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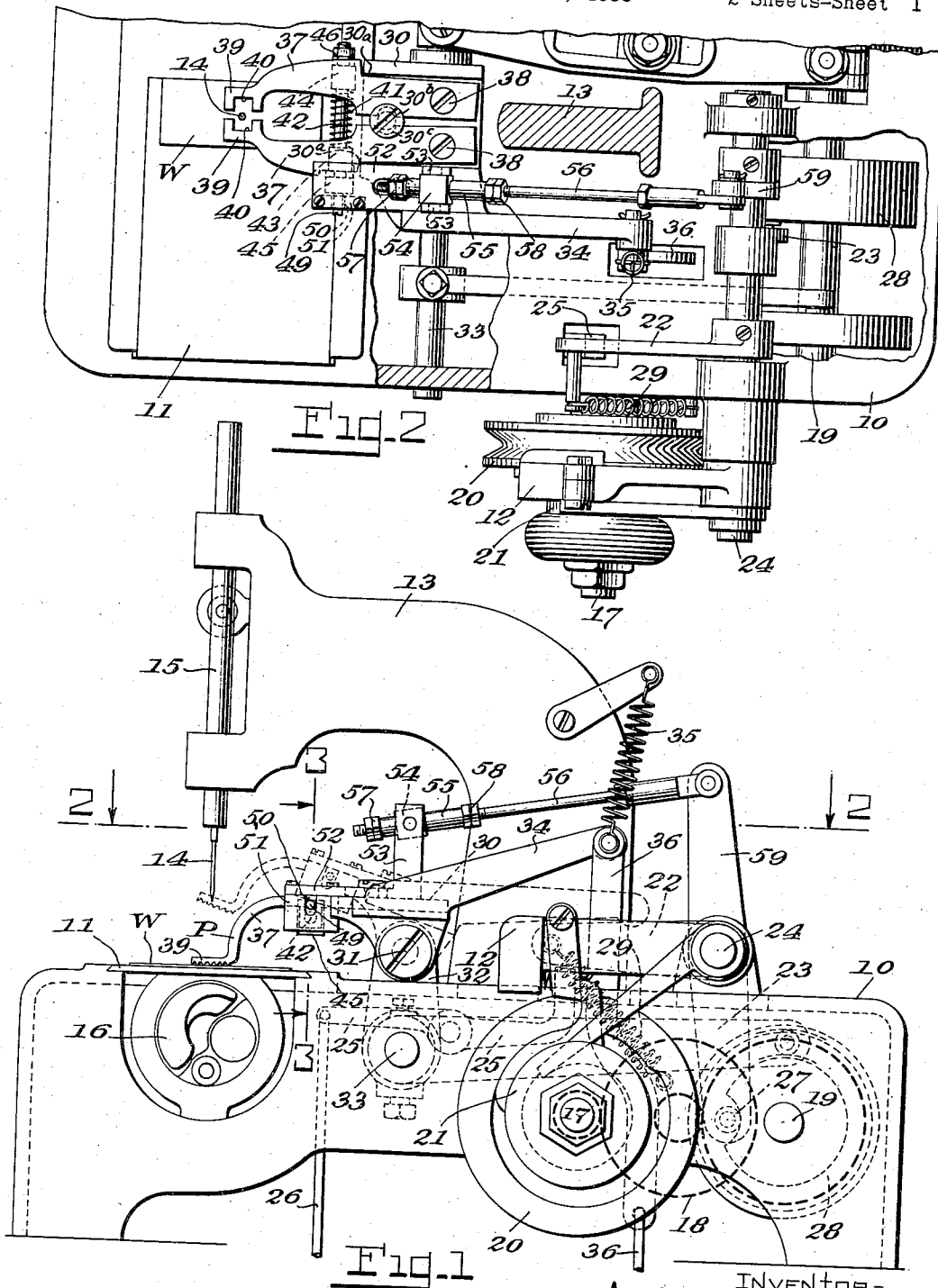
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2,144,763

WORK CLAMPING MECHANISM FOR SEWING MACHINES

Filed Dec. 28, 1936

2 Sheets-Sheet 1



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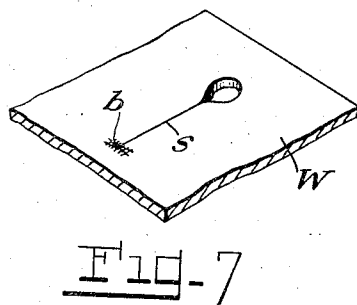
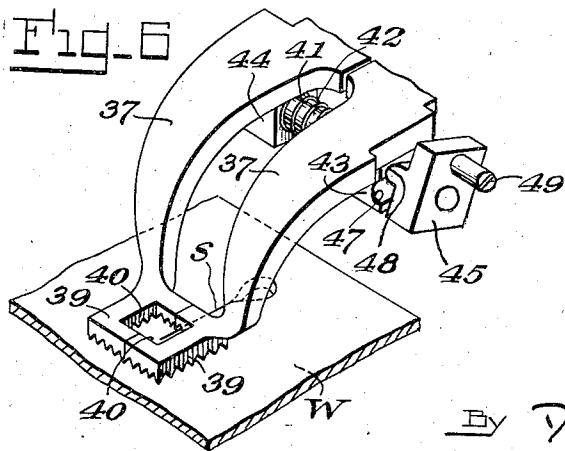
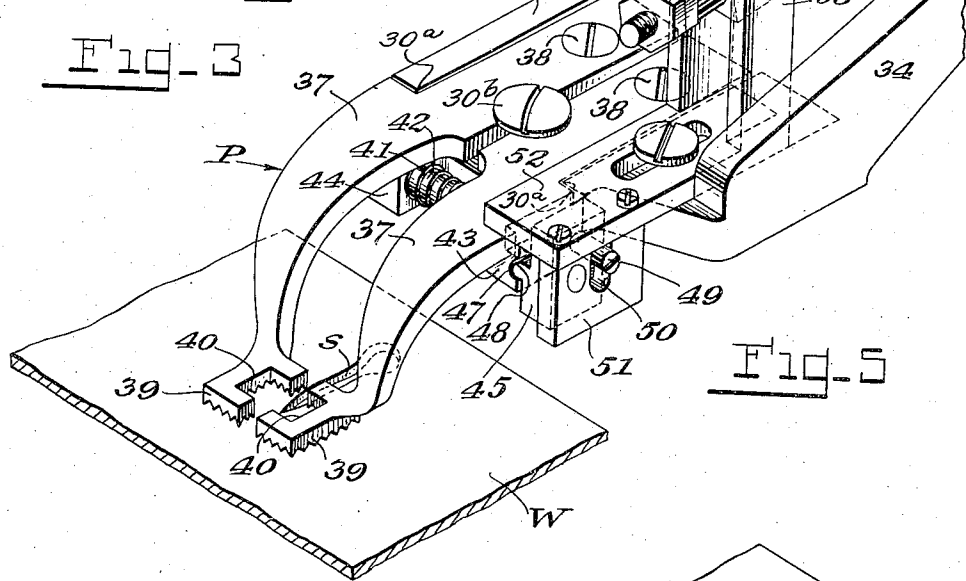
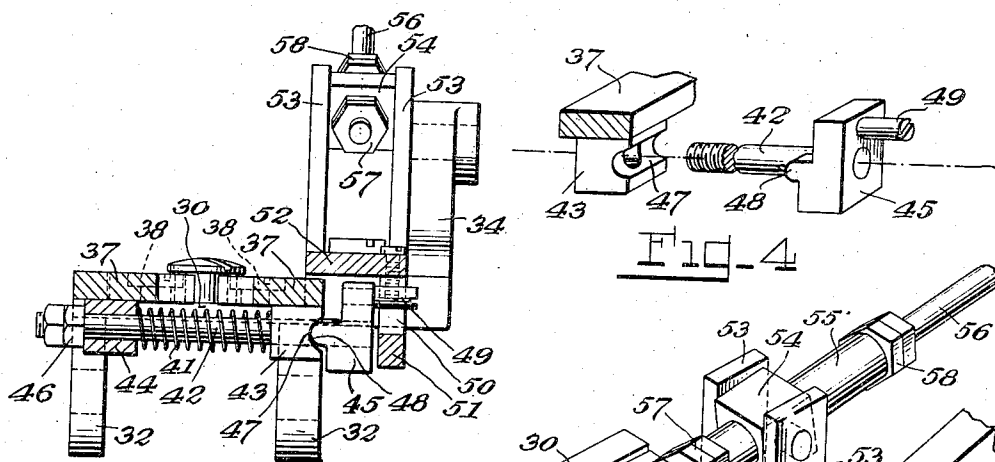
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WORK CLAMPING MECHANISM FOR SEWING MACHINES

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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WORK CLAMPING MECHANISM FOR SEWING MACHINES

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Reece Button Hole Machine Company, Boston,
Mass., a corporation of Maine

Application December 28, 1936, Serial No. 117,741

8 Claims. (Cl. 112—74)

This invention relates to machines for staying or tacking the end of an opening, such as a buttonhole slit or the like, in cloth, leather, or other material by forming a reenforcing bar of stitches across the end of the opening or slit.

It has for an object to provide means for closing the slit or other opening by pressing together the edges thereof adjacent the stitching point during the formation of the tacking stitches in order to insure the accurate positioning of the latter. More particularly it has for its object the provision of work clamping means, for holding the work and positioning the same to receive the tacking stitches, of such a character that when the work is clamped the opening therein will be closed, as above described, and held closed throughout the tacking operation.

The invention will best be understood from the following description of an illustrative embodiment thereof shown in the accompanying drawings, this, however, having been chosen for purposes of exemplification merely, it being obvious that said invention, as defined by the claims hereunto appended, may be otherwise embodied without departure from its spirit and scope.

In said drawings:

Fig. 1 is a side elevation, partly broken away, of a machine embodying the invention.

Fig. 2 is a horizontal section taken substantially on the line 2—2, Fig. 1.

Fig. 3 is an enlarged transverse section of the combined work clamp and slit closer.

Fig. 4 is a fragmentary perspective view of certain disassembled parts of the slit closing mechanism.

Fig. 5 is a perspective view of the work clamping and slit closing devices and associated parts, showing said devices in their initial work engaging position.

Fig. 6 is a similar view of said devices showing the same in slit closing position.

Fig. 7 is a fragmentary perspective view of the completed work.

For convenience the invention is herein shown as applied to, or embodied in, a tacking machine of the type shown and described in the patent to Reece, No. 520,657, May 29, 1894. The frame of the machine comprises a base 10 carrying a work supporting bed plate 11 having a needle opening, and an overhanging arm 13 rising from and supported by the base. The stitch-forming instrumentalities comprise an eye-pointed needle 14 carried by a needle bar 15 guided for vertical movement in the arm 13, and a shuttle

or equivalent under-thread-handling element 16 in the base 10 beneath the bed plate 11, said stitch-forming instrumentalities being operated, through connections not shown, from a main power shaft 17 journaled in bearings in the base. Driven from the shaft 17 through reduction gearing 18 is a cam shaft 19 likewise journaled in bearings in the base. The shaft 17 receives power through a belt pulley 20 under the control of clutch and stop mechanism 21 controlled by an arm 12 fast on a rock shaft 24 journaled in bearings on top of the base 10. Also fast on the rock shaft 24 are arms 22 and 23, the former of which cooperates with a lever 25 pivoted in the base and connected by a link 26 with a starting treadle, not shown, and the latter of which carries a cam follower 27 cooperating with a cam 28 on the cam shaft 19. The arm 22 is connected with the frame by a spring 29 tending normally to hold the parts in the position shown in Fig. 1. The arrangement is such that when the lever 25 is operated to lift the arm 22 against the tension of the spring 29, the stop mechanism is released by the arm 12 to engage the clutch and start the machine and is thereafter held released by the cam 28 until the completion of one rotation of the shaft 19, during which the machine performs its intended cycle of operations, whereupon the arm 12 is restored to its original position by the spring 29, acting through the arm 22, to cause the stop mechanism to disengage the clutch and stop the machine.

The work W is clamped to the bed plate 11 and moved thereover to position the stitches, as in the formation of a bar or stay b (Fig. 7) by a clamp or presser foot P (Fig. 1) on a carrier 30 pivoted at 31 in a yoke 32 secured to a rock shaft 33. Said rock shaft is mounted for both angular and axial movements in bearings in the base 10, and is given such movements, for the purpose of moving the presser foot P in a horizontal plane both laterally and longitudinally of the machine, by connections not shown in detail with suitable cams on the cam shaft 19. The carrier 30 is provided, at the opposite side of the pivot 31 from the presser foot P, with an arm 34 normally held in the position shown in full lines in Fig. 1, to depress the presser foot, by a spring 35, but which can be moved into the position shown in broken lines in said figure, to raise the presser foot, by connections 36 with a clamp releasing treadle, not shown.

Except as hereinafter pointed out, or as they

enter into combination with parts hereinafter described, the parts above referred to constitute no portion of the present invention and, being fully described in the Reece patent above mentioned, require no further description herein.

In accordance with the present invention, the presser foot P comprises a pair of arms 37 (Figs. 2 and 5) pivoted at 38 to the carrier 30 and having depending ends formed with work engaging members 39 having complementary recesses 40 which collectively, when the arms are in the position shown in Fig. 6, form an opening of sufficient size to permit the needle 14 to pass therethrough in all horizontal positions of the clamp. The members 39 are normally held apart, as shown in Figs. 2 and 5, by a spring 41 (see also Figs. 3 and 4) surrounding a bolt 42 and interposed between blocks 43 and 44 secured to the arms 37 and in which said bolt is slidably supported. The bolt 42 is provided at one end with a head 45 engaging the block 43 and at the opposite end with a nut 46 engaging the block 44, whereby the movement of the arms 37 away from one another under the influence of the spring 41 is limited. The block 43 and head 45 are formed with cooperating cam surfaces 47 and 48 (see particularly Fig. 4) whereby, when the head 45 is turned from the position shown in Figs. 3 and 5 into the position shown in Fig. 6, the arms 37 will be drawn toward one another against the tension of the spring 41. The work-engaging members 39 of the arms 37 assume always the same open or closed positions relative to the work-supporting bed plate 11. As shown in Figs. 2 and 5, the arms 37 engage corners 30a of the carrier 30 when the members 39 are in the open position. Conversely, semi-circular notches 30c in the arms 37 (Fig. 2) engage the stem of a screw 30b in the carrier 30 when the members 39 assume the closed position shown in Fig. 6. Inasmuch as the screw 30b is located centrally between the corners 30a, it follows that the movements of the arms 37 are always of equal amplitude. Hence if the buttonhole slit s in the material W is located so that its longitudinal axis extends centrally between the open members 39 as shown in Fig. 5, assurance is given that the longitudinal axis of said slit does not shift laterally when these members close (Fig. 6). The head 45 is provided with an eccentric stud 49 received in a slot 50 in a lug 51 depending from a controlling member in the form of a slide 52 guided for longitudinal movement on the carrier 30, whereby, when the slide 52 is moved toward the right from the position shown in Figs. 1, 2 and 5, the head 45 will be turned from the position shown in Figs. 3 and 5 into the position shown in Fig. 6. The slide 52 is retained in either position into which it is moved by the friction of the parts and particularly by the resistance of the block 43 and head 45 to relative turning movement under the pressure of the spring 41. Thus, in the position of the head 45 as shown in Fig. 6, the cam surface 48 thereof is held completely out of engagement with the cam surface 47 of block 43, i. e., bridges the recess which constitutes said cam surface 47, due to the friction of the parts as caused by the compression spring 41. In the position of the head 45 as shown in Fig. 5, the cam surface 48 is held in registry with the cam surface 47 by the compression spring 41, as can be readily understood. Rising from the slide 52 are two uprights 53 between which is swivelled a block 54 having an opening to receive a spacing sleeve 55 adjustably fixed on a link 56 by nuts 57 and 58 threaded on

the latter and constituting stops for operating the controlling member or slide 52 as hereinafter described. At its rear end the link 56 is connected with an arm 59 secured to the rock shaft 24.

In operation, the machine being at rest, the clamp releasing treadle is depressed, raising the clamp or presser foot from the position shown in full lines in Fig. 1 into the position shown in broken lines therein and permitting the proper location of the work W on the bed plate 11, the clamp arms 37 and clamp members 39 being at the same time separated, as hereinafter explained. The treadle is then released, permitting the clamp members, under the influence of the spring 35, to engage the work at opposite sides of a buttonhole slit s or other opening therein, as shown in Fig. 5. The starting treadle is then depressed, rocking the shaft 24 in a clockwise direction which first releases the stop mechanism to engage the clutch and start the machine, after which the nut 57 engages the block 54 and moves the slide 52 rearwardly or toward the right in Fig. 1, turning the head 45 into the position shown in Fig. 6 and drawing the clamp members 39 toward one another. The slit s is thereby tightly closed and held closed during the ensuing tacking operation, after which the cam 28 permits the stop mechanism to act, under the influence of the spring 29, to stop the machine and restore the rock shaft 24 and parts carried thereby to the position shown in Fig. 1. The clamp treadle is then again depressed to lift the clamp into the position shown in broken lines in Fig. 1, thereby releasing the work. This causes the block 54 to engage the nut 58, moving the slide 52 to the left, and restoring the head 45 to the position shown in Figs. 3 and 5 to permit the spring 41 to separate the clamp members 39.

It will be observed that in the operation of the mechanism above described the clamp members are not drawn toward one another to close the slit until they have been brought into full engagement with the work and exert their maximum pressure thereon. This avoids scuffing of the upper surface of the work, as would occur were the clamp members drawn toward one another concurrently with their closing movement. Also the effect of the closing of the clamps is obtained irrespective of the thickness of the work.

I claim:

1. A tacking machine having sewing mechanism, stop mechanism therefor, a controller for said stop mechanism movable into starting and stopping positions, a work clamp comprising a pair of work engaging members, opening and closing means for moving said members away from and toward one another, a controlling member for said opening and closing means, means for moving said work engaging members into and out of engagement with the work, and a pair of stops connected with said stop mechanism controller, one of said stops, when said controller is in stopping position, being in a position to be engaged by said controlling member when said work engaging members are moved out of engagement with the work to cause said opening and closing means to move said members away from one another, and the other of said stops, when said members are in engagement with the work, engaging and operating said controlling member to cause said opening and closing means to move said members toward one another when said stop mechanism controller is moved into starting position.

2. A tacking machine having sewing mecha-

nism, stop mechanism therefor, a rock shaft having means for controlling said stop mechanism, a work clamp comprising a carrier, a pair of work engaging members mounted thereon for relative movement, opening and closing means for moving said members away from and toward one another, a slide on said carrier for controlling said opening and closing means, means for operating said carrier to move said work engaging members into and out of engagement with the work, a link having a pair of spaced stops adapted to engage and move said slide in opposite directions, and an arm on said rock shaft to which said link is connected.

3. In a machine for staying or tacking the end of an opening in material, the combination of two pivotally mounted work-engaging members having depending lugs, one of said lugs providing a cam surface; a rod rotatable and longitudinally slidable in said lugs and extending transversely to said pivot axes, said rod having a shoulder at each end and one of said shoulders providing a cam surface cooperating with that of said one lug, one of said cam surfaces being a groove of concave cross section and the other cam surface being a rib registerable with said groove; and yielding means urging said members apart so that their lugs are in engagement with said shoulders.

4. In a machine for staying or tacking the end of an opening in material, the combination of a carrier; two work-engaging members pivoted on said carrier and having depending lugs, one of said lugs providing a cam surface; a rod rotatable and longitudinally slidable in said lugs and extending transversely to said pivot axes, said rod having a shoulder at each end and one of said shoulders providing a cam surface cooperating with that of said one lug and having a projecting pin eccentrically to the axis of said rod; yielding means urging said members apart so that their lugs are in engagement with said shoulders; and a slide on said carrier, said slide having a slot receiving said pin.

5. In a tacking machine, the combination of a pivotally mounted carrier; a pair of work-engaging members pivoted on said carrier for rotation about axes transverse to the pivot axis of the latter; means including a slide on said carrier for rocking said members; a swivel block carried by said slide; and a rod pivotally mounted

at one end and extending in a plane parallel to the direction of movement of said slide, said rod being relatively axially slidable in said swivel block and having shoulders on opposite sides thereof.

6. In a tacking machine, the combination of a sewing mechanism; stop mechanism therefor; a pivotally mounted carrier; a pair of work-engaging members pivoted on said carrier for rotation about axes transverse to the pivot axis of the latter; means including a slide on said carrier for rocking said members; a swivel block carried by said slide; a rock shaft having an arm and means for controlling said stop mechanism; a rod pivotally connected at one end with said arm and extending in a plane parallel to the direction of movement of said slide, said rod being axially slidable in said swivel block and having adjustable stops on opposite sides thereof.

7. In a machine for staying or tacking the end of an opening in material, the combination of two pivotally mounted work-engaging members having depending lugs, one of said lugs being provided with a cam surface; a rod rotatable and longitudinally slidable in said lugs and extending transversely to said pivot axes, said rod having a shoulder at each end and one of said shoulders providing a cam surface cooperating with that of said one lug; and yielding means urging said members apart so that their lugs are in engagement with said shoulders.

8. In a machine for staying or tacking the end of an opening in material, the combination of two pivotally mounted work-engaging members having depending lugs, one of said lugs being provided with a cam surface; a rod rotatable and longitudinally slidable in said lugs and extending transversely to said pivot axes, said rod having a shoulder at each end and one of said shoulders providing a cam surface cooperating with that of said one lug; yielding means urging said members apart so that their lugs are in engagement with said shoulders; relatively stationary positioning means engaged by said members when they are apart; and a relatively stationary centering post between said members and engaged thereby when said members are in a predetermined position close to each other.

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