Oct. 22, 1957 M. R. PERLA 2,810,360

ORNAMENTAL STITCH SEWING MACHINES

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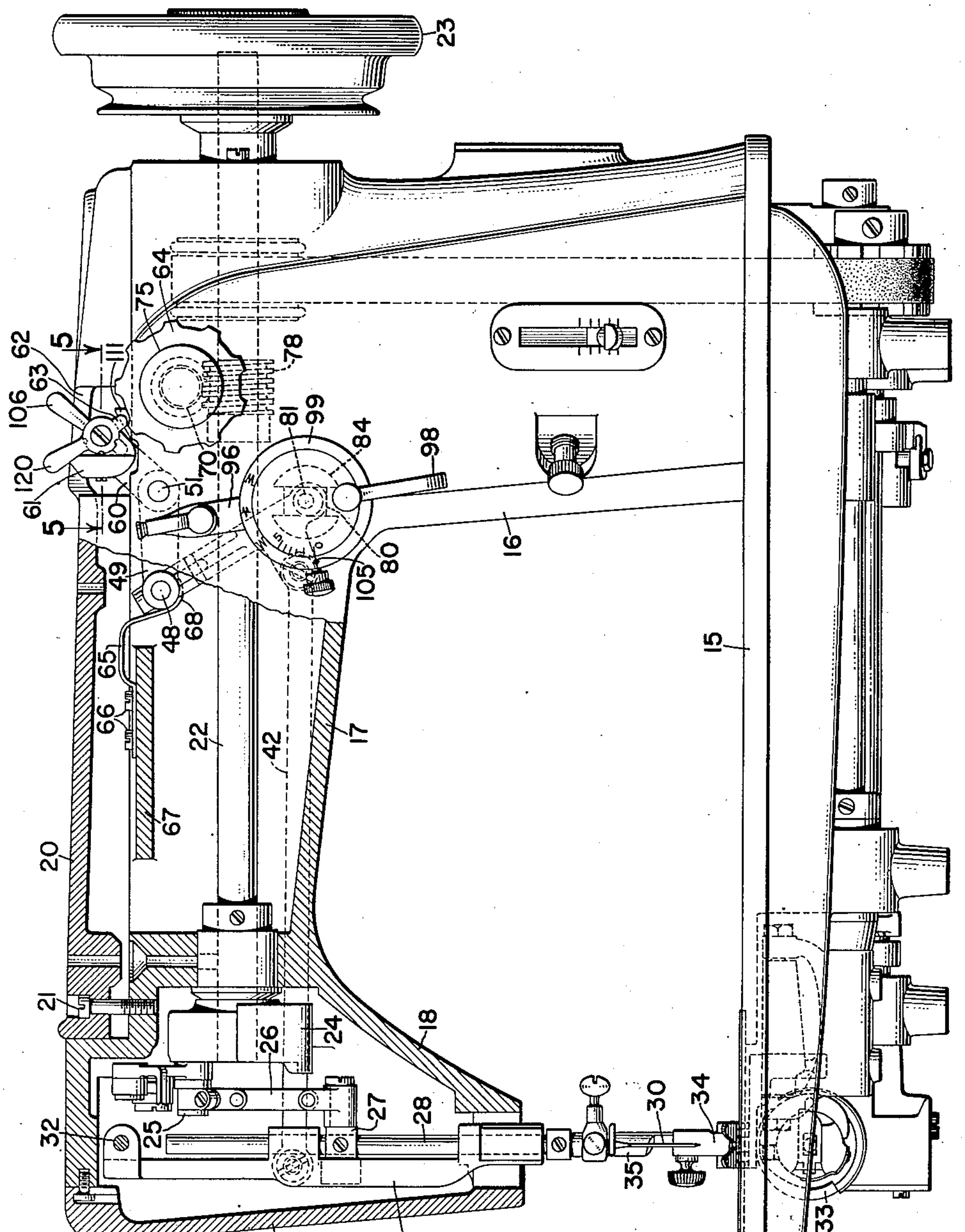

Fig. 1.

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ORNAMENTAL STITCH SEWING MACHINES

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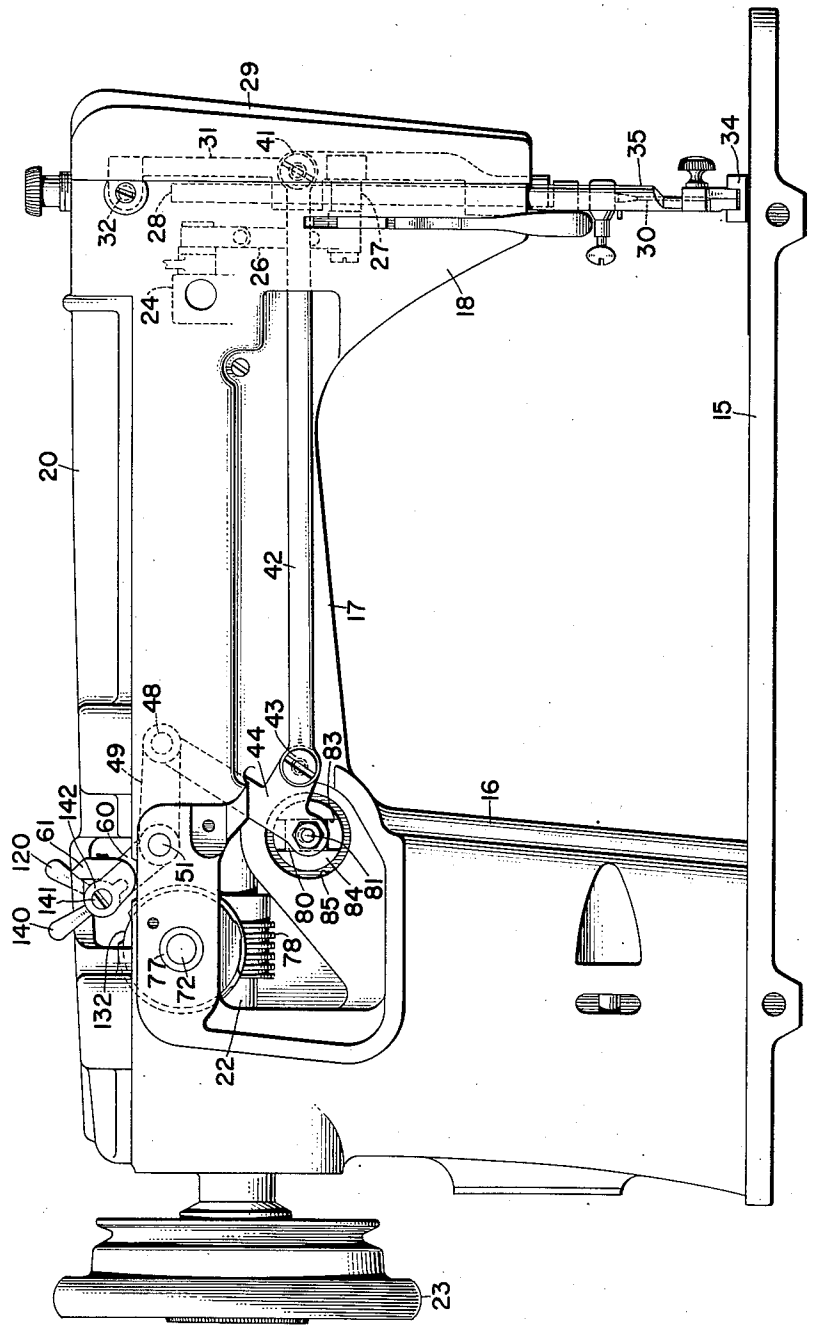

Fig.2.

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ORNAMENTAL STITCH SEWING MACHINES

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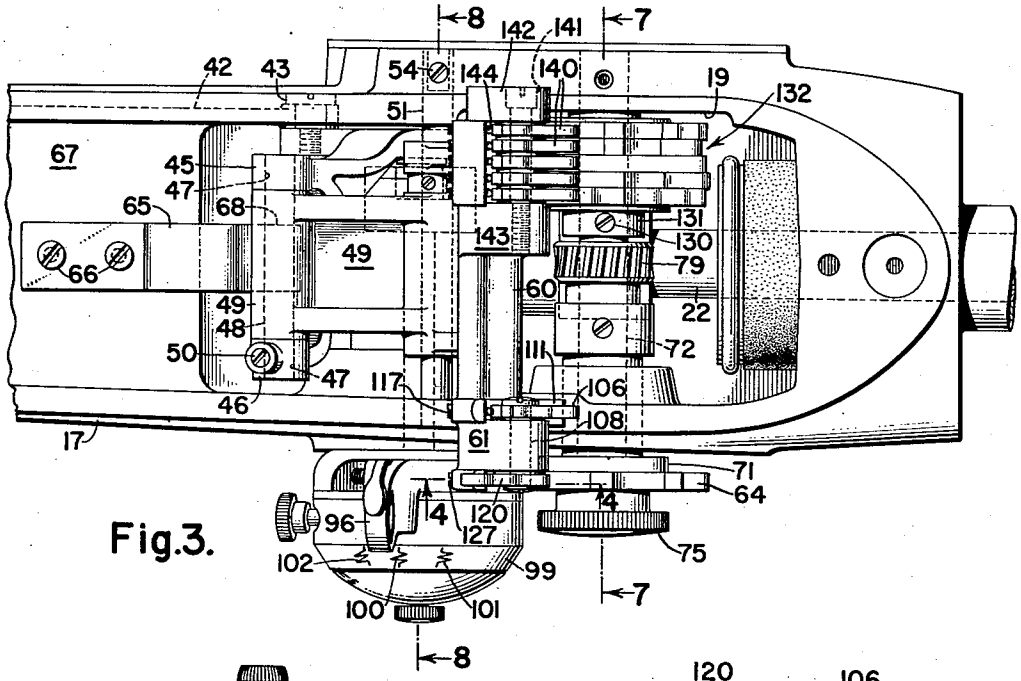

Fig.3.

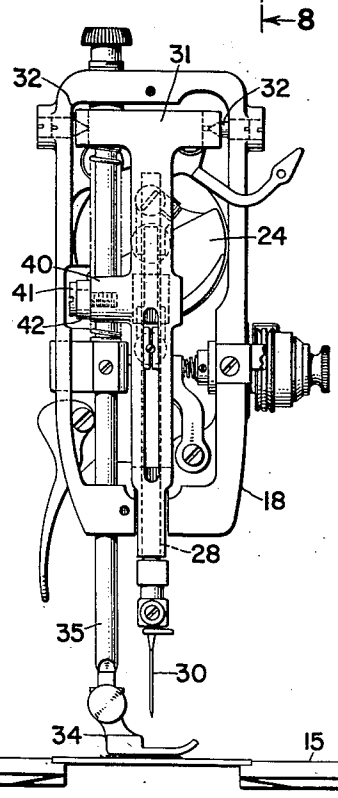

Fig.6.

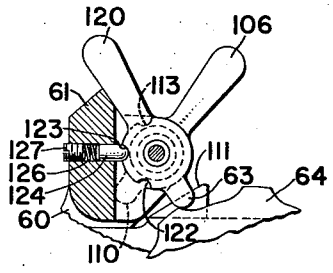

Fig.4.

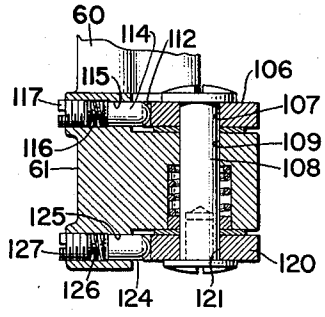

Fig.5.

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ORNAMENTAL STITCH SEWING MACHINES

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Fig.7.

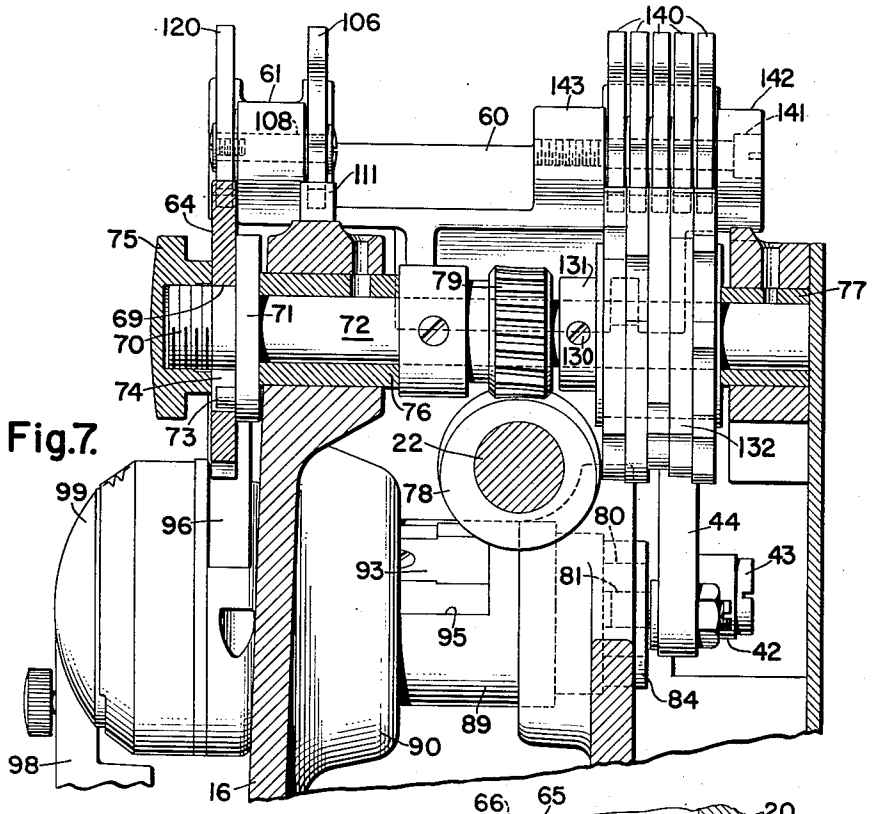
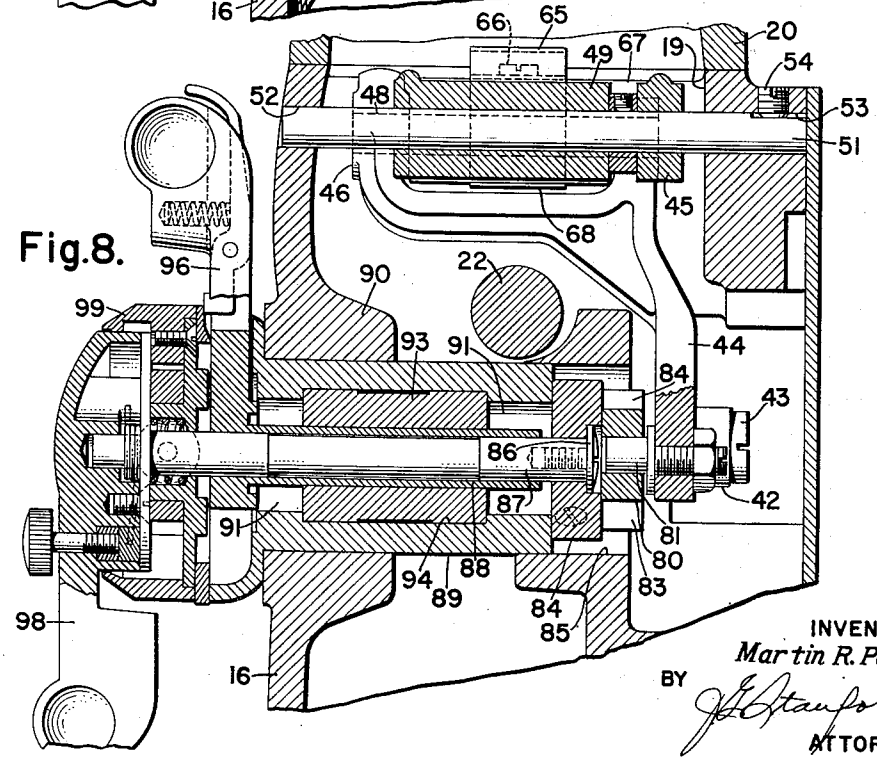


Fig.8.



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ORNAMENTAL STITCH SEWING MACHINES

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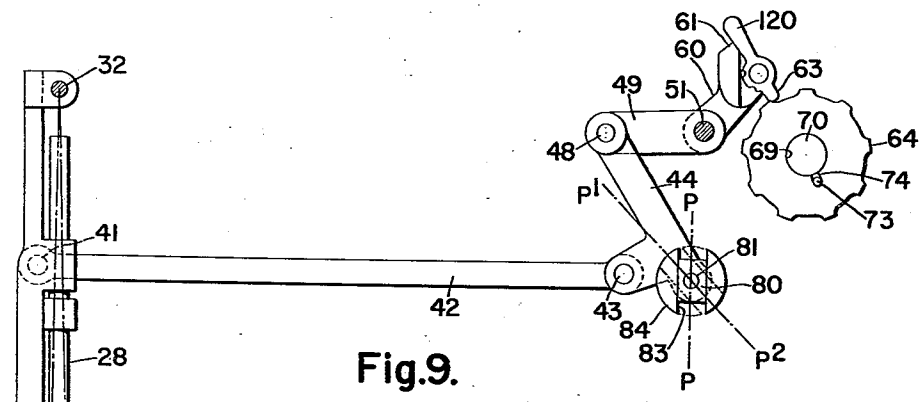

Fig.9.

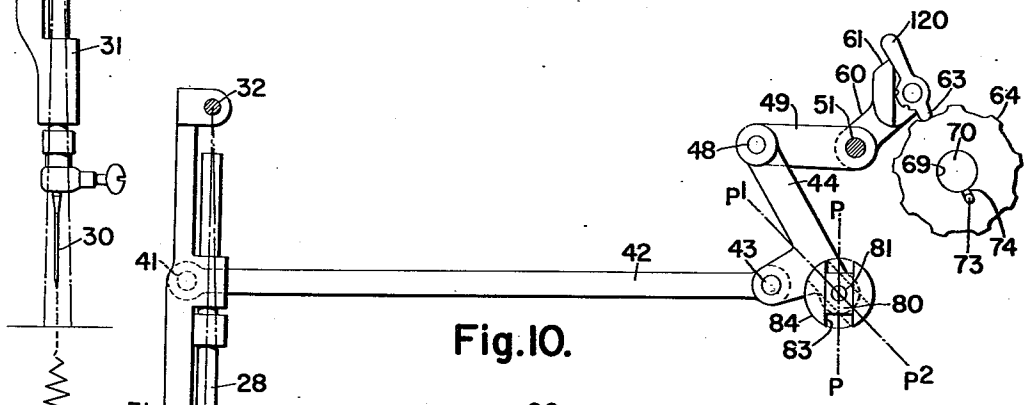

Fig.10.

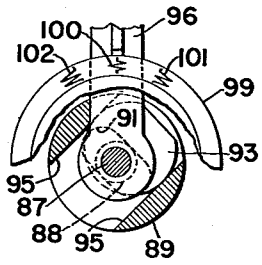

Fig.11.

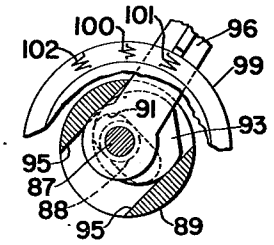

Fig.12.

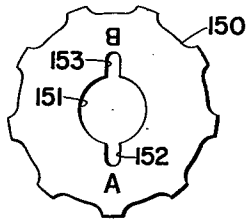

Fig.13.

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United States Patent Office

2,810,360

Patented Oct. 22, 1957

2,810,360

ORNAMENTAL STITCH SEWING MACHINES

Martin Richard Perla, Bridgeport, Conn., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application December 8, 1954, Serial No. 473,855

12 Claims. (Cl. 112—158)

This invention relates to improvements in ornamental stitch sewing machines and has for an object to provide such a machine with novel mechanism whereby the machine can be made to produce a large number of ornamental designs without any change in the construction of the machine.

A more specific object of the present invention is to provide a zigzag stitch type ornamental sewing machine with a plurality of different response producing records for controlling the actions of the zigzag stitch mechanism and means whereby such records may be selectively employed in different combinations for effecting various patterns of ornamental stitches.

A more specific object of the present invention is to provide a zigzag stitch sewing machine with novel mechanism including a plurality of rotary pattern cams and a plurality of cam tracking devices which function singularly or in combination to impart sidewise zigzag motions to the needle.

The above noted objectives have been accomplished by providing a zigzag type sewing machine, in addition to a removable rotary pattern cam located outside the confines of a sewing machine frame, with a nest of five rotary pattern cams which are secured together and rigidly mounted upon a cross-shaft which carries the usual removable cam. This nest of pattern cams is disposed within the confines of a sewing machine frame and it is not adapted normally to be removed from the machine by the operator. This machine is further provided with a first cam follower which is adapted to track the removable cam for the purpose of converting the rotary cam motions into lateral needle motions. In addition to this first cam follower the machine is provided with five supplementary cam followers of which each is adapted to track a respective one of the five nested pattern cams. These six cam followers are so arranged that any combination thereof may be operably positioned against their respective associated cams so that various combinations of cam pattern movements may be transmitted to the needle-bar, during a continuous predetermined stitching cycle.

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 the 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 disclosed in Fig. 1.

Fig. 3 represents a top plan view of a portion of the bracket-arm with the bracket-arm cover removed.

Fig. 4 represents, on an enlarged scale, a sectional view taken substantially along the line 4—4 of Fig. 3.

Fig. 5 represents, on an enlarged scale, a sectional view taken substantially along the line 5—5 of Fig. 1.

Fig. 6 represents a left-hand end view of the sewing machine disclosed in Fig. 1 but with the face plate removed.

Fig. 7 represents, on an enlarged scale, a sectional view taken substantially along the line 7—7 of Fig. 3.

Fig. 8 represents, on an enlarged scale, a sectional view taken substantially along the line 8—8 of Fig. 3.

Figs. 9 and 10 respectively represent detail views of the needlegate and its vibrating pitman and diagrammatically illustrate the effects of the pitman controlling mechanism which causes the needle to vibrate across and from one side of the neutral position of nonvibration of the needle.

Figs. 11 and 12 respectively represent cross-sectional views of the adjusting shaft and supporting bushing with the neutral position controlling lever at different limits of movement in the respective views.

Fig. 13 represents a modified form of rotary cam.

The present improvements are illustrated in the drawings and herein described as embodied in a zigzag stitch sewing machine of the type disclosed in the United States patent of Alfred Tiesler, No. 2,014,916, dated September 17, 1935. Furthermore, the manually controlled adjusting means employed in connection with the present sewing machine for effecting lateral movements of the needle is disclosed and described in detail in the United States patent application Serial No. 356,928, filed May 25, 1953, by Ralph E. Johnson and Alexander F. Kerr, now Patent No. 2,713,838, dated July 26, 1955.

Referring to the drawings, the sewing machine illustrated has a bed-plate **15** affording a work support from one end of which rises the 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, designated in Fig. 3 by the numeral **19**, is adapted to be closed by means of a cover-plate **20** which is removably secured in position by a plurality of screws of which one, **21**, is shown in Fig. 1.

Rotatably journaled in suitable bearings provided in the bracket-arm **17** is a horizontally disposed main shaft **22** extending lengthwise of the bracket-arm and carrying at one end a driving pulley **23**. At its opposite end, the main shaft **22** carries a counter-balanced crank **24** provided with a crank-pin **25** connected by a jointed link **26** to a collar **27** secured upon a vertically disposed needle-bar **28**. This needle-bar mechanism is located within the hollow head **18** which is closed at its forward end by means of a face-plate **29**.

The needle-bar **28** carries at its lower end an eye-pointed needle **30** and is journaled for endwise reciprocation in bearings provided in a substantially T-shaped vibratory needle-bar gate **31**. The gate **31** is pivotally hung upon a pair of oppositely disposed pintle screws **32—32** supported within apertures provided in the opposite wall portions of the hollow head **18** so as to provide for swinging movements of the gate about a substantially horizontally disposed axis.

Cooperating with the needle **30** below the bed-plate **15** and in the formation of lock stitches is a loop-taker **33** supported for rotation in a vertical plane parallel to and rearwardly of the plane of needle vibration. The loop-taker **33** is rotated twice for each complete needle reciprocation by driving connections with the main shaft **22**. Feeding mechanism of the lower four-motion type is provided for advancing work past the needle in a direction transverse to the plane of needle vibration, and a presser-foot **34** is secured to a presser-bar **35** so as to oppose the work-engaging portion of the feeding mechanism in a conventional manner.

Extending horizontally from an intermediate portion of the needle-bar gate 31 is a boss 40 to which is pivotally secured by means of a clamp-screw 41 one end portion of a link or pitman member 42. The pitman 42 is disposed horizontally and externally at the rearward side of the bracket-arm 17. As is best disclosed in Fig. 2, the other end of the pitman 42 is pivotally connected by means of a shoulder screw 43 to a link member 44, the upper end portion of which is formed in the manner of a fork so as to provide two spaced arms 45 and 46 of which each is apertured, as at 47, so as to be pivotally connected by means of a pin 48 to one end portion 49 of a cam-actuated bell-crank lever which also receives the pin 48. A set screw 50 threaded within the arm portion 46 locks the pin 48 in its proper position within the forked end portions of the link 44.

The lever 49 is pivotally mounted within the bracket-arm 17 by means of a horizontal stub shaft 51 which extends transversely across the sewing machine bracket-arm to be received within oppositely disposed apertures 52 and 53 formed in the bracket-arm walls. A set screw 54 locks the shaft 51 in its proper position within the bracket-arm.

Projecting upwardly and laterally from the bell-crank arm 49 is a second arm 60 carrying an offset portion 61 which extends through an aperture 62 formed within the cover-plate 20 so as to be positioned outside the confines of the sewing machine frame. As may be best understood by reference to Figs. 1 and 3, the arm portion 61 is provided with a cam follower, generally designated by the numeral 63, which cam follower will be hereinafter described in further detail.

The cam follower 63 is forced into engagement with the periphery of a rotary cam 64 by means of a leaf spring 65 of which one end portion is secured by means of screws 66, 66 to a cross brace 67 formed within the sewing machine bracket-arm, while the other end portion is formed as an upturned hook 68 which is disposed directly beneath the left-hand end portion of the bell-crank lever arm 49, as viewed in Fig. 1, so as to bias the lever in a clockwise direction thereby to urge the cam follower 63 downwardly into engagement with the periphery of the cam 64.

Referring particularly to Figs. 1, 3 and 7, the cam 64 is provided with an aperture 69 so that the cam may be removably disposed over the threaded end portion 70 and against the shouldered portion 71 of a cam shaft 72. The cam shaft 72 has its end shoulder portion 71 provided with a pin 73 which is received within an aperture 74 for the purpose of locating the cam in its proper position upon the cam shaft 72. A thumb screw 75 is adapted to be received over the threaded end portion 70 of the cam shaft for the purpose of locking the cam 64 in its operable position against the shoulder 71.

The cam shaft 72 is journaled in the front and rear walls of the bracket-arm 17 in bearing bushings 76 and 77, said cam shaft 72 being disposed above and horizontally transverse to the main shaft 22. A spiral gear 78 carried by the main shaft 22 drives a spiral gear 79 secured upon the cam shaft 72 whereby the latter is rotated, for example, at one-eighteenth the speed of rotation of the main shaft 22.

From the foregoing, it will be understood that, during the operation of the machine the cam 64 being carried by the rotary stub shaft 72 will rotate and thus actuate the cam follower 63 to the end that the bell-crank lever 49—60 will pivot about its pin 51 so that the lever 49 will rise and fall in a manner as dictated by the peripheral shape of the cam and, thus, the pitman 42 through the medium of the depending link member 44 will have its left-hand end portion, as viewed in Fig. 2, shifted up and down.

In order to translate the lateral vibratory movements of the pitman 42 into effective endwise reciprocatory movements, thereby to impart swinging movements to the needle-bar gate 31, a guide block 80 (see Figs. 2 and 8) is secured upon the pitman 42 by a pin 81, which guide block 80 is shiftably disposed within a guideway 83 constituted by a rearwardly open slot formed on the outer or rearwardly exposed face of an arcuately and bodily adjustable guide head 84. The guideway 83 and the block 80 preferably have straight sides but, if desired, the guideway and the block may each be arcuate with its center of curvature in one position of the guide 83 lying in the pivotal axis of the pitman 42 afforded by its pivotal connection 41 with the needle-bar gate 31.

The guide head 84 extends freely through an opening 85 in the rear wall of the bracket-arm 17 whereby the portion of the guide head containing the guideway 83 is disposed at the rear of the bracket-arm. The guide head 84 is secured by a screw 86 upon an adjusting shaft 87 disposed parallel to the cam shaft 72 and having its longitudinal axis in substantially the horizontal plane.

The adjusting shaft 87 of the guide head 84 is rotatably journaled in a bearing sleeve 88 in the form of a hollow shaft telescopically arranged in a coaxial relation with the adjusting shaft 87 and supported for turning and bodily lateral movements thereof by a supporting member in the form of a fixed bushing 89 secured by one or more screws, not herein shown, in a bearing boss 90 provided in the front wall of the bracket-arm 17. The opposite ends of the bearing sleeve 88 are fitted to slide in parallel guide slots 91, 91 provided at the opposite ends of the bushing 89, such guide slots being elongated in a direction corresponding to the general direction of the center line of the guideway 83 at its limit of angular movement in which the needle has its maximum lateral throw. The guide slots 91, 91 therefore confine the bearing sleeve 88 and the adjusting shaft 87 journaled in the bearing sleeve through lateral movements in a path corresponding to the path of movement of the block 80 in the guideway 83 at the limit of angular movement of the guide head 84 influencing maximum vibration of the needle. As the lateral movements of the adjusting shaft 87 determine the different neutral positions of nonvibration of the needle, it will be understood that the maximum needle vibration of the needle remains fixed on changing from one to another neutral position of nonvibration of the needle. This arrangement has the advantage of maintaining cooperative relationship between the needle and the loop-taker within predetermined limits of lateral throw of the needle so that within said limits no provision need be made for imparting compensating movements to the loop-taker regardless of the neutral position adjustment of the controlling mechanism.

In order manually to effect bodily shifting movement of the adjusting shaft 87 and therefore the axis of angular adjustment of the guide head 84, an eccentric 93 is secured by a set screw, not herein shown, upon the bearing sleeve 88 within the ends of the latter. The eccentric 93 is disposed within a recess 94 provided in the bushing 89 between the ends of the bushing containing the guide slots 91, 91, the opposed and parallel walls 95 which (see Figs. 11 and 12) define the recess 94 being substantially transverse to the length of the guide slots 91, 91 diametrically of the bushing. The front end of the bearing sleeve 88 extends beyond the front end of a bushing 89 and rigidly carries an operating arm 96 disposed externally of the front wall of the bracket-arm 17.

By turning the operating arm 96 from one limit of movement as shown in Fig. 11 to the other limit of movement shown in Fig. 12, a combination turning and sliding movement is imparted to the eccentric 93 within the confines of the walls 95, 95 of the bushing 89 due to the fact that the bearing sleeve 88 which carries the eccentric 93 is confined by the guide slots 91, 91. The described movement of the eccentric 93 carries the bearing sleeve 88 from one end to the other on the guide slots 91, 91 and thereby effects a bodily lateral shifting movement of the angular adjustment axis of the guide head 84 between fixed limits. Obviously the operating

arm **96** may be turned a distance less than that of its full throw, if desired.

The front end of the adjusting shaft **87** extends forwardly beyond the front end of the bearing sleeve **88** and secured thereto by means not herein described, is a hand lever **98** operable to turn angularly the guide head **84** and thereby change the amplitude of needle vibration. For a more complete description and disclosure of the present needle vibration controlling mechanism, reference may be had to the above noted United States patent application Serial No. 356,928.

In connection with the adjusting levers **96** and **98**, it is sufficient to say that the member **96** has cooperating therewith an indicia plate **99** having, as best disclosed in Figs. 1, 7 and 8, three indicia characters **100**, **101** and **102** of which the character **100** indicates the central or null position of the needle illustrated by the solid lines of Figs. 9 and 11, while the character **101** indicates an extreme left-hand adjustment of the needle as indicated by the solid lines of Figs. 10 and 12. Character **102** illustrates the extreme right-hand position of the needle which is not illustrated in the present drawings.

In the mid-position of the operating arm **96**, illustrated in Fig. 11, the fulcrum axis of the adjusting shaft **87** is disposed at mid-position of its movement within the inclined slots **91**, **91** of the bushing **89** and the non-vibration path of the needle is located centrally of its field of vibration as illustrated in Fig. 9 of the drawings. In this position of the lever **96**, and when the hand lever **98** employed to control the vibration amplitude of the needle is disposed in its lower position as indicated in Fig. 1, the index arrow **105** carried by the handle **99** (see Fig. 1) points to the zero marking on the handle **98** and this is indicative of the fact that upon operation of the machine the needle will be reciprocated in a fixed path which, as above indicated, is located centrally of its field of vibration. This is due to the position of the guideway **83**, as shown in full lines in Fig. 9, which is now disposed in a neutral position wherein the guide block **80** idly traverses said guideway **83** in a path P—P so that no appreciable endwise movement is imparted to the pitman **42**. If the hand lever **98** is now turned in a counterclockwise direction as viewed in Fig. 1, the guideway **83** will be correspondingly turned angularly into a position of axial influence upon the pitman **42**, the center of the guide block **80** now traversing a path P^1, P^2 which extends equal distances to opposite sides of and intersects the angular adjustment of central axis of the guideway **83**. Consequently, this action will effect the action of the needle so that the throw of the needle will be at opposite sides of its neutral path of reciprocation in a symmetrical manner. In the described position of the operating arm **96**, any positions of the hand lever **98** from zero to maximum throw of the needle will be visually indicated by the index figures carried by the member **98** and the arrow **105** of the member **99**.

When the operating arm **96** is turned to its right-hand limit of its movement (see Fig. 12) while the hand lever **98** is in the position illustrated in Fig. 1 the fulcrum axis of the adjustment shaft **87** will be laterally displaced in a direction corresponding substantially to the length of the guideway **83** that is in substantially the path P^1, P^2 illustrated in Fig. 9. As hereinbefore explained, this is due to the fact that the guide slots **91**, **91** are elongated in a direction substantially corresponding to the path P^1, P^2.

Referring now to Fig. 10, it will be understood that the lateral shifting of the adjusting shaft **87** from the position illustrated in Fig. 9 has displaced the fulcrum or central axis of the guideway **83** into coincidence with the lower limit of movement of the center of the guide block **84**. Consequently, operation of the hand lever **98** now effects angular adjustment of the guideway **83** about said lower point and the guide block **80** has a path of travel bearing from its neutral path P—P to its path P^1, P^2 of maximum influence upon the pitman **42**, the neutral path of reciprocation of the needle being entirely at the left-hand side of its field of vibration as shown in Fig. 10.

By the same token, if the handle **96** is moved to its extreme left-hand position of the said indicia device **99**, the needle would be shifted to its extreme right-hand position and, thus, the neutral path of reciprocation of the needle will be entirely at the right-hand side of the field of operation all of which is disclosed and described in the above noted pending United States patent application Serial No. 356,928.

From the above, it is to be understood that the present machine as so far described is characterized by having a rotary pattern-cam **64** which is adapted to impart lateral zigzag movements to the needle **30**. This cam mechanism is designed in such a manner that various cams may be substituted for the purpose of providing different types of ornamental zigzag stitches. For example, the cam **64** disclosed in Figs. 9 and 10 of the patent drawings is adapted to produce a conventional zigzag stitch whenever the handle **98** is shifted away from its zero position, but, of course, other cams having different peripheral configurations may be substituted for the cam **64** so as to produce various types of motion patterns for the needle. However, in addition to being cam actuated the present machine is provided with means for altering the amplitude of lateral needle vibration and for varying the null or nonvibration position of the needle. In other words, the various selected cams may be employed for imparting divers patterns of lateral motion to the needle but at the same time the amplitude of this motion, as well as the nonvibration position of the needle, may be varied by movement of the handles **96** and **98**.

In order to prevent wear of the cam follower **63** and the cam **64** during the time that the machine is adjusted for straight line stitching the present invention contemplates the provision of a cam follower lifting device in the form of a hand lever **106** whose intermediate portion is apertured at **107** so that the member may be rotatably secured upon a pin **108** mounted within an aperture **109** formed in the portion **61** of the bell-crank lever arm **60**. The lifting lever **106** is provided at its lower end with a finger portion **110** which, when the lever is turned in a counterclockwise direction as viewed in Fig. 4, is adapted to engage an inclined abutment block **111** formed upon the side wall of the bracket-arm **17**. As the finger portion **110** engages the inclined abutment member **111** it will urge the member **61** to move in a counterclockwise direction about its pivot pin **51** whereby the cam follower portion **63** will rise out of contact with the cam **64** so that during straightaway stitching of the machine the cam **64** will not engage the cam follower **63**.

As may be observed from Figs. 4 and 5, the lever **106** is provided with a pair of detent-receiving notches **112** and **113** which are adapted to receive a detent pin **114** slidably disposed within an aperture **115** formed within the member **61**. A spring **116** located within the bore **115** urges the detent **114** toward the lever **106** while a set screw **117** maintains the spring in its proper position. From this it is to be understood that the detent-receiving notches **112** and **113** respectively lock the handle member **106** in its operative or inoperative positions relative to the inclined abutment block **111**.

For reasons which will be hereinafter set forth, the above noted cam follower **63** is formed upon the lower portion of a hand lever **120** which, like the cam follower lifter lever **106**, is apertured as at **121** so as to be pivotally secured upon the pin **108** carried by the member **61**. The member **120** is also provided with a pair of detent-receiving notches **122** and **123** of which each is adapted to be engaged by a detent member **124** located within a bore **125** of the member **61** so as to be biased by a spring **126** toward the member **120**. A set screw **127** maintains the spring **126** in its proper position. From

this it is to be understood that the detent-receiving notches 122 and 123 will function respectively to maintain the member 120 either in its inoperative or operative position relative to the cam 64.

Referring particularly to Figs. 3 and 7, the cam shaft 72 has secured thereto by means of a set screw 130 a cylindrical hub member 131 which carries as an integral part thereof five different rotary cam elements which are designated by the numeral 132. These five cams are rigidly mounted upon the hub 131 so that they will all rotate in synchronism with the shaft 72 and as a consequence with the aforementioned cam 64.

Cooperating with each of the five cams is a separate cam follower lever member 140 having a configuration and a construction substantially similar to that of the lever 120. By referring particularly to Fig. 3, it is to be observed that there are five of these levers 140 of which each is pivotally mounted upon a pin 141 carried between spaced portions 142 and 143 of the bell-crank arm 60 so that each of the lever members 140 may be shifted about the pin in the same manner as the above noted lever member 120. Cooperating with each of these levers 140 is a spring-biased detent pin, designated by the numeral 144, and each of these pins is constructed and is adapted to operate in the exact same manner as is the above noted pin 124.

Each of the members 140 is adapted to be shifted about the pin 141 independently of its associated members and it is designed in the manner of the aforesaid lever 120 to engage an oppositely disposed one of the five rotary cams 132 when the lever is in one position and to be disposed out of contact with the cam when the lever is in its retracted or inoperative position in the same manner as the lever arm 120.

From this it is to be understood that the levers 140 function in the same manner as the lever 120 to cooperate with their oppositely disposed cams 132 and, as a matter of fact, an operator may select any one of the available six cams for operation at any one time or, in the alternative, any combination of these cams may be operatively employed simultaneously merely by throwing the appropriate lever arms into their operative positions. Thus, the present machine is designed to produce a large number of different ornamental stitch patterns as dictated by the peripheral cam portions of the various six cams. Furthermore, various combinations of these cams may be selected to operate in synchronism thus producing cam patterns which are distinctly different from any one of the individual cams themselves. Thus, from one to six cams may be operated either singularly or in various selected combinations.

The cam follower lifting member 106 when thrown to its operative position wherein its finger portion 110 is upon the inclined abutment member 111 functions to raise all of the six cam followers so that they will not engage any of the cams to the end that the followers will not engage the cams during straight stitching operations.

It will also be appreciated that the hand control levers 96 and 98 which control the bight or amplitude of needle-bar vibration will alter the effectiveness of the cams 132 in the exact same fashion that they affect the effectiveness of the cam 64 to the end that these cams may be rendered ineffective by positioning the bight control arm 98 in its so-called zero position, and the width of the stitch pattern produced by any one or a combination of these cams may be affected by the proper adjustment of the lever 96 in the fashion as described hereinabove in connection with the operation of cam 64.

It is to be understood that the above described groups of cams are in effect intelligence record-carrying means having a plurality of different response producing records while the various cam follower elements 120 and 140 are in effect individual intelligence pick-up devices corresponding to each of the response-producing records for sensing and responding to said records in reaction to the relative movements between the pick-up means and the record-carrying means. Also, the bell-crank lever member 49—60 is essentially a mechanism for integrating a plurality of the record responses, while the pitman 42 with its connection means constitutes a transmission mechnism for shifting the needle sidewise in conformance with the integrated record response, and the elements 96 and 98 constitute operator-influenced means for varying the effect of the various record-carrying means.

In order to provide further patterns of ornamental stitches the present invention contemplates the provision of means whereby a needle-controlling cam may be adjusted about its cam shaft. For example, the cam 64 may be replaced by a cam 150 (see Fig. 13) which is provided with two notches 152 and 153, either of which may receive the cam-shaft locating pin 73. For purposes of convenience these notches may be labeled on the cam by the letters "A" and "B." From Fig. 13 it may be observed that the notches 152 and 153 are disposed adjacent dissimilar portions of the cam periphery so that the cam 150 may be mounted upon the shaft 72 in two different effective positions relative to the other cams 132. Thus, the cam 150 may be adjusted about the shaft 72 and relative to the cams 132 to the end that such an adjustment will affect a new ornamental stitch pattern whenever the cam 150 is simultaneously employed in conjunction with any combination of the cams 132.

Naturally, additional pin-receiving notches may be provided in cam 150 so as to provide for further adjustment of the cam about its shaft 72. Such a relative phase shifting of the cams will result in an alteration of the integrated record response of the bell-crank lever arm 49 with the result that a different ornamental stitch will be produced.

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

1. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, intelligence record-carrying means carried by said frame and having a plurality of different response-producing records, means for sensing and responding to at least a pair of said records during a continuous predetermined stitching cycle, said last mentioned means including an individual intelligence pick-up device provided for each of said response-producing records for sensing and responding to its associated record in reaction to relative movements between said pick-up device and said record-carrying means, means producing such relative movements in synchronism with the needle reciprocating movements during said cycle, means permanently aligning each pick-up device for sensing and responding to its associated record only, transmission mechanism connected with said needle for shifting said needle sidewise, means connecting each of said pick-up devices with said transmission means, and operator-influenced means carried by said frame for individually rendering each of said pick-up devices operative and inoperative relative to its associated record, and whereby a combined record response may be transmitted to said transmission means and to said needle by rendering operative two or more of said pick-up devices.

2. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, means connected to said needle for shifting the needle sidewise, a plurality of cylindrical rotary cams mounted upon said frame for rotation about a fixed common axis, means for rotating said cams in synchronism with the needle reciprocating movements, a plurality of cam-tracking elements of which each includes an arm and of which each element corre-

sponds to a respective one of said cams for sensing and responding to its associated cam in response to the movements of the cam, means supporting each of said elements upon said frame for shifting movements relative to and independently of its associated elements, means permanently aligning each of said elements for sensing and responding to its associated cam only, and operator-influenced means carried by said frame for selectively establishing an operative connection between said first mentioned means and each of said elements whereby said needle may be shifted sidewise in conformance with selected cam responses of said elements.

3. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a pitman connected to said needle for shifting the needle sidewise, a plurality of cylindrical rotary cams mounted upon said frame for rotation about a fixed common axis, means for rotating said cams in synchronism with the needle reciprocating movements, a plurality of cam-tracking elements each corresponding to a respective one of said cams, means permanently aligning each of said elements to movement in a single plane, means connecting each of said elements with said pitman thereby to actuate the latter in response to movements of said cams, means for individually shifting each of said elements into and out of cam-tracking relation with its associated cam, said last mentioned means including a plurality of handles each being connected to a respective one of said cam-tracking elements, and spring means carried by said frame and biasing said cam-tracking elements toward engagement with said cams.

4. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a pitman connected to said needle for shifting the needle sidewise, a plurality of cylindrical rotary edge cams mounted on said frame for rotation about a fixed common axis, means for rotating said cams in synchronism with the needle reciprocating movements, a plurality of cam-tracking elements all pivotally mounted about a common axis with each element corresponding to a respective one of said cams, means permanently aligning each element in radial relation with a respective one of said cylindrical cams, means connecting each of said elements with said pitman thereby to actuate the latter in response to movements of said cams, means for individually shifting each of said elements about said common axis and relative to its associated elements and into and out of cam-tracking position, said last mentioned means including a plurality of handles all pivotally mounted about a common axis and each being connected to a respective one of said cam-tracking elements, and spring means carried by said frame and biasing said cam-tracking elements toward engagement with said cams.

5. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a pitman connected to said needle for shifting the needle sidewise, a lever pivotally mounted on said frame and about a fixed axis and connected with said pitman by means of a link, a plurality of rotary cams mounted upon said frame for rotation about a fixed common axis, means for rotating said cams in synchronism with the needle reciprocating movements, a plurality of cam-tracking elements all pivotally mounted about a common axis with each element corresponding to a respective one of said cams, means permanently aligning each of said elements in radial relation with a respective one of said cams, means connecting each of said elements with said lever so as to shift the latter about its axis in response to the movements of said cams, means for individually shifting each of said elements about said common axis and relative to its associated elements and into and out of cam-tracking position, said last mentioned means including a plurality of handles of which each is carried upon said lever and is connected to a respective one of said cam-tracking elements, and spring means carried by said frame and biasing said cam-tracking elements toward engagement with said cams.

6. An ornamental stitch sewing machine comprising, a hollow bracket-arm terminating at its free end in a head, a needle mounted in said head for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary shaft extending lengthwise of and within said bracket-arm and connected with said needle for reciprocating the latter, a pitman connected to said needle for shifting the needle sidewise, a lever pivotally mounted within said bracket-arm and about a fixed axis and connected with said pitman by means of a link, a cam shaft mounted within said bracket-arm and transversely of said rotary shaft, gears operatively connecting said two shafts, a plurality of rotary cylindrical edge cams disposed within said bracket-arm and mounted upon and for rotation with said cam shaft, a plurality of cam-tracking elements all disposed within said bracket-arm with each element corresponding to a respective one of said cams, means supporting each of said elements upon said frame for shifting movements relative to and independently of its associated elements, means permanently aligning each of said elements for tracking and responding to its associated cam, means connecting each of said cam-tracking elements with said lever so as to shift the latter about its axis in response to the movements of said cams, means for individually shifting each of said cam-tracking elements into and out of cam-tracking relation with its associated cam, said last mentioned means including a plurality of handles of which each is carried upon said lever and is connected to a respective one of said cam-tracking elements and projects out of the bracket-arm through an aperture provided in the bracket-arm, and spring means carried upon said bracket-arm and biasing said cam-tracking elements toward engagement with said cams.

7. An ornamental stitch sewing machine comprising, a hollow bracket-arm terminating at its free end in a head, a needle mounted in said head for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary shaft extending lengthwise of and within said bracket-arm and connected with said needle for reciprocating the latter, a pitman connected to said needle for shifting the needle sidewise, a lever pivotally mounted within said bracket-arm and about a fixed axis and connected with said pitman by a link, a cam shaft mounted within said bracket-arm and transversely of said rotary shaft, gears operatively connecting said two shafts, a plurality of rotary cylindrical edge cams disposed within said bracket-arm and mounted upon and for rotation with said cam shaft, a plurality of cam-tracking elements disposed within said bracket-arm with each of said elements being carried by said lever and corresponding to a respective one of said cams for tracking the same, means supporting each of said elements upon said lever for shifting movements relative to and independently of its associated elements, means permanently aligning each of said elements for movement in a single plane, means for individually shifting each of said elements into and out of cam-tracking relation with its associated cam, said last mentioned means including a plurality of handles of which each is carried upon said lever and is connected to a respective one of said elements and projects out of the bracket-arm through an aperture provided in the bracket-arm, and spring means carried by said bracket-arm and biasing said elements toward engagement with said cams.

8. An ornamental stitch sewing machine comprising, a hollow bracket-arm terminating at its free end in a

head, a needle mounted in said head for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a rotary shaft extending lengthwise of and within said bracket-arm and connected with said needle for reciprocating the latter, a pitman connected to said needle for shifting the needle sidewise, a lever pivotally mounted within said bracket-arm and about a fixed axis and connected with said pitman by means of a link, a cam shaft mounted within said bracket-arm and transversely of said rotary shaft, gears operatively connecting said two shafts, a plurality of rotary cylindrical edge cams disposed within said bracket-arm and mounted upon and for rotation with said cam shaft, a plurality of cam-tracking elements disposed within said bracket-arm and pivotally mounted about a common axis with each of said elements corresponding to a respective one of said cams, means permanently aligning each of said elements in radial relation with a respective one of said cams, means connecting each of said elements with said lever so as to shift the latter about its axis in response to the movements of said cams, means for individually pivoting each of said elements about said common axis thereby to shift such element into and out of cam-tracking position with its associated cam, said last mentioned means including a plurality of handles of which each is carried upon said lever and is connected to a respective one of said elements and projects out of the bracket-arm through an aperture provided in the bracket-arm, spring means carried by said bracket-arm and biasing said elements toward engagement with said cams, a pin carried by said pitman, an angularly adjustable guideway carried by said bracket-arm and receiving said pin for translating lateral vibrations of the pitman into endwise movements, and means mounted upon said bracket-arm for angularly adjusting said guideway thereby to alter the pattern of endwise pitman movements.

9. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a plurality of adjacently disposed rotary edge cams mounted on said frame for rotation about a common axis, means for rotating said cams in synchronism with the needle reciprocating movements, a lever pivotally secured upon said frame and about an axis disposed in parallel relation with the cam axis and being connected with said needle so as to shift the latter sidewise, a spring carried by said frame and biasing said lever toward said cams, a plurality of cam-tracking elements pivotally mounted upon said lever and about a common axis disposed in parallelism with said cam axis with each element corresponding to a respective one of said cams, means permanently aligning each of said elements in radial relation with a respective one of said edge cams, and means for individually pivoting each of said cam-tracking elements about its axis thereby to shift such element into and out of cam-tracking position with its associated edge cam, said last mentioned means including a plurality of handles of which each is connected to a respective one of said elements.

10. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a pair of rotary cams mounted upon said frame, means rotating said cams in synchronism with the needle reciprocating movements, cam-tracking means carried by said frame for tracking and responding to said pair of cams during a continuous predetermined stitching cycle, transmission mechanism connecting said cam-tracking means with said needle for shifting said needle sidewise in conformance with the combined cam responses of said cam-tracking means, and means enabling said two cams to be phase-shifted relative to each other thereby to alter the stitch patterns performed by the needle.

11. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, a pair of rotary edge cams mounted upon said frame and about a common axis, means rotating said cams in synchronism with the needle reciprocating movements during a continuous predetermined stitching cycle, cam tracking means carried by said frame for tracking and responding to both of said cams during said continuous cycle, transmission mechanism connecting said cam tracking means with said needle for shifting said needle sidewise in conformance with the combined cam responses of said cam-tracking means, and means enabling one cam to be relocated about said common cam axis and relative to its associated cam thereby to alter the stitch patterns performed by the needle.

12. An ornamental stitch sewing machine comprising, a frame, a needle mounted in said frame for endwise reciprocation and for sidewise movements transversely of the direction of reciprocation, an oscillatable lever pivotally mounted about an axis fixed by said frame, said lever connected to said needle for shifting the latter sidewise, a plurality of cylindrical rotary edge cams mounted upon said frame for rotation about a fixed common axis, means rotating said cams in synchronism with the needle reciprocating movements, a plurality of cam-responding elements each corresponding to a respective one of said cams, means mounting each of said elements upon said lever for movements relative to said lever whereby each element may be shifted into and out of cam-responding relation with its associated cam, spring means biasing said lever toward said cams, manually operable means carried by said lever for releasably locking each of said elements against movement relative to said lever and in cam-responding relation with its associated cam whereby said needle may be shifted sidewise in conformance with selected cam responses of said elements, and means permanently aligning each of said cam-responding elements for responding to its associated cam only.

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