

April 7, 1925.

1,532,301

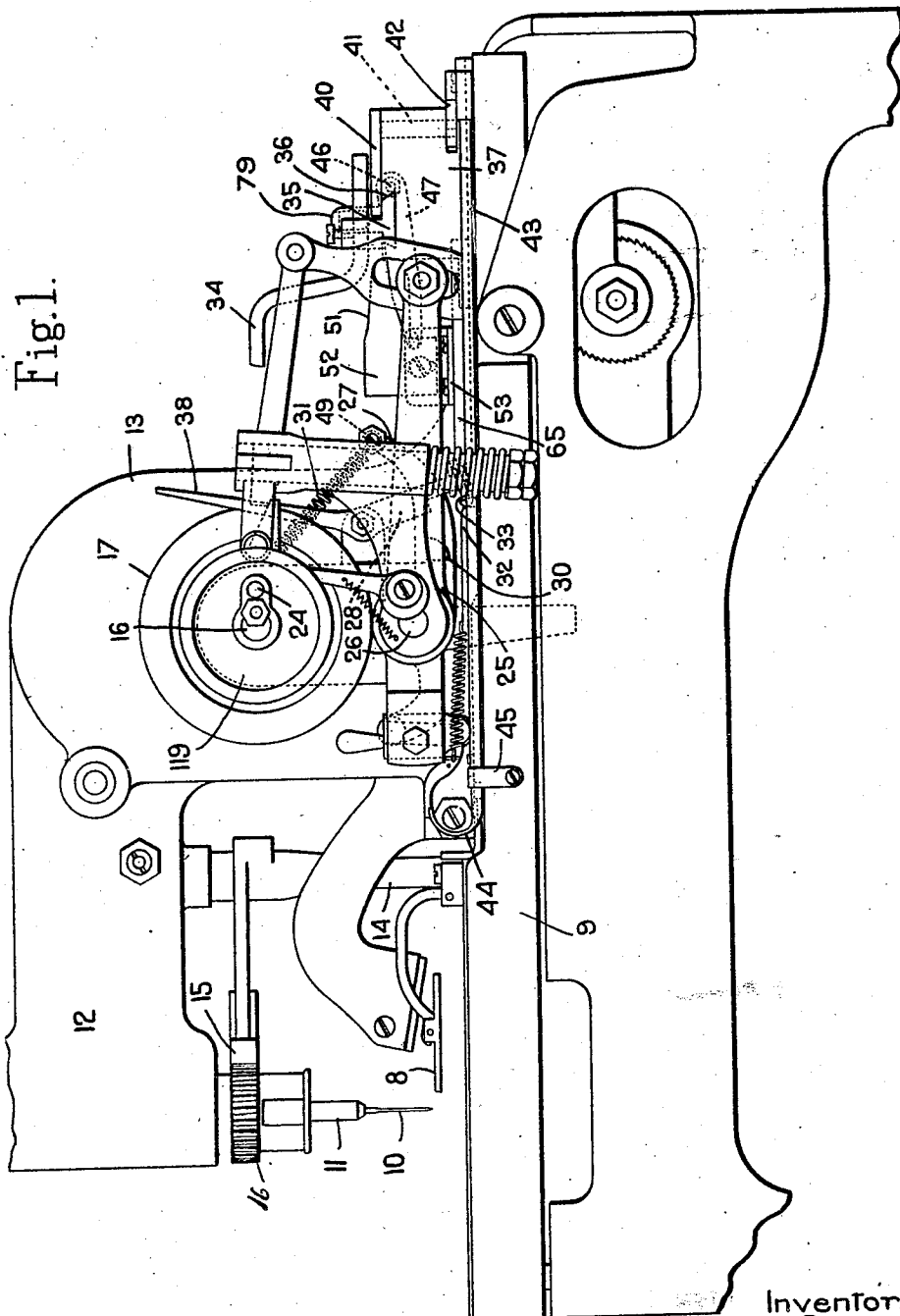
J. W. CONNORS

BUTTONHOLE SEWING MACHINE

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4 Sheets-Sheet 1

Fig. 1.



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4 Sheets-Sheet 2

Fig.2.

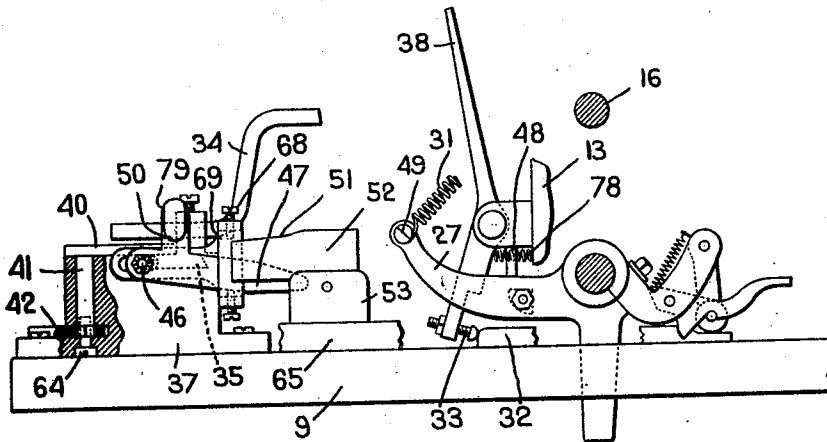


Fig.3.

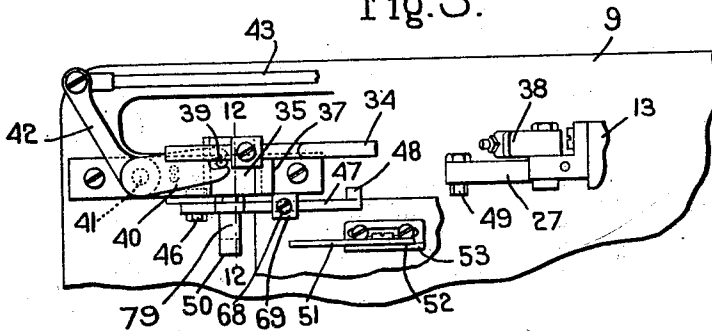
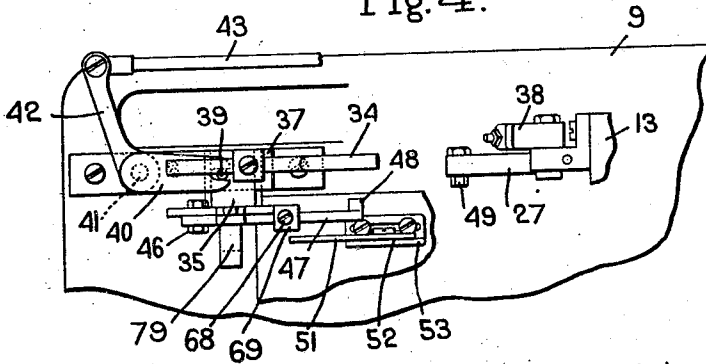


Fig.4.



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4 Sheets-Sheet 3

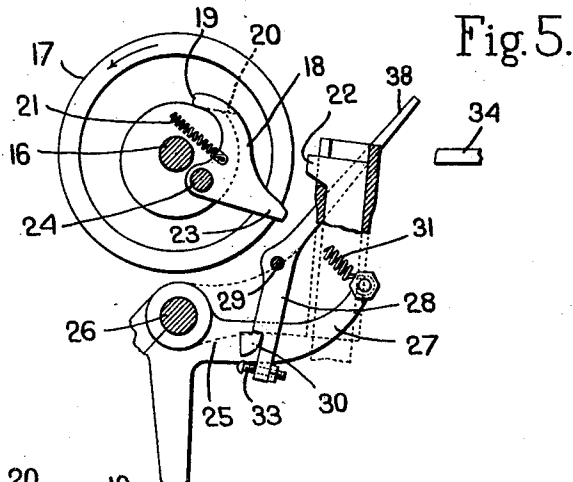


Fig. 5.

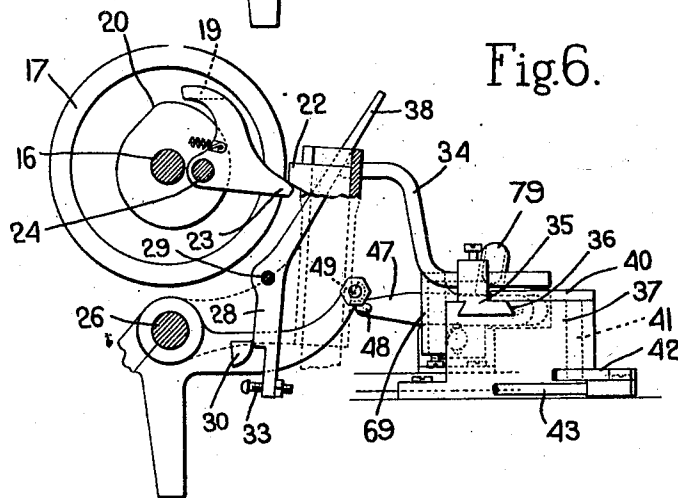


Fig. 6.

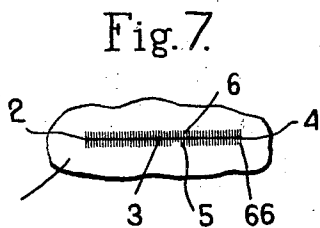


Fig. 7.

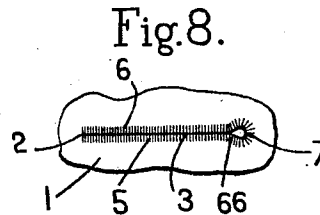


Fig. 8.

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4 Sheets-Sheet 4

Fig. 9.

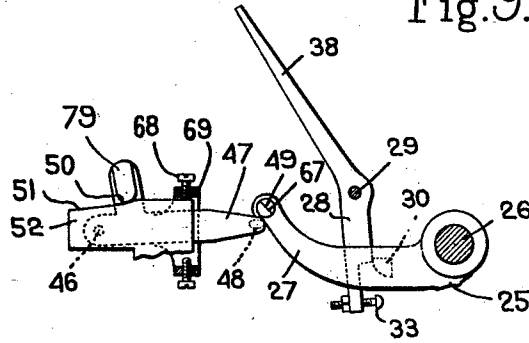


Fig. 10.

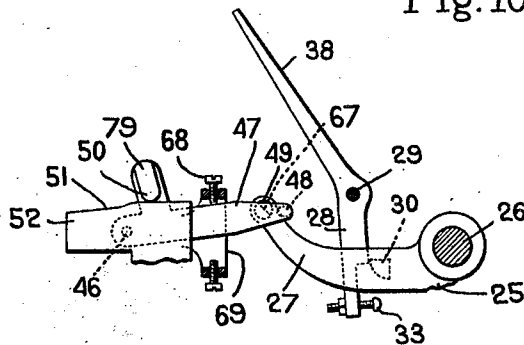


Fig. 11.

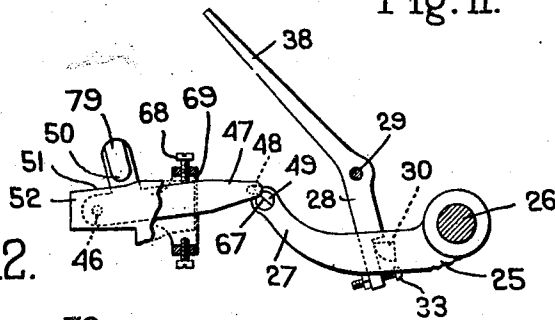
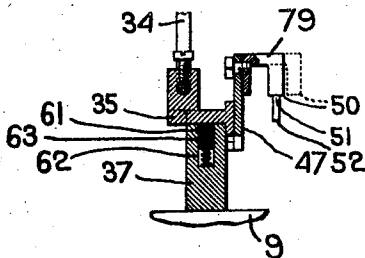


Fig. 12.



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Patented Apr. 7, 1925.

1,532,301

UNITED STATES PATENT OFFICE.

JOHN W. CONNORS, OF DEDHAM, MASSACHUSETTS, ASSIGNOR TO THE REECE BUTTON HOLE MACHINE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MAINE.

BUTTONHOLE-SEWING MACHINE.

Application filed February 23, 1924. Serial No. 694,559.

To all whom it may concern:

Be it known that I, JOHN W. CONNORS, a citizen of the United States, and resident of Dedham, county of Norfolk, State of Massachusetts, have invented an Improvement in Buttonhole-Sewing Machines, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to buttonhole sewing machines of that type in which the stitch-forming mechanism is arranged to turn bodily about a vertical axis at one end of the buttonhole while said mechanism is operating thereby to form a buttonhole with an eye at said end, and particularly to buttonhole sewing machines of this class which are so constructed that the stitch-forming mechanism may be operated or may be rendered inoperative at the will of the operator when said stitch-forming mechanism is having its bodily movement at the end of the buttonhole whereby a buttonhole with or without an eye can be formed, the buttonhole without the eye being commonly referred to as a "straight" buttonhole.

The object of my invention is to provide an improved means for automatically rendering the stitch-forming mechanism inoperative after the stitching has been performed on one side of the buttonhole and while the stitch-forming mechanism is turning around the end of the buttonhole and then to render said stitch-forming mechanism operative again thereby to complete the stitching on the other side of the buttonhole.

In the present invention this means for rendering the stitch-forming mechanism inoperative at the end of the buttonhole may be thrown into or out of operation at the will of the operator thus making it possible for the operator to sew a buttonhole of either type.

In order to give an understanding of the invention I have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a side view of a sewing machine embodying my invention;

Fig. 2 is a fragmentary view of the mechanism for stopping the operation of the

stitch-forming mechanism after the stitching is completed on one side of the buttonhole and for starting the stitch-forming mechanism again after it has turned around the end of the buttonhole;

Figs. 3 and 4 are plan views of the device shown in Fig. 2, Fig. 3 showing the parts set for making a so-called "straight" buttonhole, and Fig. 4 showing the parts set for forming the buttonhole with the eye;

Fig. 5 is a fragmentary view showing the clutch for operating the stitch-forming mechanism and the means for disengaging the clutch;

Fig. 6 is a similar view showing the clutch disengaged;

Fig. 7 illustrates a so-called "straight" buttonhole;

Fig. 8 illustrates a buttonhole with the eye in the end;

Figs. 9, 10 and 11 are fragmentary views showing the operation of resetting the latch 28;

Fig. 12 is a section on the line 12-12, Fig. 3.

As stated above my present invention comprises an improved buttonhole sewing machine which is constructed to sew either the straight buttonhole illustrated in Fig. 7 or the buttonhole with an eye, such as shown in Fig. 8.

Buttonhole sewing machines are usually constructed so that in sewing a buttonhole in material 1 the sewing will start at one end 2 of the buttonhole slit 3 and will proceed along one side of the buttonhole to the end 4 thereof thereby forming the stitches 5 and will then proceed along the other side of the buttonhole back to the starting point again thereby forming the stitches 6. If the buttonhole is to have an eye at the end 4, as shown in Fig. 8 then the stitch-forming mechanism is operated while it is turning about a vertical axis to carry it from one side to the other of the buttonhole slit thereby to form the eye 7.

In case the buttonhole is not to have an eye or is to be a "straight" buttonhole as shown in Fig. 7 then the stitch-forming mechanism is rendered inoperative while turning around the end 4.

The sewing machine herein illustrated is of the type shown in United States Patents No. 655,637, dated August 7th, 1900 and No. 713,764, dated November 18th, 1902. This

sewing machine comprises the usual work-holding means by which the work is held during the stitching of the buttonhole and stitch-forming mechanism arranged to form the stitches along the sides of the buttonhole. The work-holding means comprises the clamp plates 8 which are pivotally mounted on the bed plate 9 and which operate to clamp the work against the bed plate. The stitch-forming mechanism is of the usual type comprising upper and lower thread-handling mechanism. The upper thread-handling mechanism is in the form of a vertically-reciprocating needle 10 carried by a needle bar 11 which reciprocates in the overhanging arm 12 of a head or frame 13 that is mounted on the bed plate 9. The under-thread-handling mechanism (not shown) is carried on a turret situated beneath the bed plate 9 all as illustrated in said patents.

The stitch-forming mechanism comprising the upper and under thread-handling mechanism is arranged to be turned bodily about a vertical axis at each end of the buttonhole as usual in sewing machines of this type and as shown in the above-mentioned patents. This turning movement is secured through a vertical rock shaft 14 which carries at its upper end a segmental gear 15 meshing with a gear 16 associated with the upper thread-handling mechanism, said rock shaft having a similar segmental gear (not shown) meshing with a gear on the turret which supports the under thread-handling mechanism, all as shown in said Patent No. 655,637. This rock shaft 14 is turned at each end of the buttonhole thereby to give a bodily turning movement to the stitch-forming mechanism.

The stitch-forming mechanism and work-holding means have a relative movement during the stitching along the sides of the buttonhole and in the machine herein shown this relative movement is provided for by moving the head 13 carrying the stitch-forming mechanism back and forth on the bed plate 9, such movement being derived from a suitable main cam (not shown) situated beneath the bed plate, all as shown in the above-mentioned patents.

The stitch-forming mechanism is driven from a shaft 16 by means of a pulley 17 which is loose thereon and which is clutched thereto by a clutch of the type illustrated in said Patent No. 713,674 and which comprises a clutch dog 18 (see Figs. 5 and 6), which is pivoted at 24 on a hub 119 which is fast to the shaft 16. The clutch dog 18 has a projection 19 formed thereon which is adapted to engage a suitable shoulder 20 formed on the pulley 17. This clutch dog is acted on by a spring 21 which normally holds it in operative position with the projection 19 in the path of the shoulder 20. So long as said projection engages the shoulder

the shaft 16 will be coupled to the pulley 17 and will be rotated thereby.

The clutch is disengaged by releasing the projection 19 from the shoulder 20 and this is accomplished by bringing a clutch-disengaging member 22 into the path of movement of the tail 23 of the clutch dog so that as said tail engages the member 22 it will be turned about its pivot 24 as shown in Fig. 6 thereby withdrawing the projection 19 from the shoulder 20.

The member 22 is yieldingly supported on a rocking member 25 which is mounted on a rock shaft 26 supported on the head 13, said member having rigid therewith a rearwardly-extending arm 27. During the operation of the stitch-forming mechanism this rocking member 25 is held in its inoperative position shown in Fig. 5 by means of a latch 28 which is pivotally mounted at 29 on the head 13 and is adapted to engage a lug 30 carried by the arm 27. When the member 25 is thus engaged by the latch the disengaging member 22 will be held out of the path of movement of the tail 23 of the clutch dog.

The arm 27 is acted upon by a suitable spring 31 which tends to swing said arm upwardly thereby carrying the member 22 into the path of movement of the tail 23 of the clutch dog 18. When, therefore, the latch is released from the lug 30, as shown in Fig. 6, then the member 22 will be automatically thrown into the path of movement of the tail 23 of the clutch dog thereby disengaging the latter and bringing the stitch-forming mechanism to rest.

Fig. 5, therefore, illustrates the position of the parts when the stitch-forming mechanism is operating and Fig. 6 illustrates the position of the parts when the stitch-forming mechanism has been brought to rest.

Sewing machines of this type are usually provided with means for releasing the latch 28 from the lug 30 at the completion of the buttonhole and in the construction herein shown this is accomplished by a projection or shoulder 32 formed on the bed plate 9 and situated to be engaged by a screw 33 carried in the lower end of the latch 28 when the stitching on the buttonhole has been completed, said screw being brought into engagement with the projection by the movement of the head or frame 13 as the stitching 6 is being completed.

The parts thus far described are or may be all as shown in the above-mentioned Patent No. 713,764 and form no part of the present invention, which relates to an improved means by which the latch 28 may be released or not, this rendering the stitch-forming mechanism inoperative or allowing it to continue in operation at the will of the operator, when the stitching 5 on one side of the buttonhole has been completed and

by which the clutch dog 18 may be rendered operative again to actuate the stitch-forming mechanism after the latter has made its bodily turning movement around the end 4 of the buttonhole.

The means herein shown for releasing the latch comprises a latch-releasing member 34 which is shown as carried by a slide 35 that is slidable transversely in ways 36 formed in a supporting block 37 carried by the bed plate 9. By reason of the movement of this slide 35 the latch-disengaging member 34 may be placed in line with the upper portion 38 of the latch 28 as shown in Fig. 3 or out of line therewith as shown in Fig. 4. When the slide 35 is positioned to place the latch-disengaging member 34 in line with the latch as shown in Fig. 3 then when the head or frame 13 has been brought to the end of its movement in one direction by which the stitching 3 is carried to the point 4 the member 34 will engage the latch and disengage it from the lug 30 as shown in Fig. 6, thereby stopping the stitch-forming mechanism.

On the other hand, if the slide 35 has been shifted to carry the member 34 out of line with the latch 28 then said latch will be unaffected by the member 34 and the stitch-forming mechanism will continue in operation while it is turning around the end 4 of the buttonhole.

The slide 35 is manually controlled and may be shifted at the will of the operator from the position shown in Fig. 3 to that shown in Fig. 4. For this purpose I have shown said slide as having a pin 39 operating in a slot in an arm 40 which is rigid with a vertical rock shaft 41 that is journaled in the block or support 37. The lower end of this rock shaft 41 has rigid therewith an arm 42 to which is connected a link 43 that extends forwardly along the bed frame 9 and terminates in a finger piece or hook 44 which may be grasped by the operator. This link is guided in its movement by a suitable guide 45. By means of this finger piece 44 the operator may turn the rock shaft 41 and through the arm 40 shift the slide 35 laterally in its ways 36.

61 indicates a friction member which is carried in the support 37 and which frictionally engages the under side of the slide 35. The purpose of this friction member is to frictionally hold the slide in any adjusted position thereby preventing it from being accidentally shifted due to the vibration of the machine or other cause. This friction member 61 is mounted in a recess 62 formed in the block 37 and it is acted on by a spring 63 which yieldingly holds it against the slide.

The lower end of the rock shaft 41 is squared and the arm 42 has a square aperture therein to receive the squared portion

of the rock shaft. A screw 64 extending upwardly through the bottom of the block or support 37 is screw-threaded into the lower end of the rock shaft and thus retains it in position.

The above describes the means herein provided for releasing the clutch dog 18 or allowing it to continue in operation at the will of the operator when the stitching 5 along one side of the buttonhole has been completed.

The invention also comprises novel means for setting the stitch-forming mechanism in operation again after it has rounded the end 4 of the buttonhole so that the stitching 6 may be properly performed.

Pivotaly mounted at 46 on the slide 35 is a dog 47 having at its end a cam projection 48 which cooperates with a projection 49 formed on the arm 27. These projections 48, 49 are so situated relative to each other that when the slide 35 is in the position shown in Fig. 3, in which position the latch-disengaging member 34 is in its operative position, said projections will engage each other just after the stitch-forming mechanism has turned around the end 4 of the buttonhole and by their engagement will depress the arm 27 sufficiently to allow the latch 28 to snap over the lug 30 by the action of the spring 78.

The dog 47 has rigid therewith a U-shaped arm 79, the end 50 of which co-operates with the cam face 51 of a cam member 52 that is carried on a bracket 53 mounted on the portion 65 of the frame or head 13.

Fig. 2 shows the position of the parts at the beginning of the stitching on the buttonhole and as the stitching 5 is carried down one side of the buttonhole slit 3 the frame 13 with the part 65 thereof and the cam 52 is moved to the left Fig. 2 thereby carrying the cam 52 underneath the end 50 of the arm 79. As the cam passes under the arm 79 the dog 47 will be raised, the construction being such that when the stitching has proceeded to the point 66 Figs. 7 and 8 the arm 47 and projection 48 will be in substantially the position shown in Fig. 9, the projection 48 on the dog 47 being just under the projection 49 on the arm 27.

The sewing machine herein illustrated is so constructed that during the time that the stitch-forming mechanism is making its bodily turning movement about the end of the buttonhole the head 13 has a slight feeding movement so that when the eye portion of the buttonhole is being formed it will have a somewhat elongated shape. During this further feeding movement while the stitch-forming mechanism is turning about its vertical axis the head will move relative to the dog 47 into the position shown in Fig. 10 and during this movement the cam 52 raises the dog 47 so as to bring the pro-

jection 48 thereon behind the projection 49 as shown in Fig. 10. As the head 13 begins its movement in the opposite direction during the latter part of the bodily turning movement of the stitch-forming mechanism the projection 48 engages the cam face 67 of the projection 49 and thereby depresses the arm 27 slightly, such depressing movement being sufficient to carry the lug 30 below the shoulder on the latch 28 so that the latter will snap over the shoulder under the influence of the spring 78 as shown in Fig. 11. During this operation the dog 47 is prevented from upward movement by a stop screw 68 that is carried in a guiding frame 69 through which the dog 47 extends.

In the operation of the device, therefore, the projection 48 is carried under the projection 49 during the final movement of the head 13 in one direction and while the stitch-forming mechanism is making the first half of its turning movement about its vertical axis and will be carried over the projection 49 during the initial movement of the frame 13 in the opposite direction and while the stitch-forming mechanism is making its final turning movement about its vertical axis.

It will be understood that the depressing of the arm 27 above referred to causes the dog-releasing member 22 to be moved backwardly and thus disengage from the tail of the clutch dog 18 thereby allowing the spring 21 to throw the clutch dog into operation thereby to clutch the pulley 17 to the shaft 16. This will set the stitch-forming mechanism in operation again.

The cam 52 and its cam face 51 constitute a controlling cam for controlling the operation of the dog 47 to cause it to withdraw the dog-releasing member 22 thereby to allow the stitch-forming mechanism to be automatically started in operation again.

The dog 47 being mounted on the slide 35 is moved into and out of operative position by movement of the slide and when the parts are in the position shown in Fig. 4 both the latch-releasing member 34 and the dog 47 are in inoperative position and, therefore, do not function. When, however, the parts are in the position shown in Fig. 3 said member 34 and dog 47 become operative to stop the operation of the stitch-forming mechanism when the end 4 of the buttonhole has been reached and while the stitch-forming mechanism is making its bodily turning movement about the end 4 and start the stitch-forming mechanism in operation again after such bodily turning movement, thereby to form the stitches 6. It will, therefore, be seen that when the parts are in the position shown in Fig. 3 the machine will form a so-called "straight" buttonhole such as illustrated in Fig. 7, the stitch-forming mechanism being rendered

inoperative when turning around the end 4 of the buttonhole, but when the parts are in the position shown in Fig. 4 the stitch-forming mechanism will remain in operation while turning around the end 4 of the buttonhole thereby forming a buttonhole with an eye 7 as shown in Fig. 8.

I claim:

1. In a buttonhole sewing machine, the combination with a bed plate and work-holding means thereon, of a frame movably mounted on the bed plate and carrying stitch-forming mechanism which is mounted for turning movement about a vertical axis at the end of the buttonhole, a clutch by which the stitch-forming mechanism is operated, a clutch-disengaging member carried by said frame and having an arm, a latch to hold said clutch-disengaging member inoperative, a slide movably mounted on said bed plate, a latch-releasing member carried by said slide and adapted to release the latch as the frame moves, a restoring member also carried by said slide, and arranged to co-operate with said arm to restore the clutch-disengaging member to inoperative position, and means for shifting said slide to place the latch-releasing member and restoring member into or out of operative position.

2. In a buttonhole sewing machine having a bed plate supporting work-holding means, a frame slidably mounted on the bed plate and carrying stitch-forming mechanism which is arranged to turn about a vertical axis at each end of the buttonhole, a clutch for operating said stitch-forming mechanism, a clutch-disengaging member and a latch to hold said clutch-disengaging member in inoperative position, the combination with said clutch-disengaging member and latch, of a block carried by the bed plate, a transversely-movable slide mounted thereon, a latch-releasing member carried by the slide and adapted to engage and release the latch when the stitching on the first side of the buttonhole has been completed, a restoring member pivoted to said slide, and co-operating with the clutch-disengaging member to restore the latter to inoperative position after the stitch-forming mechanism has made its half rotation around the end of the buttonhole, and a cam movable with the frame and co-operating with the restoring member to place it in operative position.

3. In a buttonhole sewing machine having a bed plate supporting work-holding means, a frame slidably mounted on the bed plate and carrying stitch-forming mechanism which is arranged to turn about a vertical axis at each end of the buttonhole, a clutch for operating said stitch-forming mechanism, a clutch-disengaging member, a latch to hold said clutch-disengaging member in inoperative position, the combination with said clutch-disengaging member and latch,

of a block carried by the bed plate, a transversely-movable slide mounted thereon, a latch-releasing member carried by the slide and adapted to engage and release the latch 5 when the stitching on the first side of the buttonhole has been completed, a restoring member pivoted to said slide and co-operating with the clutch-disengaging member to restore the latter to inoperative position 10 after the stitch-forming mechanism has made its half rotation around the end of the buttonhole, a cam movable with the frame and co-operating with the restoring member to place it in operative position, and manually-controlled means for shifting the slide 15 to place the latch-releasing member and restoring member into and out of operative position.

In testimony whereof, I have signed my name to this specification.

JOHN W. CONNORS.