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CONTROL MEANS FOR ORNAMENTAL STITCH SEWING MACHINES

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3 Sheets-Sheet 1

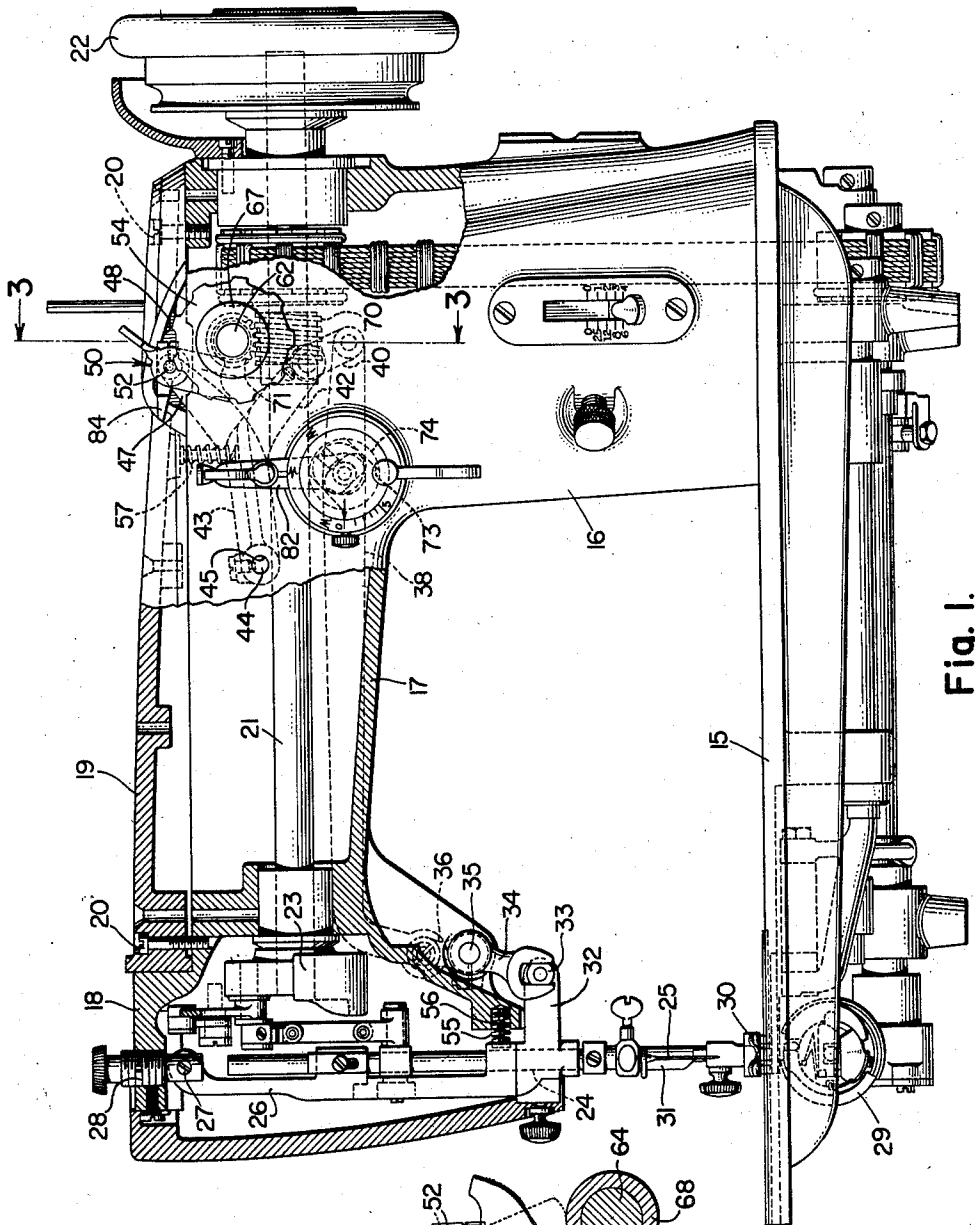


Fig. 1.

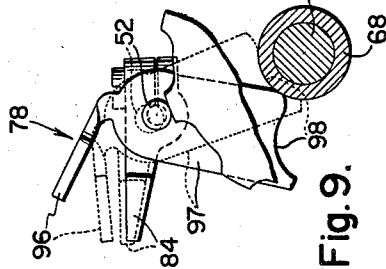


Fig. 9.

WITNESS

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3 Sheets-Sheet 2

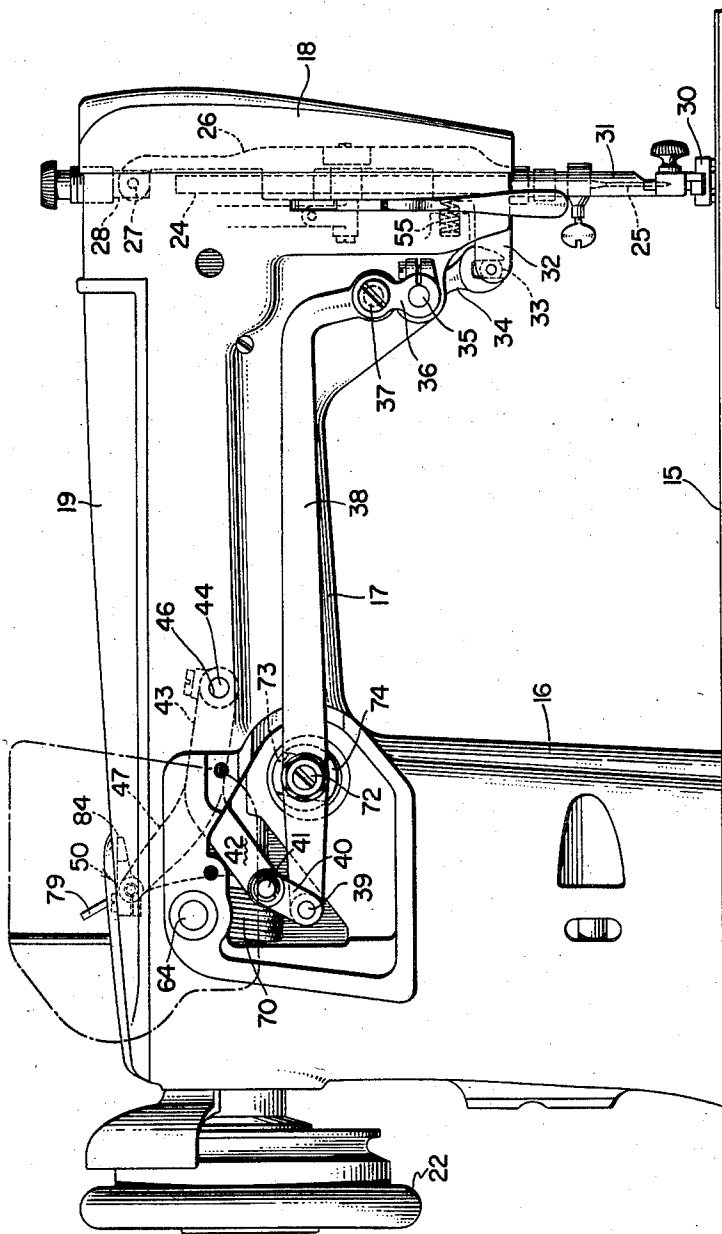


Fig. 2.

WITNESS

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3 Sheets-Sheet 3

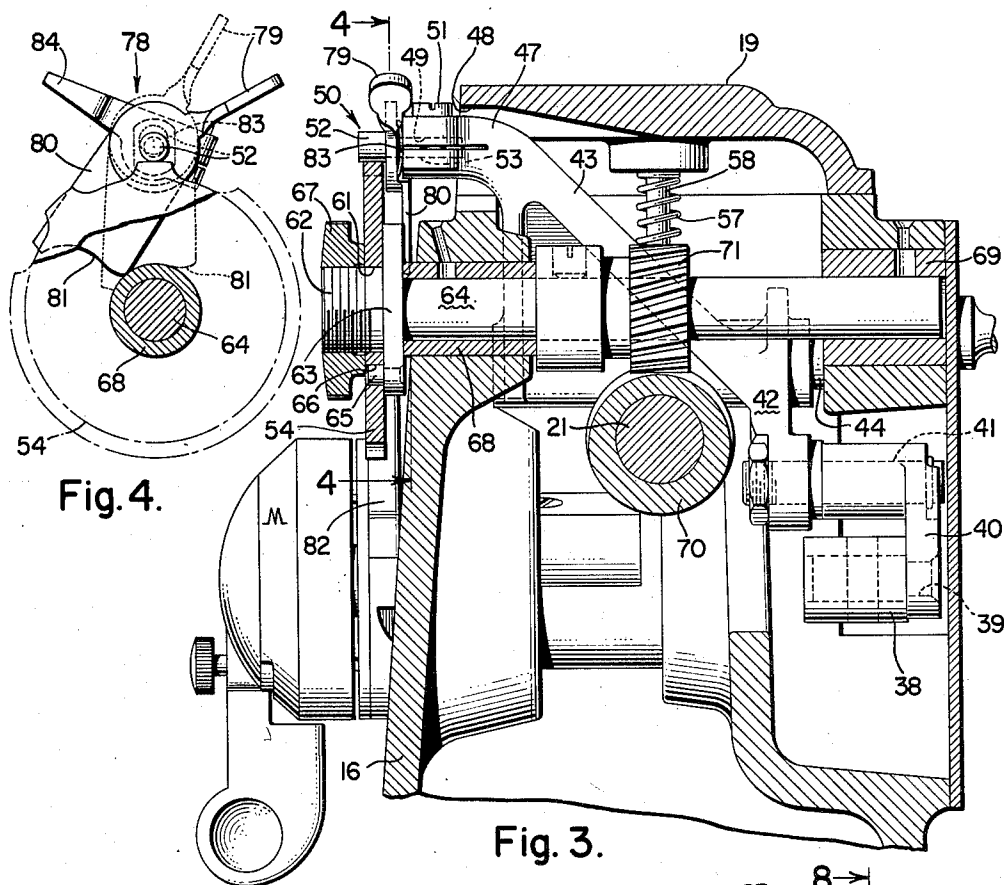


Fig. 4.

Fig. 3.

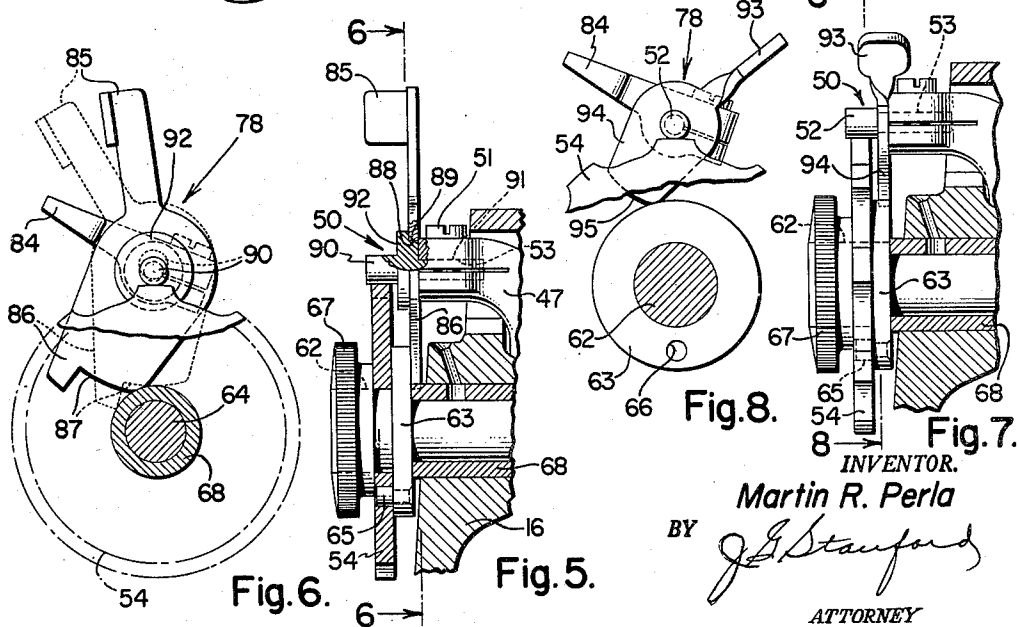


Fig. 8.

Fig. 7.

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CONTROL MEANS FOR ORNAMENTAL STITCH SEWING MACHINES

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Application August 2, 1955, Serial No. 525,969

6 Claims. (Cl. 112—158)

This invention relates to improvements in ornamental stitch sewing machines of the laterally vibrating needle type wherein the lateral needle movements are produced by a rotary pattern cam, and has for an object to provide means whereby the needle may be properly positioned laterally of the normal direction of work feed independently of the rotary pattern cam thereby to produce straight stitching in a predetermined path.

A further object of the invention is to provide means whereby the needle may be maintained in a predetermined operable position whenever the rotary pattern cam is removed from the machine.

With the above and other objects in view, the invention comprises the devices, combinations and arrangements of parts hereinafter described in connection with the accompanying drawings, which illustrate a preferred embodiment of the invention, from which the several features of the invention and the advantages attained thereby will be readily understood by those skilled in the art.

In the drawings,

Fig. 1 represents a side elevation, partly in section, of a sewing machine containing the present improvements.

Fig. 2 represents a rear side elevation of the bracket-arm of the machine.

Fig. 3 represents, on an enlarged scale, a sectional view taken substantially along the line 3—3 of Fig. 1.

Fig. 4 represents a fragmentary sectional view taken substantially along the line 4—4 of Fig. 3.

Fig. 5 represents, on an enlarged scale, a modified form of the invention taken substantially along the line 3—3 of Fig. 1.

Fig. 6 represents a fragmentary sectional view taken substantially along the line 6—6 of Fig. 5.

Fig. 7 represents, on an enlarged scale, another form of the invention taken substantially along the line 3—3 of Fig. 1.

Fig. 8 represents a fragmentary sectional view taken substantially along the line 8—8 of Fig. 7.

Fig. 9 is similar to Fig. 4 but represents another form of the present invention.

The present improvements are illustrated in the drawings herein described as embodied in a zigzag stitch sewing machine of the type disclosed in the United States patent application of Perla and Koenig, Serial No. 386,684, filed October 19, 1953.

Referring to the drawings, the sewing machine illustrated has a frame comprising a bed-plate 15 affording a work-support from one end of which rises a hollow standard 16 of a bracket-arm 17 overhanging the bed-plate and terminating at its free end in a hollow head 18.

The bracket-arm 17 is open at its upper portion so as to form a substantially trough-shaped unit and this opening is adapted to be closed by means of a cover-plate 19 which is removably secured in position by means of a plurality of bolts 20—20.

Rotatably journaled in suitable bearings provided in the bracket-arm 17 is a horizontally disposed main shaft

21 extending lengthwise of the bracket-arm and carrying at one end a driving pulley 22. At its opposite end the main shaft 21 carries a crank 23 connected in a conventional manner to a vertically disposed needle-bar 24.

The needle-bar 24 carries at its lower end a needle 25 and is journaled for endwise reciprocation in suitable bearings provided in a vibratory gate 26. The gate 26 is pivotally hung upon a screw stud 27 carried by a supporting member 28 adjustably threaded into the upper wall of the bracket-arm 17 to provide for swinging movements of the gate 26 about a pivotal axis substantially transverse to the axis of rotation of the main shaft 21. Cooperating with the needle 25 below the bed-plate 15 and in the formation of lock-stitches is a loop-taker 29 supported for rotation in the vertical plane parallel to and rearwardly of the plane of needle vibration. The loop-taker 29 is rotated twice for each complete needle reciprocation by a suitable driving connection with the main shaft 21. Suitable feeding mechanism of the lower four-motion type is provided for advancing the work past the needle in a direction transverse to the plane of needle vibration, and any usual or suitable presser-foot 30 may be secured to a conventional presser-bar 31 so as to oppose the work-engaging portion of the feeding mechanism in a conventional manner.

Extending horizontally from the lower end of the needle-bar gate 26 is an arm 32 of which the free end portion extends externally of the bracket-arm 17 and carries a pivot block 33. Embracing the pivot block 33 is a forked end of a rock-arm 34 depending from the front end of a short rock shaft 35 disposed horizontally transverse to the main shaft 21 and suitably journaled at the under side of the bracket-arm head 18. Extending upwardly from the rock shaft 35 at the rearward side of the head 18 is a rock-arm 36 of which the upper end is connected by a pivot screw 37 to one end of a pitman 38 disposed horizontally and externally at the rearward side of the bracket-arm 17. The other end of the pitman 38 is pivotally connected by means of a pin 39 to a link 40, the other end portion of which is in turn connected by means of a second pin 41 to an arm 42 depending from a cam-actuated member 43 which is pivotally mounted within the bracket-arm 17 of the sewing machine by means of a horizontal shaft 44 which extends transversely across the sewing machine bracket-arm to be received within oppositely disposed apertures 45 and 46 formed in the bracket-arm.

Projecting upwardly and laterally from the member 43 is a second arm 47 which extends through an aperture 48 formed within the cover-plate 19 so as to be positioned outside the confines of the sewing machine frame. As may be best understood by reference to Figs. 1, 3 and 4, the arm 47 is provided with a longitudinally split aperture 49 containing a cam follower pin, generally designated by the numeral 50, which pin is locked within the aperture 49 by means of a set screw 51. This pin 50 comprises a cam-engaging cylindrical portion 52 and a reduced cylindrical shoulder portion 53 which is received within the arm aperture 49.

The cam follower 52 is forced into engagement with the periphery of a rotary cam 54 by means of a pair of compression springs 55. One of these compression springs 55 is disposed within the hollow head portion 18 of the bracket-arm with one end of the spring located within an aperture 56 formed within the head so as to maintain the spring in a proper position whereby the other end portion may bear against the lower end portion of the needle-bar gate 26 for the purpose of biasing the gate in a direction away from the sewing machine head thereby to urge the cam follower 52 into engagement with the periphery of the cam 54.

A second compression spring 57 is mounted about a pin 58 depending from the under side of the cover-plate 19. As may be observed from Figs. 1 and 3, the spring 57 is disposed directly over the member 43 so that the lower end portion of the spring will urge the member downwardly about its pivot shaft 44 thereby to complement the spring 55 in urging the cam follower 52 against the peripheral portion of the rotary cam 54.

Referring particularly to Figs. 1 and 3, the cam 54 is provided with an aperture 61 so that the cam may be removably disposed over the threaded end portion 62 and against the shoulder portion 63 of a cam shaft 64. More specifically, the cam shaft 64 has its shoulder 63 provided with a pin 65 which is received within an appropriate aperture 66 formed within the cam 54 for the purpose of locating the cam in its proper angular position upon the cam shaft. A thumb screw 67 is adapted to be received over the threaded end portion 62 of the cam shaft 64 for the purpose of locking the cam 54 in its operative position.

The cam shaft 64 is journaled in the front and rear walls of the bracket-arm 17 in bearing bushings 68 and 69, with the cam shaft being disposed above and horizontally transverse to the main shaft 21. A spiral gear 70 carried by the main shaft 21 drives a spiral gear 71 secured upon the cam shaft 64 whereby the latter is rotated, for example, at $\frac{1}{18}$ speed of rotation of the main shaft 21.

From the foregoing, it will be understood that during the operation of the machine, the cam 54 being carried by the rotary stub shaft 64 will rotate about the shaft axis and thus actuate the cam follower 52 to the end that the member 43 will rise and fall in a manner as dictated by the peripheral shape of the cam 54 and thus the pitman 38, through the medium of the arm 42 and link 40, will have its left-hand end portion, as viewed in Fig. 2, vibrated in a vertical plane.

In order to translate the vertical vibratory movements of the pitman 38 into effective endwise reciprocatory movements thereby to impart swinging movements to the needle-bar gate 26, an appropriate guide block, not herein shown, is suitably secured upon the pitman by a bolt 72, which guide block is shiftably disposed within a guideway 73 constituted by a rearwardly open slot formed in the outer or rearwardly exposed face of a guide head 74. As is well known, the angular adjustment of the guide head 74 controls the amplitude of reciprocatory movements of the pitman 38 all in a manner as is disclosed in the above noted Perla and Koenig patent application.

As hereinabove set forth, it is a primary object of the present invention to provide means whereby the needle may be properly positioned laterally of the normal direction of work feed independently of the rotary pattern cam thereby to produce straight stitching in a predetermined path. In one form of the present invention, such means comprises a two-armed lever 78 whose apertured center portion is adapted to be pivotally mounted upon the reduced shoulder portion 53 of the cam follower pin 50 at a location between the cam follower portion 52 and its carrying arm 47. One arm 79 of this lever is in the form of a handle, while the other arm 80 is provided with a curved cam surface 81 which, when manually turned about the cam-follower carrying pin 50 by the handle 79, engages the stationary bushing 68 of the pattern cam shaft 64 so as to wedge the cam follower 52 away from the cam 54 whereby the cam follower is entirely removed from the path of movement of the cam in a manner as is indicated by the dotted lines of Fig. 4. Manifestly, with the cam follower 52 in this raised position, any rotation of the cam 54 will be ineffective to actuate the pitman 38 and, thus, the needle 25 will be reciprocated in a vertical direction without any accompanying lateral movements to the end that a line of straight stitches will be per-

formed in the work. Whenever the cam follower 52 is so raised above the cam 54, the position of the needle 25 laterally of the work bed 15 may be adjusted lengthwise of the bed-plate 15 by a manual manipulation of the handle member 82 in a manner as will be understood by reference to the above identified Perla and Koenig patent application.

Still referring to Figs. 3 and 4, the handle member 78 may have disposed between its center portion and its carrying arm 47 a conventional type of spring washer 83 which will function to maintain the handle member in any position of angular adjustment. It is to be particularly observed from Fig. 3 that the arm 80 of the handle member 78 is offset in a right-hand direction from the remaining portion of the lever so that its cam portion 81 will properly engage the stationary sleeve 68.

Referring to Fig. 4 it is to be noted that the end portion of the arm 47 carries a lateral extension 84 in the form of a handle which an operator may grasp in combination with the handle 79 so as to facilitate the turning of the two-armed lever 78 in a counterclockwise direction as is viewed in Fig. 4.

A second form of the present invention is disclosed in Figs. 5 and 6. In this form of the invention, the two-armed lever 78 comprises a handle member 85 and an arm 86 of which one end is formed with a cam portion 87 for engagement with the stationary bearing sleeve 68 in a manner substantially similar to the first form of the invention disclosed in Figs. 3 and 4. However, in Fig. 5, it will be observed that the apertured portion 88 of the member 78 is pivotally mounted upon a cylindrical portion 89 of a cam follower pin 50 comprising a cam-engaging portion 90 and a reduced portion 91 which is mounted within the aperture 53 of the arm 47. The two-armed lever 78 is disposed between the end portion of the arm 47 and a cylindrical shoulder 92 of the cam follower 50. Manifestly, this second form of the invention functions in a manner similar to that of the first form of the invention disclosed in Figs. 3 and 4 and its cam-follower lifting action is shown by the dotted lines of Fig. 6.

Figs. 7 and 8 disclose a third form of the invention wherein a two-armed lever 78 is constituted by a handle member 93 and an arm 94 having a cam portion 95 which is adapted to engage the peripheral portion of the shoulder 63 of the cam shaft 64 for the purpose of raising the cam follower 50 from out of engagement with the rotary cam 54. As may be seen from Fig. 7, the two-armed lever 78 is pivotally mounted upon the reduced end 53 of the cam follower pin 50 at a location between the end portion of the arm 47 and the cylindrical cam-engaging portion 52 of the pin. This two-armed lever differs from that disclosed in Figs. 3 and 4 primarily in that it is provided with no offset portion and is disposed directly over the shoulder member 63 of the cam shaft 64.

A fourth form of the present invention is disclosed in Fig. 9. Here the invention comprises a two-armed lever 78 which differs primarily from the corresponding member disclosed in Figs. 3 and 4 in that its handle member 96 is disposed substantially at a right angle to the length of its arm 97 so that the arm 96 can be conveniently biased toward the arm 84 by the operator's fingers. This two-armed lever, like the first three forms of the present invention, is provided with a cam surface 98 which co-operates with a stationary bearing sleeve 68 so as to raise the cam follower 50 from engagement with the cam 54 whenever the member is shifted in a counterclockwise direction in a manner as is illustrated by the dotted lines of Fig. 9.

From the above it is to be understood that broadly speaking the present invention comprises a rotary pattern cam 54 mounted upon a sewing machine frame 15, 16 and 17, a cam follower element 50 engaging the cam, connections 43, 40, 38, 36 and 34 between the follower element and the needle 25 for imparting sidewise move-

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ments to the needle, manually operable means, means for shifting the cam follower element away from the cam, with such means comprising a lever 78 pivotally mounted upon the cam follower element, and an abutment member 68 or 63 carried by the frame 16 and 17 and disposed within the range of movement of one end portion of the lever 78 so as to be engaged thereby.

Having thus described the nature of the invention, what I claim herein is:

1. In a sewing machine having a frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon said frame, a cam follower element engaging said cam, and connections between said follower element and said needle for imparting sidewise movements to said needle; the improvement which consists in the provision of manually operable means for shifting said cam follower radially away from said cam, said last mentioned means comprising a lever carried by and pivotally mounted upon said cam follower, and a stationary abutment member carried by said frame and disposed within the range of movement of one end portion of said lever so as to be engaged thereby.

2. In a sewing machine having a frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon said frame, a cam follower element engaging said cam, and connections between said follower element and said needle for imparting sidewise movements to said needle; the improvement which consists in the provision of manually operable means for shifting said cam follower radially away from said cam, said last mentioned means comprising a two-armed lever carried by and pivotally mounted upon said cam follower with one end thereof formed as a handle, and a stationary abutment member carried by said frame and disposed within the range of movement of the other arm of said lever so as to be engaged thereby.

3. In a sewing machine having a frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon said frame, a cam follower element engaging said cam, and connections between said follower element and said needle for imparting sidewise movements to said needle; the improvement which consists in the provision of manually operable means for shifting said cam follower away from said cam, said last mentioned means comprising a first handle member fixed upon said cam follower, a two-armed lever pivotally mounted upon said cam follower with one end thereof formed as a handle normally disposed adjacent said first mentioned handle, and an abutment member carried by said frame and disposed within the range of movement of the other arm of said lever so as to be engaged thereby.

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4. In a sewing machine having a frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon said frame, a cam follower including an elongated pin disposed in parallelism with the axis of rotation of said cam, connections between said cam follower and said needle for imparting sidewise movements to said needle, a two-armed lever pivotally mounted upon said cam follower and about the axis of said pin with one end thereof formed as a handle, and an abutment member carried by said bracket-arm and disposed within the range of movement of the other arm of said lever so as to be engaged thereby.

5. In a sewing machine having a hollow frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon an outside face of said frame, a cam follower pivotally secured to and at a location within said frame with a portion thereof extending outside the confines of said frame to engage said cam, connections between said cam follower and said needle for imparting sidewise movements to said needle, and manually operable means for shifting said cam follower radially away from said cam, said last mentioned means comprising a lever carried by and pivotally mounted upon said cam follower at a location outside the confines of said frame, and a stationary abutment member carried by said frame and disposed within the range of movement of one end portion of said lever so as to be engaged thereby.

6. In a sewing machine having a hollow frame, a needle mounted upon said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary pattern cam mounted upon said frame, a cam follower including an elongated pin disposed in parallelism with the axis of rotation of said cam, spring means to bias said follower against said cam, connections between said cam follower and said needle for imparting sidewise movements to said needle, and manually operable means to shift said follower to a predetermined position where it will no longer engage said cam, said last mentioned means including a two-armed lever pivotally mounted upon said cam follower and about the axis of said pin with one end thereof formed as a handle, the other end of said lever being shaped as a cam, and an abutment member carried by said frame and disposed within the range of movement of the cam surface of said lever so as to be engaged thereby.

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