

Nov. 10, 1964

R. REEBER ETAL

3,156,205

SEWING MACHINE MECHANISM FOR DECORATIVE STITCHING

Filed April 23, 1963

FIG. 1

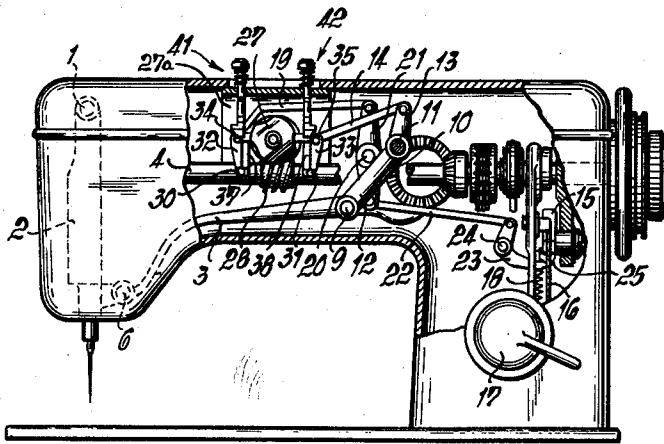


FIG. 2

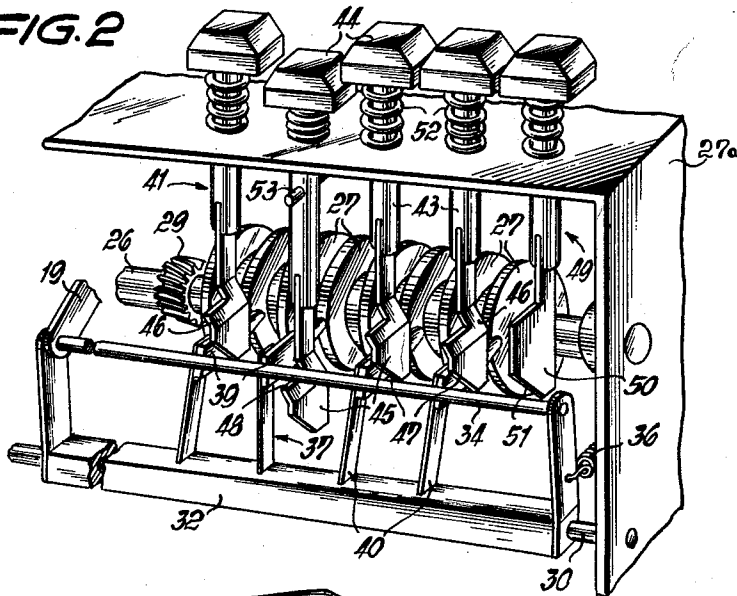
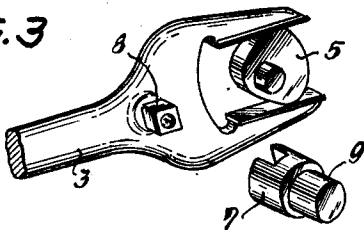


FIG. 3



INVENTORS

Rudolf REEBER
Reinhold DOBNER
Rudolf SCHAFFER

BY *Robert A. Faust*
AGT.

1

3,156,205

**SEWING MACHINE MECHANISM FOR
DECORATIVE STITCHING**

Rudolf Reeber, Reinhold Dobner, and Rudolf Schäfer,
Kaiserslautern, Germany, assignors to G. M. Pfaff
A.G., Kaiserslautern, Pfalz, Germany

Filed Apr. 23, 1963, Ser. No. 275,018

Claims priority, application Germany, Apr. 26, 1962,
P 29,253

3 Claims. (Cl. 112—158)

The present invention relates to sewing machines and is particularly concerned with mechanism for controlling decorative stitching operations.

More in particular, the invention concerns a mechanism or assembly for sewing machines adapted for sewing fancy or decorative patterns. Such mechanism comprises a plurality of pattern cam disks mounted on a stationary shaft and an equal number of cam followers journalled equi-axially on a spring loaded rocker as well as a selector or setting device for establishing an operative connection between the rocker and one of the cam disks by way of the follower associated therewith.

It is an object of the invention to provide a simple mechanism for controlling the sewing of decorative stitches which is particularly simple in construction and operation in which the danger of setting or operational errors is eliminated and great accuracy of the transmitted impulses is obtained. In accordance with the invention this is accomplished in that the scanning end of each follower is secured to the rocker by a leaf spring which yields perpendicularly to the movement of the rocker and is movable radially and axially by means of an operating member associated with the selecting means.

In accordance with this arrangement the previously selected follower is automatically disconnected as a new follower is rendered operative. In addition, it is possible in this manner to coordinate with each follower a particular operating member which is not moved during sewing, for example, a push button. The elimination of joint connections between the cam disks and the rocker insures of a high degree of accuracy in the transmission of the impulses derived from the cam disks.

In a preferred embodiment of the invention each operating member has a switch element having two key surfaces that are disposed to exert forces displaced at angles of 90° with respect to one another, one of which cooperates with the scanning end or scanning member and the other with an abutment which is firmly connected with the scanning end or member and extends perpendicularly to the plane in which it rocks.

Further advantages and objects of the invention will become apparent from the following description and with reference to the embodiment of the new mechanism illustrated in the drawings in which:

FIG. 1 is an overall view, partly in section, of a sewing machine equipped with the new decorative stitching mechanism;

FIG. 2 is a perspective illustration of a part of the decorative stitching mechanism drawn to an enlarged scale, and

FIG. 3 shows the slide control device of the machine which is under the control of the mechanism.

As shown in FIG. 1 the mechanism for sewing decorative stitches is accommodated in the machine arm which,

2

in a known manner has a needle bar guide or oscillator 2, the lateral movements of which are effected by a bifurcated lever 3. The driving of the lever 3 is accomplished in a known manner by a triangular cam 5 which is operatively connected to the arm shaft 4 of the machine (see also FIG. 3). In this manner the bifurcated lever 3 is caused to oscillate about the joint 6 by means of which it is connected to the needle bar oscillator. The magnitude of the over stitch or stitch width and the stitch location are determined by a slide member 7 in which a slide block 8 is slidably received. The angular position of the slide member 7 determines the magnitude of the transverse stitches while the lateral position of the shaft 9 which is rigidly connected with the slide portion 7 determines the stitch location.

The change in the position of the shaft 9 necessary for changing the stitch location is effected by a double armed lever 10 (FIG. 1) which is journalled in a stud 11 secured in the housing of the sewing machine. An arm 12 of the lever 10 encompasses the shaft 9 while the other arm 13 operates the decorative stitch mechanism by way of a link 14.

A stitch setting device of known construction is arranged in the standard of the machine, the slide 15 of which is connected by way of a bar 16 with a setting mechanism 17 while a spring 18 pulls the slide 15 positively in forward direction in the position determined by the setting mechanism 17.

The slide 15 is adjustable by way of the setting mechanism 17 not only by hand but also automatically by way of the decorative stitching mechanism, particularly by way of a link 19, a double armed lever 21 journalled in the housing by means of a stud 20, a connecting bar 22 and an angular lever 23 which is likewise journalled in the housing of the machine by means of a stud 24. Under these conditions the free end 25 of the angular lever 23 rests against the slide 15.

As shown in FIGS. 1 and 2 the decorative stitching mechanism has a plurality of pattern cam disks 27 which are secured to a cam shaft 26 rotatably journalled on a support 27a in the housing of the machine and are separated by gaps from one another. The drive of the shaft is effected from the arm shaft 4 by way of a worm gear 28 which cooperates with a corresponding gear 29 on the shaft 26. On both sides of the pattern cam disks 27 shafts 30 and 31 are journalled (FIG. 1) each of which carries a rocker 32 or 33 and the arms of which are each connected with an abutment 34 or 35 respectively. A pull spring 36 is fastened at one end to an arm of the rocker 32 and at the other end to the opposite arm of the rocker 33.

The rocker 32 supports a series of followers 37 and the rocker 33 a series of followers 38. The followers 37 and 38 consist of leaf springs 40 provided with the scanning or follower ends 39 which are secured in the rockers 32 or 33 in such a manner that the scanning ends 39 can normally move in the free space laterally of their appertaining pattern cam disks 27. The scanning ends 39 of the followers 37 normally rest with their back ends against the abutment 34 of the rocker 32 and the scanning ends 39 of the followers 38 against the abutment 35 of the rocker 33.

A switching member 41 is provided for each follower 37 and a switching member 42 for each follower 38. Each

3

of the switching members 41, 42 has a bar 43 that extends through the wall of the support 27a in the housing and which carries at its outwardly extending end a push button 44 and at its inner end an angularly offset switching member 45. The center portion of the switch member 45 defines a key 46 which is inclined in a direction to engage and move the scanning end 39 with which it is associated against the bias of spring 40. The switching member 45 is provided at the lower end with a key surface 47 which is directed in the switch members 41 against the abutment 34 and in the switch members 42 against the abutment 35. Above the key surface 47 the switch member 45 presents a retaining surface 48 which is disposed perpendicularly to the direction of movement of the switch member 41 or 42 and across which the abutment 34, respectively 35 can move when the switch member is depressed. The effective operating force of the key 46 is disposed at an angle of 90° with respect to the force exerted by the key surface 47.

In each row of the switch members 41 and 42 a further switch member 49 is provided which corresponds to the switch members 41 and 42 except for the switch members 45. In the switch members 49 switch elements 50 are mounted which merely have key surfaces 51 directed against the abutment 34 or 35 of the rockers 32 or 33 respectively. Between the push button 44 and the housing a pressure spring 52 is arranged on each of the rods 43 which raises the switch members 41, 42 and 49 into their inoperative position. The upward movement of the bars 43 is limited by abutment pins 53.

The link 19 which is connected with the mechanism for changing the stitch length is linked to the abutment 34 of the rocker 32 while link 14 is pivotally connected with the abutment 35 of the rocker 33 which is connected with the slide 7 by way of a double armed lever 19.

The mechanism operates as follows:

As the switch members 41 are pressed downwardly by means of the respective push button 43, the abutment 34 and thus the rocker 32 is first rocked by means of the key surface 47 of the corresponding switch element 45 against the effect of the pull spring 36. The followers 37 are likewise rocked by means of the rocker 32 to which they are fastened. Further pressure on the switch member 41 causes the key surface 47 to press the upper edge of the scanning end 39 of the corresponding follower 37 to the side whereby the scanning end 39 is moved out of the free space along the appertaining pattern cam disk 27 into the circulating or rotating path thereof. With the switch member 41 fully depressed, the abutment 34 under the effect of pull spring 36 places itself above the retaining surface 48 of the switch member 45 and prevents its upward movement against the effect of the pressure spring 52. The lateral surface of the switch member 45 forms a sliding guide for the scanning end 39 which moves to and fro as the pattern cam disk 27 rotates.

During operation of one of the followers 38 of the switch member 42 the switch element 45 acts in an analogous manner with respect to the corresponding scanning finger 38 and the abutment 35 of the rocker 33.

The followers 37 of the rocker 32 that are made operative at any time transmit the impulses scanned from the pattern cam disks 27 by way of the link 19, the two armed lever 21, the connecting bar 22 and the angular lever 23 to the slide 15 for setting the stitch length. The followers 38 of the rocker 33 transmit the impulses by way of the link 14 and the two armed lever 19 to the slide 7 for swinging the needle bar oscillator.

As another switch member 41 or 42 is depressed, the associated rocker 32 or 33 is swung over in the manner described above whereby the switch member 42 or 43 which previously had been depressed is raised under the influence of the pressure spring 52. The scanning end 39 of the corresponding follower 37 or 38 then springs back into the free space alongside the pattern cam disk 27 previously scanned.

4

If all the followers 37 or 38 which belong to a series are to be rendered inoperative, which is the case, for example if the zig-zag setting or the stitch length setting are to be controlled by hand, then by depressing the switch member 49 that belongs to this row causes the key surface 51 of the switch element 50 due to its engagement with the abutment 34 or 35 to swing the abutment out so far that the previously depressed switch member 41 or 42 is released by the abutment 34 or 35 and is raised under the influence of the pressure spring 52. Since switching element 50 does not permit retaining switch member 49 by the abutment 34 or 35, the switching member 49 returns to its initial position after being released.

Having now described our invention with reference to the embodiment illustrated in the drawings, we do not wish to be limited thereto, but what we desire to protect by Letters Patent of the United States of America is set forth in the appended claims.

We claim:

1. Mechanism for sewing decorative stitching on a sewing machine having a machine housing and a drive shaft, said mechanism comprising a support arranged in said housing in fixed position proximate said drive shaft, a cam shaft journaled on said support in driving engagement with said drive shaft, a plurality of pattern cam disks mounted on said cam shaft, a spring loaded rocker disposed proximate and extending parallel to said cam shaft, said rocker including an abutment member, a plurality of followers corresponding in number to the number of said disks and mounted in alignment on said rocker, a switch member for each said follower mounted on said support in said housing for movement into engagement with its respective said follower and operative selectively to move a follower to establish connection between the rocker and one said pattern cam disk, each said follower having a leaf spring secured at one end to said rocker and presenting a scanning end proximate one said disk and each said follower yielding resiliently in a direction generally parallel to said shaft and being movable angularly and axially in response to movement of its associated switch member.

2. Mechanism for sewing decorative stitching on a sewing machine having a machine housing and a drive shaft, said mechanism comprising a support arranged in said housing in fixed position proximate said drive shaft, a cam shaft journaled on said support in driving engagement with said drive shaft, a plurality of pattern cam disks mounted on said cam shaft, a spring loaded rocker disposed proximate and extending parallel to said cam shaft, said rocker including an abutment member, a plurality of followers corresponding in number to the number of said disks and mounted in alignment on said rocker, a switch member for each said follower mounted on said support in said housing for movement into engagement with its respective said follower and operative selectively to move a follower to establish connection between the rocker and one said pattern cam disk, each said follower having a leaf spring secured at one end to said rocker and presenting a scanning end proximate one said disk and each said follower yielding resiliently in a direction generally parallel to said shaft and being movable angularly and axially in response to movement of its associated switch member, each said switch member having a switch element presenting a pair of key surfaces disposed to exert forces displaced at an angle of 90° relative to one another one of which engages said scanning end and the other said abutment, and said abutment being connected firmly with said scanning end and extending perpendicularly to the rocking plane thereof.

3. Mechanism for sewing decorative stitching on a sewing machine having a machine housing and a drive shaft, said mechanism comprising a support arranged in said housing in fixed position proximate said drive shaft, a cam shaft journaled on said support in driving engagement with said drive shaft, a plurality of pattern cam disks

5

mounted on said cam shaft, a spring loaded rocker disposed proximate and extending parallel to said cam shaft, said rocker including an abutment member, a plurality of followers corresponding in number to the number of said disks and mounted in alignment on said rocker, a switch member for each said follower mounted on said support in said housing for movement into engagement with its respective said follower and operative selectively to move a follower to establish connection between the rocker and one said pattern cam disk, each said follower having a leaf spring secured at one end to said rocker and presenting a scanning end proximate one said disk and each said follower yielding resiliently in a direction generally parallel to said shaft and being movable angularly and axially in response to movement of its associated switch member, each said switch member having a switch element present-

6

ing a pair of key surfaces disposed to exert forces displaced at an angle of 90° relative to one another one of which engages said scanning end and the other said abutment, said abutment being connected firmly with said scanning end and extending perpendicularly to the rocking plane thereof, and said switch element having a retaining surface at the upper end of said other key surface extending perpendicularly to the direction of movement of said switch member.

References Cited in the file of this patent

UNITED STATES PATENTS

2,316,776	Elliott -----	Apr. 20, 1943
3,085,526	Kawaguchi -----	Apr. 16, 1963
3,094,086	Meier -----	June 18, 1963