

May 25, 1954

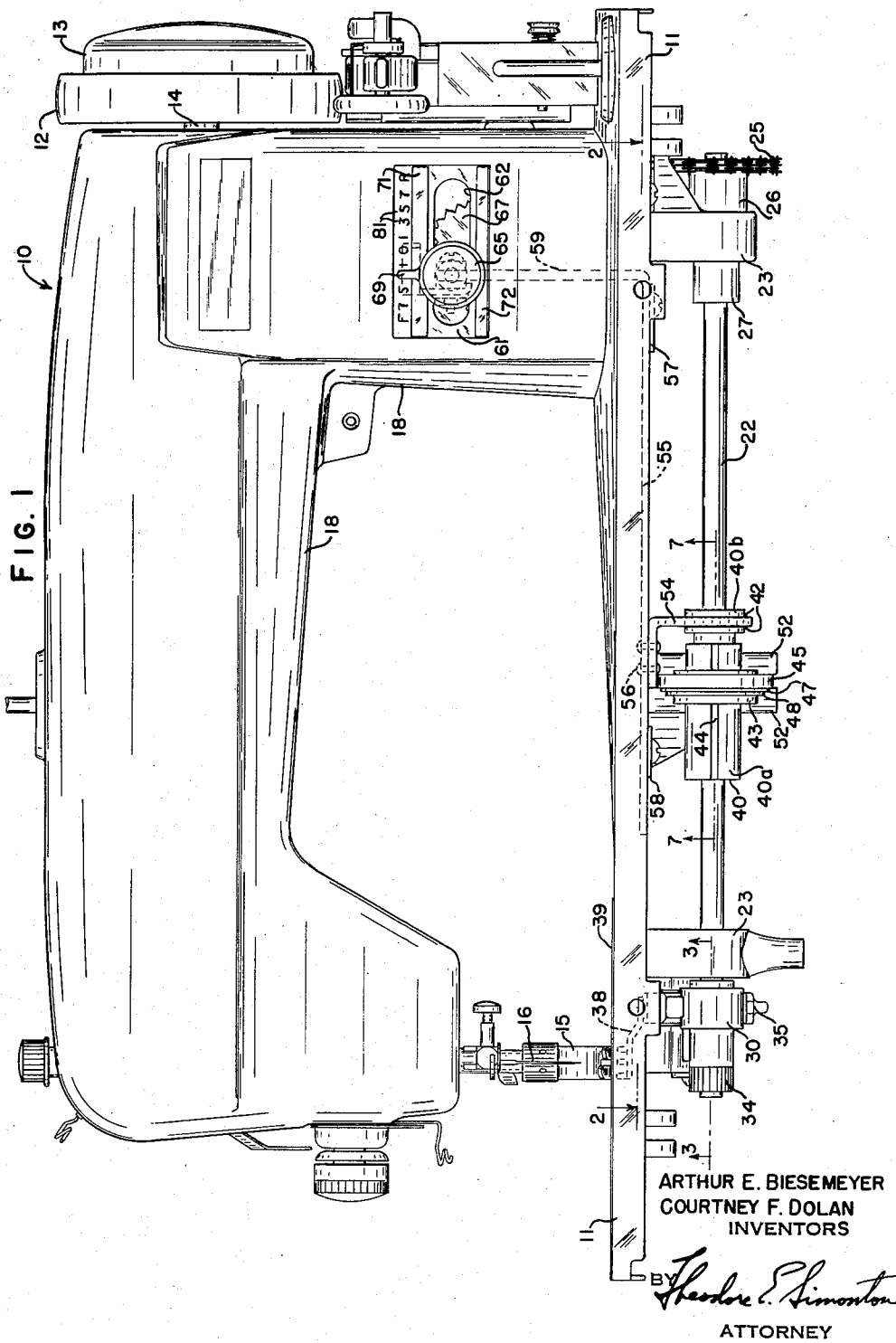
A. E. BIESEMEYER ET AL

2,679,220

STITCH CONTROL MECHANISM FOR SEWING MACHINES

Filed June 1, 1951

3 Sheets-Sheet 1



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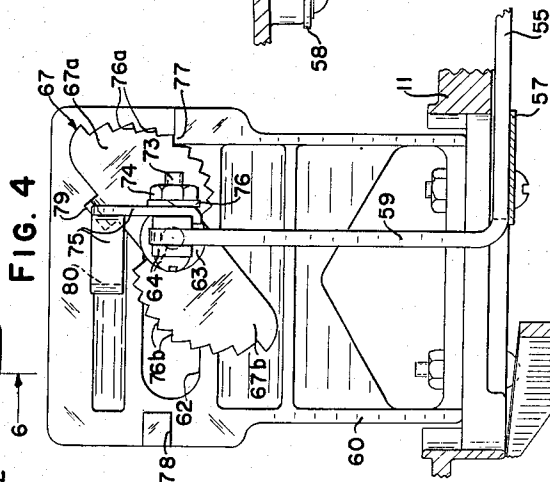
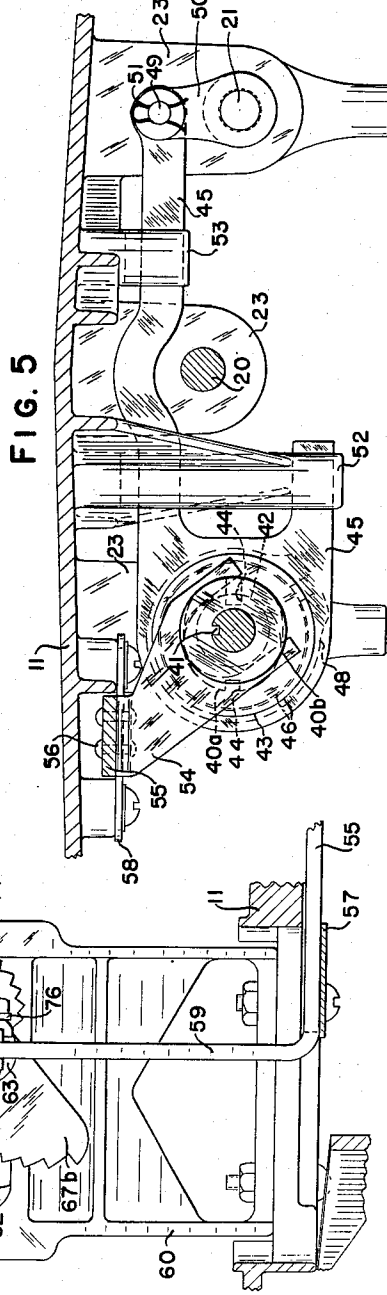
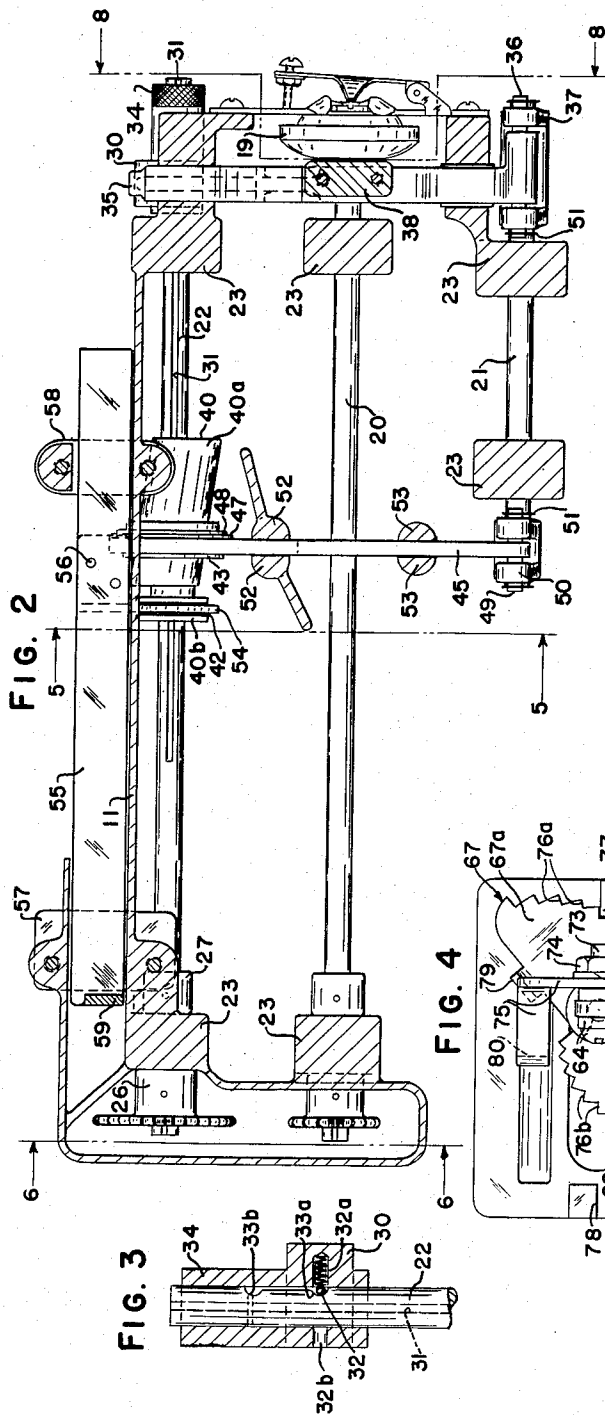
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3 Sheets-Sheet 2



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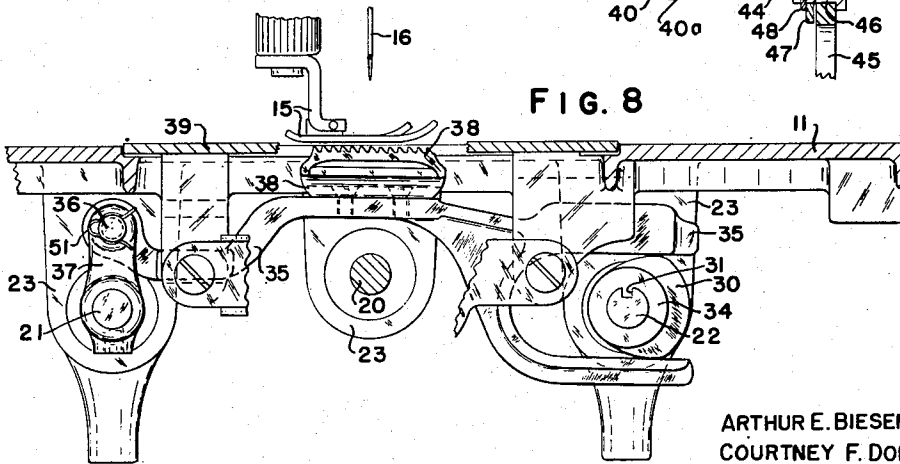
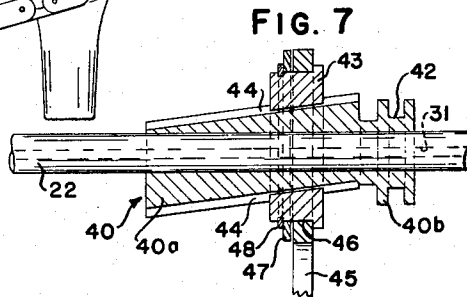
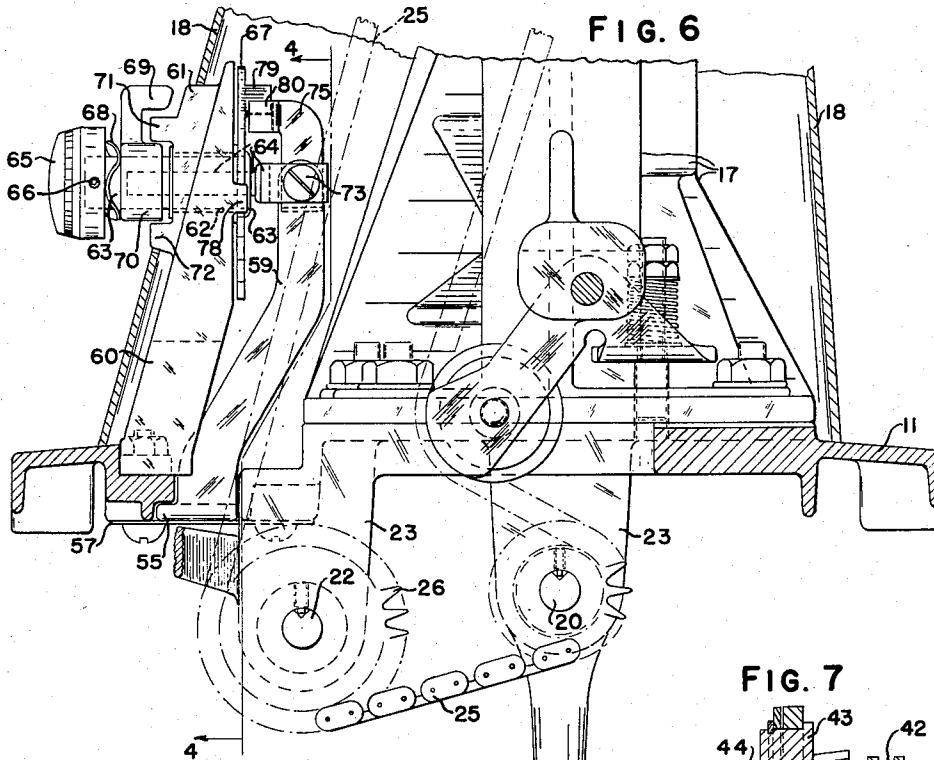
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STITCH CONTROL MECHANISM FOR SEWING MACHINES

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STITCH CONTROL MECHANISM FOR
SEWING MACHINES

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2 Claims. (Cl. 112-215)

1

This invention relates to a stitch control mechanism for sewing machines and more particularly to a mechanism for selectively disabling the work feed.

In sewing machines, particularly in those of the household type where versatility is necessary, it is important that the entire work feed mechanism may be easily rendered inoperative so that the machine may be used for darning and mending. Furthermore, it is most important that this work feed mechanism, with its adjusting and control mechanism, be simply and cheaply constructed so that the machine may be marketed at a low price.

The primary object of the present invention, therefore, is to provide a simple, easily accessible, means by which the work feed mechanism may be rendered inoperative.

Other objects and advantages pertaining to the construction of the device and to the form and relation of the parts thereof will more fully appear from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a front elevation of a sewing machine head showing portions of the stitch control mechanism;

Figure 2 is a sectional view thereof on the line 2-2 of Figure 1;

Figure 3 is an enlarged sectional view of the feed lift cam on the line 3-3 of Figure 1;

Figure 4 is a sectional view on the line 4-4 of Figure 6, showing the rear of the stitch control setting mechanism;

Figure 5 is an enlarged sectional view on the line 5-5 of Figure 2, showing the feed control cam and associated parts;

Figure 6 is an enlarged sectional view on the line 6-6 of Figure 2, showing the cam shaft driving mechanism and portions of the stitch control setting mechanism;

Figure 7 is an enlarged sectional view of the feed control cam on the line 7-7 of Figure 1; and

Figure 8 is an enlarged sectional view on the line 8-8 of Figure 2, showing the feed lift cam and associated parts.

Referring more particularly to Figure 1, a sewing machine 10, having the usual base 11, motor driven flywheel 12, clutch 13, main shaft 14, presser foot 15, and needle 16, is illustrated with the frame 17 (Figure 6) secured to and above base 11, enclosed in a shroud 18. In Figure 2 may best be viewed the shuttle 19 on the shuttle shaft 20, the rock shaft 21, and the

2

feed cam shaft 22, all three shafts being mutually parallel and journaled in the usual manner in suitably located, pendant bosses 23 of the base 11.

The needle 16 is reciprocated by mechanism not shown, but in conventional manner, by the rotation of the main shaft 14, driven by flywheel 12 through clutch 13. A chain 25, driven by a sprocket (not shown) on main shaft 14, is used to drive the shuttle shaft 20 and cam shaft 22 in the usual manner as best illustrated in Figure 6.

Having briefly described the setting of the invention for the sufficient understanding of those familiar with the art, the feed mechanism and the feed control, the subject of the present invention, will now be described.

A chain sprocket 26 is secured to one end of the feed cam shaft 22 and a thrust collar 27 is likewise secured on the other side of the adjacent boss 23. At the other end of feed shaft 22, adjacent the shuttle 19 and easily accessible to the operator, a feed lift cam 30 is keyed at 31 (Figure 8) to rotate with the shaft 22 and is retained on the shaft by a ball and socket locking arrangement, best viewed in Figure 3. The spring pressed ball 32 is shown engaged in the socket 33a in shaft 22 with the ball and its spring in a hole 32a drilled partially through cam 30. The portion of the drilled hole at 32b on the opposite side of feed shaft 22 from the nose of cam 30 is used for insertion of the spring and ball 32 which are contained in the nose of cam 30.

Toward the left end of feed shaft 22 by a distance slightly in excess of the width of cam 30 is another socket 33b. Shaft 22 is ground flat, as shown, between sockets 33a and 33b so that cam 30 may be easily slid from one position to the other as hereinafter described. Cam 30 has a hub or fingerpiece portion 34 at its left or exterior end which is knurled or grooved so as to be easily grasped, the fingerpiece 34 extending to the end of feed shaft 22 so as to be easily accessible to the operator.

The forked end of a lift cam follower arm 35 embraces the lift cam 30, and the arm 35 (Figures 2 and 8) extends across the machine. The other end of arm 35 is hingedly joined by pin 36 to the yoke arm 37 which is secured radially to one end of rock shaft 21. The follower arm 35 is suitably offset about the shuttle shaft 20 and has secured thereto the conventional feed claw 38 which is adapted to move, by the action of the lift cam 30, up through a suitable opening in the

shuttle cover plate 39 of base 11. Cover plate 39 is removable or suitably hinged in conventional manner to provide access to shuttle 19 and the feed lift cam 30.

Intermediate the ends of shaft 22, a substantially cylindrical feed control cam 40 is slidable on, and keyed to, shaft 22. Preferably the above-described keyway 31, extended, is used for this purpose (Figure 2), and the key 41 may be integrally formed on the cam (Figure 5). The axis of the cylindrical body portion 40a of cam 40 is at an acute angle, of the order of 7 degrees, to the axis of the shaft 22, the cylinder axis crossing the shaft axis approximately midway of the length of the cylindrical portion 40a, as best viewed in Figure 7. At one end of cam 40 is a portion 40b containing an annular groove 42 concentric with said shaft.

While the feed cams 30 and 40 may be made of any appropriate material, a plastic such as nylon is preferred. It has been found that when cams 30 and 40 are made of nylon, they are self-lubricating, showing almost no appreciable wear. They are quiet in operation and may be at all times easily adjusted to the desired position because of their self-lubricating properties.

A cam ring 43 is keyed at 44 to control cam 40 as shown in Figures 5 and 7, so that the cam 40 is slidable within the ring 43 to vary the eccentric action of the cam, and ring 43 rotates with cam 40 and shaft 22. The cam 40 being made of nylon, the ring 43 is preferably made of metal to obtain good bearing surfaces and free sliding.

The feed control follower arm 45 (Figures 5 and 7) has one annular end adapted to fit in an exterior annular follower groove 46 in the ring 43, and a conventional retaining washer 47 and snap ring 48 hold the follower arm 45 aligned in groove 46. The surface of follower groove 46 is cylindrical and parallel with shaft 22 and the groove extends in a direction normal to the axis of shaft 22 for reasons that will be apparent.

Follower arm 45 extends across the machine (Figures 2 and 5) and is hingedly joined, by pin 49, to the yoke arm 50 which is secured radial to rock shaft 21 at the opposite end thereof from yoke arm 37. Spring clips 51 are used to retain the pins 49 and 36 on their respective yoke arms. The follower arm 45 is suitably offset about the shuttle shaft 20 and is guided for reciprocatory movement, transverse the machine and normal to shaft 22, by the pairs of pendant lugs 52—52 and 53—53 (Figure 2).

Embracing the groove 42 in cam 40, a forked offset arm 54 (Figures 1 and 2) is fastened to the feed control operating lever 55 as by the rivets 56. The operating lever 55 is secured to base 11 in a groove therein for sliding movement therealong, parallel to shaft 22, by the plates 57 and 58 secured by screws to base 11. An operating arm 59, joined to lever 55, projects up through an opening in base 11 near the frame 17 as best seen in Figures 4 and 6. Arm 59 is suitably offset to be enclosed in the shroud 18 and behind the bracket 60 which is bolted to, and forms part of, base 11.

Bracket 60 has a portion 61 which projects through a suitable opening in shroud 18, and the portion 61 is slotted at 62 for the operating shaft 63—64. This shaft is in two parts, the inner rod-like portion 64 being slidable, for ease in assembly, in telescopic fashion within the tube-like outer portion 63. A finger knob 65 is secured by a set screw 66 to the outer end of shaft portion 63 and a limiter plate 67 is secured to the other end by

peening over the reduced end of the shaft 63 as it projects through a hole in the plate 67 in well-known style.

A spring washer 68 and a pointer 69 are mounted on the shaft 63 adjacent knob 65, the pointer 69 having a square portion 70 which is prevented from rotating with shaft 63, when knob 65 is turned, by the rectangular bosses 71 and 72 projecting from the portion 61 of bracket 60 on either side of the slot 62 as best shown in Figure 6.

The inner portion 64 of the operating shaft is forked at one end and this forked end is rigidly clamped to the end of operating arm 59 by means of the screw bolt 73 therethrough and nut 74 as best seen in Figure 4. A limiter stop 75 is also bolted thereto and a lock washer 76 may be added.

The limiter plate 67 has two wing-like arms, 67a and 67b, one on either side of shaft 63. Each arm has a series of stepped notches, 75a and 75b, arcuately arranged along one edge for engagement with the lugs 77 and 78, respectively, projecting from the inner face of the bracket 60. Each successive step or notch 76 as at a uniformly increased radial distance from the center of shaft 63 and the steps on the two arms, 67a and 67b, are oppositely arranged. Each diametrically opposite pair of steps 76, in the arms 67a and 67b, is equidistant from the center of shaft 63.

The arm 67a has a projecting tongue 79 offset from its upper edge for engagement with the offset outer end 80 of the limiter stop 75. Tongue 79 and the end 80 of stop 75 cooperate to limit the turning of knob 65 and the limiter plate 67 in a clockwise direction in a position with arms 67a and 67b vertically arranged and with the steps of 75a and 75b closest to shaft 63 in position, on either side of shaft 63, for engagement with the lugs 77 and 78, respectively, as lever 55 is slid in base 11 by moving knob 65 and shaft 63—64 to the left or right in slot 62.

Lever 55, from the forked arm 54 to the offset arm 59, is of such length that when shaft 63—64 is at the center of slot 62 the stitch control cam 40 is slid within ring 43 to a position where the cylinder axis of cam 40 crosses the axis of cam shaft 22 in the transverse vertical plane through the center of the follower arm 45.

With shaft 63—64 at the center of slot 62, pointer 69 lies over the center, or zero mark, of a suitable scale 81 inscribed on the portion 61 of bracket 60. With the shaft 63—64 in this position, knob 65 may be turned counter-clockwise and the steps of 75a and 75b farthest from shaft 63 engage the lugs 77 and 78, respectively, locking the control lever 55 in zero position.

The operation of the feed mechanism, in general, is conventional, consisting of the usual four motions, up and down, and back and forth. The rotation of the feed lift cam 30 on shaft 22 imparts an up and down motion to the lift cam follower arm 35. Feed claw 38, being secured thereto, is lifted once during each revolution of the shaft 22, to a position where it extends through the cooperating opening in the shuttle cover plate 39 of base 11.

The feed control cam 40, when adjusted to any but the zero position, imparts a back and forth, transverse, movement to the control cam follower arm 45. This back and forth motion, caused by the throw of cam 40, is transmitted by means of the rock shaft 21 and its radial yoke arms 50 and 37, to the follower arm 35 and feed claw 38. The transverse movement of the claw 38,

when extended above the shuttle cover plate 39, causes the work to be moved under needle 16.

The operation of the feed control mechanism will now be apparent. As the oblique cylindrical cam 40 is moved along shaft 22 on either side of the zero position, it will be evident that the cam ring 43 will be moved, in a plane normal to shaft 22, to a position in which it is not concentric with shaft 22. The farther from the zero position that cam 40 is moved, the greater this eccentricity will be and the greater the transverse throw of the cam 40.

The operator may conveniently move cam 40 by grasping the operating knob 65 and moving it to the left or right. Knob 65 carries with it the shaft 53—64, the offset arm 59 to which shaft 64 is rigidly secured, the sliding operating lever 55 and the forked arm 54 which, being engaged in the groove 42, causes the control cam 40 to slide along shaft 22. The pointer 69, being carried by shaft 63, is moved and the feed control cam 40 may be set for any desired stitch length by moving pointer 69 to the appropriate mark on scale 81.

The flywheel 12 is driven in a clockwise direction, as viewed from the right, movement of the top of the flywheel being away from the operator. Inspection of Figures 2, 5 and 8 will reveal that the control cam 40 and the lift cam 30 are so placed on shaft 22 that when the cam 40 is moved to the operator's left the throw of the control cam 40 is away from the operator while the lift cam 30 is imparting an upward movement to the claw 38. When knob 65 is to the left of the zero position on scale 81, therefore, the feed of the machine is forward, the work moving away from the operator.

It will be obvious that when knob 65 is moved to the right of the zero position, control cam 40 is also moved to the right and the throw of the cam will be in the opposite direction. The feed of the machine will then be reversed, the work moving toward the operator.

Referring now to Figure 4, it will be seen that when the machine is set to a stitch length of 3, for example, in a forward direction, as shown in Figure 1, knob 65 may be turned by the operator in a counter-clockwise direction until the appropriate step 76a of the limiter plate 67 engages the shoulder 77. The operator may now move knob 65 to his right without turning the knob and the corresponding step 76b will engage shoulder 78, setting the machine for a stitch length of 3 in the opposite direction. Since each diametrically opposite step of 76a and 76b is equidistant from shaft 64, the corresponding reverse stitch length may be thus obtained for each setting of forward stitch length on scale 81.

Referring now to Figures 1, 2, 3 and 8, it will be seen that the operator may easily render the whole feed mechanism inoperative by grasping the knurled end 34 of the feed lift cam 30 and drawing the cam from the position shown with the spring pressed ball 32 engaged in the socket 33a to the alternate position with ball 32 engaged in socket 33b. In this latter position, the cam 30 is removed from engagement with the forked end of the feed lift lever 35, and the lever falls of its own weight on to cam shaft 22. To re-engage the cam 30, the lever 35 is lifted and cam 30 pushed back again between the two arms of the forked end of the lever.

It will be apparent that the feed control cam ring 43 could be omitted. If the annular end of the cam follower 45, suitably rounded, then close-

ly embraced the cylindrical cam 40 at the correct angle, the operation of the cam would be the same except for the likelihood of uneven wear on the parts.

Cam ring 43 rotates with cam 40 and is necessarily bored at the same angle as cam 40 with respect to shaft 22. The cam follower 45, being guided by the lugs 52—52 and 53—53, is closely contained in groove 46 by the retaining washer 47 and snap ring 48, and ring 43 is thus prevented from sliding, with cam 40, along shaft 22 when the stitch length is changed. The surface of the follower groove 46 which is parallel to shaft 22 is, however, the cam surface which imparts to and fro, horizontal movement to the claw 38, through follower 45 and rock shaft 21, the cam 40 contributing the eccentricity of the camming action in the desired amount.

It will also be apparent that the feed control cam 40 might equally well be of any convenient cross-sectional shape other than circular as shown, the central bore of cam ring 43 being of the same shape. So long as cam 40 is substantially cylindrical in shape, so that it may be slid along shaft 22 within ring 43 to vary the eccentricity of the camming action, the operation of cam 40 and ring 43 will be the same.

It will also be noted that the hereinabove described arrangement of cams 40 and 30 on shaft 22, places the feed lift cam 30 at the left end of shaft 22 immediately under the work supporting left end of the machine where it is easily accessible to the operator through the opening provided by the shuttle cover plate 39. The ribbed, fingerpiece portion 34 of cam 30 is therefore an easily accessible and cheaply made means for moving this cam to its disengaged position.

While there is herein described, and in the drawings shown, an illustrative embodiment of the invention, it is to be understood that the invention is not limited thereto, but may comprehend other constructions, arrangement of parts, details and features without departing from the spirit of the invention. We desire to be limited, therefore, only by the scope of the appended claims.

We claim:

1. In a sewing machine of the type having a work-supporting base provided with an opening in its work-supporting surface, a cover plate for said opening, said cover plate being displaceable to permit access to the parts located beneath said base adjacent said opening, a feed claw aperture in said cover plate, a feed claw normally located in said aperture, and a shuttle beneath said feed claw, in combination, a rotating feed shaft mounted beneath said base, an outboard bearing for said feed shaft secured to the underside of said base, said feed shaft having a free end extending beyond said outboard bearing and located adjacent said opening, a feed lift cam keyed to said free end of the feed shaft and slidable therealong, said cam having an eccentric portion, a cam follower adapted to be engaged by the eccentric portion of said cam, said feed claw being mounted on said cam follower, and said cam having rigid therewith a fingerpiece portion of smaller diameter than said eccentric portion and projecting from the side of the cam remote from said outboard bearing, said fingerpiece portion being located adjacent said opening for convenient access therethrough, whereby by grasping said fingerpiece portion through said opening said cam may be moved on said shaft from a position in engagement with said follower to a posi-

tion of non-engagement therewith to render said feed claw inoperative.

2. The combination as claimed in claim 1, having a spring pressed ball carried in said cam and cooperating sockets therefor in said shaft, 5 whereby said cam may be locked in said engaged and disengaged positions.

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