressively with the action of the stitching mechanism and means pivotally moving the cutter as the stitching progresses and thereby predetermining the length of the slit with respect to the rows of stitching put in the work by the stitching mechanism.

MARION C. RICH.

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The following references are of record in the file of this patent:

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