

Jan. 28, 1936.

J. H. STEARNS

2,029,278

ADJUSTABLE ECCENTRIC FOR SEWING MACHINES

Filed July 17, 1934

3 Sheets-Sheet 1

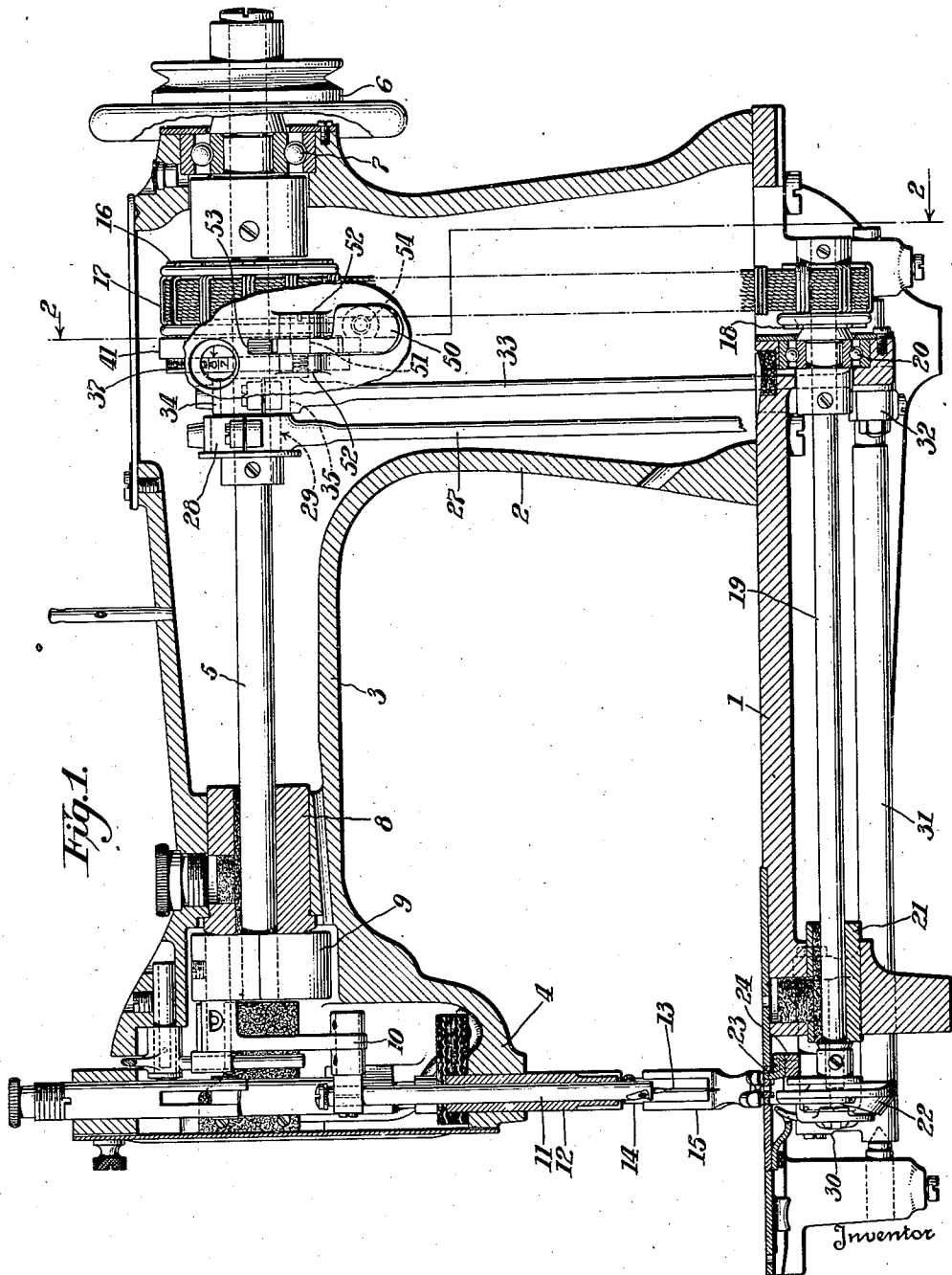


Fig. 1.

Jake H. Stearns

Witness:  
Joseph J. Jones

By Henry Miller Attorney

Jan. 28, 1936.

J. H. STEARNS

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3 Sheets-Sheet 2

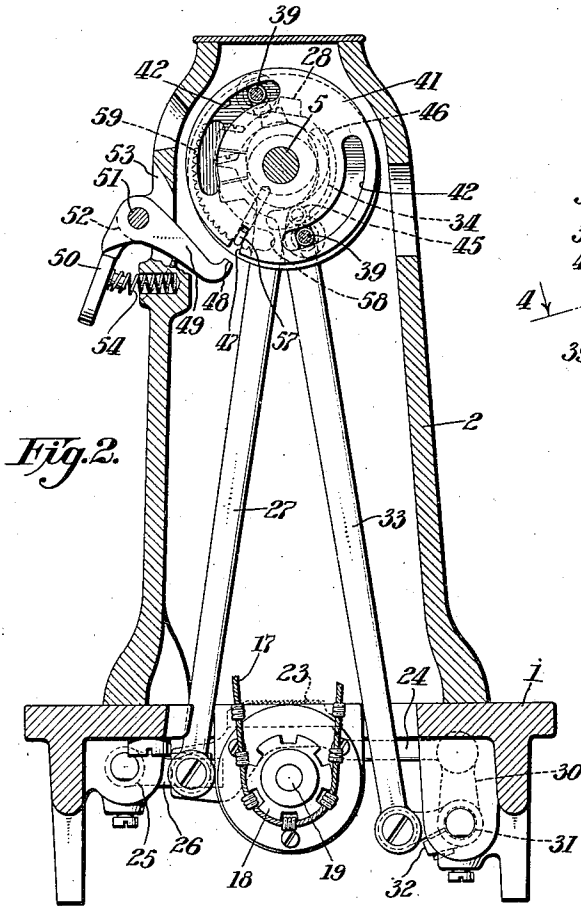


Fig. 2.

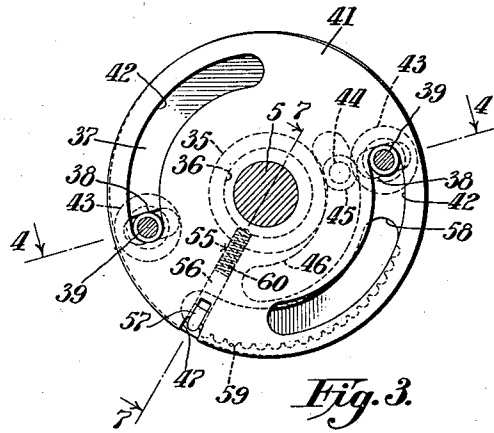


Fig. 3.

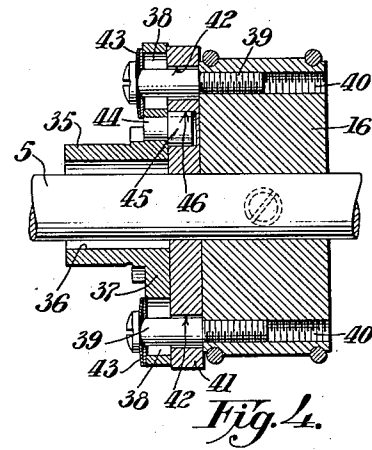


Fig. 4.

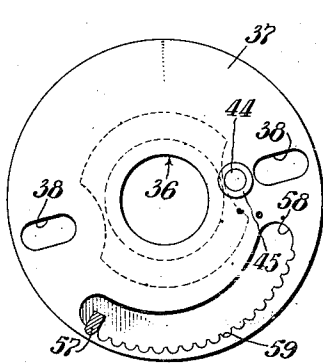


Fig. 5.

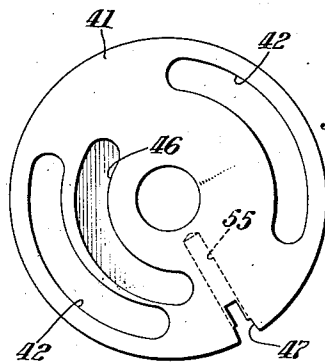


Fig. 6.

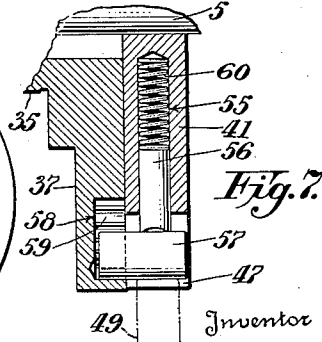


Fig. 7.

Inventor  
Jake H. Stearns

Witness:  
Joseph Stearns

By: Henry J. Miller, Attorney

Jan. 28, 1936.

J. H. STEARNS

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3 Sheets-Sheet 3

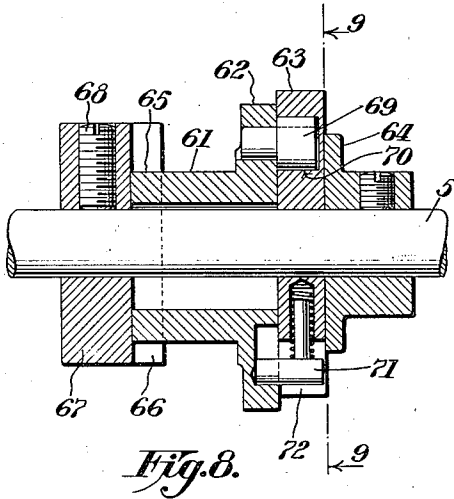


Fig. 8.

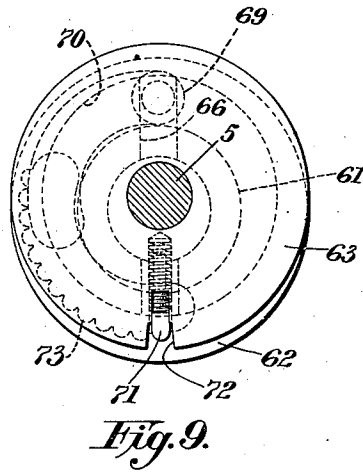


Fig. 9.

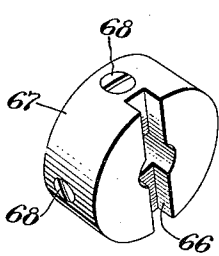


Fig. 10.

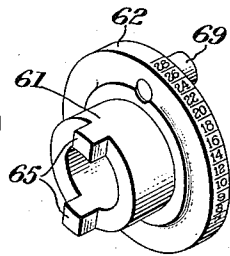


Fig. 11.

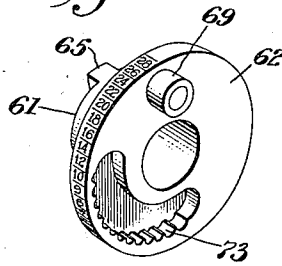


Fig. 12.

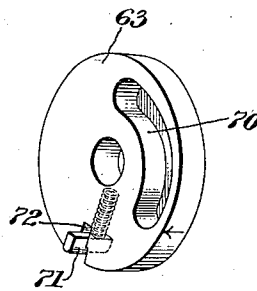


Fig. 13.

Inventor

Jake H. Stearns

Witness:  
Joseph Stearns

By Henry Miller, Attorney

# UNITED STATES PATENT OFFICE

2,029,278

## ADJUSTABLE ECCENTRIC FOR SEWING MACHINES

Jake H. Stearns, Bridgeport, Conn., assignor to  
The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application July 17, 1934, Serial No. 735,612

8 Claims. (Cl. 74—571)

This invention relates to improvements in adjustable eccentrics for use in connection with sewing machines and is herein described as a sewing machine feed-actuating eccentric, although adapted to other uses in connection with sewing machines.

The primary object of the invention is to provide an actuating eccentric for sewing machines which is conveniently adjustable as to eccentricity and definitely maintains any one of a plurality of set positions of eccentricity at high speeds of operation and under heavy load conditions.

More specifically, the present invention aims to improve the type of adjustable feed-eccentric disclosed in the U. S. Patent to C. H. Willcox et al., No. 572,041, November 24, 1896.

With the above and other more specific objects in view, the invention comprises the devices, combinations and arrangements of parts hereinafter described in connection with the accompanying drawings, 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 accompanying drawings, Fig. 1 represents a vertical section longitudinally of the sewing machine. Fig. 2 represents a transverse section of the machine through the arm-standard thereof and substantially on the line 2—2 of Fig.

1. Fig. 3 is an enlarged detail view of one form of the improved feed-adjusting device from the same side as shown in Fig. 2, but with the parts relatively adjusted into a different position thereof. Fig. 4 represents a sectional view of the

feed-adjusting device substantially on the line 4—4 of Fig. 3. Fig. 5 is a face view of the feed-eccentric flange from the side thereof opposite to the eccentric. Fig. 6 is a similar view of the feed-adjusting disk from the eccentric-flange side thereof. Fig. 7 represents a detail sectional view of the feed-adjusting device substantially on the

line 7—7 of Fig. 3. Fig. 8 represents a longitudinal section of a modification of the feed-adjusting device. Fig. 9 represents a cross-section of the modification substantially on the line 9—9 of Fig. 8. Figs. 10 to 13, inclusive, represent perspective views of the component parts of the modified feed-adjusting device illustrated in Fig. 8.

Referring to the drawings, the present improvements have been embodied in a sewing machine including a frame comprising a bed-plate 1, from one end of which rises a hollow standard 2 of a tubular bracket-arm 3 overhanging the bed-plate

and terminating at its free end in a head 4. Disposed within and extending longitudinally of the bracket-arm 3 is a rotary main or needle-reciprocating shaft 5, carrying at its outer end a combination balance-wheel and driving-pulley 6. Adjacent to the balance-wheel, the shaft 5 is journaled in a ball-bearing 7, the opposite end of the shaft being journaled in a bearing bushing 8 within the bracket-arm 3. The shaft 5 carries a crank-disk 9 connected by a link 10 to the upper end of a needle-bar 11, journaled for vertical reciprocation in an elongated bushing 12 suitably fixed in the bracket-arm head 4. At its lower end, the needle-bar 11 carries a needle 13. Also journaled for vertical movement in the bracket-arm head is the usual presser-bar 14, to the lower end of which is secured a presser-foot 15.

Suitably secured upon the main shaft 5 for rotation therewith is a peripherally grooved pulley 16 connected, by a clip-belt 17, with a pulley 18 of one half the size of pulley 16. The pulley 18 is carried by one end of a loop-taker shaft 19 disposed below the bed-plate 1 and in parallelism with the main shaft 5. Adjacent to the pulley 18, the loop-taker shaft 19 is journaled in a ball-bearing 20, the opposite end of said shaft being journaled in a bearing bushing 21 and carrying a loop-taker 22 adapted to cooperate with the needle 13 in the formation of lock-stitches.

The work to be stitched is intermittently advanced by a feeding mechanism of the lower four-motion type and comprising a feed-dog 23 carried by a feed-bar 24. One end of the feed-bar is operatively connected to a crank-arm upon one end of a feed-lift rock-shaft 25 journaled below and extending longitudinally of the bed-plate 1. Adjacent to its opposite end, the rock-shaft 25 carries a crank-arm 26 pivotally connected to the lower end of a pitman 27 of which the opposite end has a strap 28 embracing a suitable feed-lift eccentric 29 carried by the main shaft 5.

The feed-bar 24 is also pivotally connected to a feed-rocker 30 carried by a feed-advance rock-shaft 31 journaled below and extending longitudinally of the bed-plate 1. Clamped upon the rock-shaft 31 is a crank-arm 32 pivotally connected to the lower end of a pitman 33, of which the upper end has a strap 34 embracing an eccentric 35. It is the supporting and adjusting mechanism for this eccentric which constitutes the present invention, although, as hereinbefore indicated, an eccentric supported and adjustable in like manner may be employed in a sewing machine for actuating an element other than the feed-dog.

According to the construction illustrated in

55

Figs. 1 to 7, inclusive, of the drawings, the eccentric 35 surrounds the main shaft 5 and has an enlarged circular shaft-aperture 36, although obviously this aperture may be ovate if preferred. The eccentric 35 has a peripherally indexed end flange 37 comprising, in effect, a disk rotatable with the eccentric. The flange-disk 37 is provided with a pair of diametrically aligned and elongated slots 38 through which pass stud-screws 39 threaded into apertures 40 provided in the belt-pulley 16, whereby the eccentric 35 is secured for rotation with the main shaft 5, but is adjustable radially of the shaft as to eccentricity.

Disposed upon the main-shaft 5, between the flange-disk 37 and the pulley 16, is an adjusting-cam or disk 41, provided with arcuate slots 42 at opposite sides and concentric with the main-shaft 5, said slots 42 receiving and providing clearance for the stud-screws 39 upon relative rotation of the eccentric 35 and the adjusting cam 41. Friction washers 43, interposed between the heads of the stud-screws 39 and the flange-disk 37 serve to yieldingly maintain the eccentric and cam against any substantial movement endwise of the main-shaft 5. Projecting from the adjusting-cam side of the flange-disk 37 is a pin 44 carrying a cam-roller 45 entering a cam-groove 46 provided in the adjacent side face of the adjusting cam, whereby the eccentric and cam are so connected that relative rotation thereof effects adjustment of the eccentric 35 as to eccentricity.

The adjusting cam 41 is peripherally provided with a stop-notch 47 adapted to be entered by the nose 48 of a manually operable latch-member in the form of a bell-crank lever 49, 50, fulcrumed upon a pivot-screw 51 and between spaced ears 52 provided upon the front wall of the arm standard 2 to receive the pivot-screw. The latch-member arm 49 which has the nose 48 extends into the arm-standard through a suitable slot 53 in the arm-standard front wall, while the arm 50 of said latch-member is flattened to provide a thumb-piece at the outer side of the arm standard. A spring 54 acts to yieldingly hold the latch-member retracted from engagement with the adjusting cam. When the nose 48 of the latch-member is caused to enter the adjusting-cam notch 47, said adjusting cam is restrained against rotation with the shaft 5 and, consequently, by now turning said shaft 5, the eccentric 35 will be adjusted as to eccentricity.

In prior constructions, reliance has been placed upon the friction washers 43 to maintain the eccentric 35 in adjusted position during the operation of the machine, i. e., to maintain unison rotation of the adjusting cam 41 and eccentric 35. However, at higher speeds of operation and heavy load conditions, a slippage occurs between the eccentric and cam, thereby dislodging the eccentric from set position. This liability to slippage may be overcome up to a certain speed of operation of the machine by tightly clamping the cam 41 and eccentric 35 together, by means of the stud-screws 39. However, when so tightly clamped as to reduce liability of slippage between the cam and eccentric during the operation of the machine, it becomes extremely difficult to effect adjustment of the eccentric by turning the main-shaft 5, in a position of the latch-member 49, 50 wherein the cam is restrained against rotation.

According to the present invention, the eccentric 35 and adjusting cam 41 are normally positively locked together for unison rotation during the operation of the machine, the locking means being readily releasable and preferably simulta-

neously with the anchoring of the adjusting cam against rotation. To this end, the adjusting cam 41 is provided with a radial aperture 55 opening into the stop-notch 47 thereof. Slidably disposed in said aperture 55 is the shank 56 of a detent having a transverse head 57 extending into an arcuate groove or recess 58 provided in the side face of the flange-disk 37 which is adjacent to the cam 41. One of the arcuate walls of the recess 58 is toothed to provide an arcuate rack 59 adapted to be engaged by the detent-head 57, said head being shaped to fit the teeth of the rack 59 in positions corresponding to the markings, or index, upon the periphery of the flange-disk 37. A spring 60 housed in the aperture 55 acts to normally seat the detent in locking engagement with the rack 59. As the detent head 57 extends into the stop-notch 47 of the cam, said detent is also disposed in the path of movement of the latch-member nose 48 into cam-anchoring position.

It will therefore be understood that, while the eccentric and adjusting cam are positively locked against relative slippage during the normal operation of the machine, the latch-member not only serves as means to anchor the cam but simultaneously therewith acts to unseat the detent 56, 57 from the toothed rack 59, so that the main-shaft may be easily turned to effect adjustment of the eccentric. It will also be understood that the provision of the positive locking means described eliminates any necessity for tightly clamping the cam and eccentric together by means of the stud-screws 39, it being merely necessary to maintain cooperative relationship between said elements.

In the modification illustrated in Figs. 8 to 13 inclusive of the drawings, novel means are provided for securing an eccentric to the actuating shaft for rotation therewith and, nevertheless, providing for adjustment of the eccentric. To this end, the eccentric 61, which surrounds the actuating shaft 5, has a peripherally indexed end-flange or disk 62 contacting a side face of an adjusting-cam or disk 63 upon the shaft 5, said adjusting-cam 63 being held against movement endwise of the shaft, in one direction, by a collar 64 suitably secured upon the shaft 5. The end of the eccentric 61 opposite to the end-flange 62 thereof has diametrically opposite guide-lugs 65 slidably disposed in a guideway 66 provided by diametrically grooving a side face of a collar 67 secured by set-screws 68 upon the shaft 5, said collar 67 together with the collar 64 also serving to maintain cooperative relationship between the eccentric 61 and cam 63 as to relative movement endwise of the shaft.

As in the construction herein first described, the eccentric-flange 62 carries a cam-roller 69 entering a cam-groove 70 in the adjacent side face of the adjusting cam 63. The adjusting cam 63, likewise, is provided with a spring-pressed detent 71 extending into a stop-notch 72 in the periphery of the adjusting cam, said detent normally engaging an arcuate rack 73 in the recessed side face of the eccentric-flange 62 to positively lock the adjusting cam and eccentric for unison rotation during the operation of the machine.

Having thus set forth the nature of the invention, what I claim herein is:—

1. In a sewing machine, a rotary shaft, an actuating eccentric having an arcuate rack, means for securing said eccentric for rotation with said shaft and providing for right line adjustment of the eccentric crosswise of the shaft, an adjusting cam rotatably mounted upon said shaft, a con-

nection between said cam and eccentric whereby relative rotation of the cam and eccentric effects adjustment of the eccentricity of the eccentric, a spring-pressed detent carried by said cam for engagement with said rack, and manually operable means for releasing said detent from said rack.

2. In a sewing machine, a rotary shaft, an actuating eccentric having an arcuate rack, means for securing said eccentric for rotation with said shaft and providing for right line adjustment of the eccentric crosswise of the shaft, an adjusting cam loosely mounted upon said shaft and peripherally provided with a stop-notch, a connection between said cam and eccentric whereby relative rotation of the cam and eccentric effects adjustment of the eccentricity of the eccentric, a spring-pressed detent carried by said cam for engagement with said rack, said detent in its rack-engaging position extending into said stop-notch of the cam, and a manually operable latch-member adapted to enter the cam stop-notch and shiftably engage said detent, to thereby restrain said cam against rotation and to release said detent.

3. In a feeding mechanism for sewing machines, a rotary shaft, an adjusting cam rotatably disposed upon said shaft and having a peripheral stop notch, a feed actuating eccentric provided with an arcuate rack, said eccentric and rack being disposed at the same side of said adjusting cam, means for securing said eccentric for rotation with said shaft and providing for adjustment of the eccentricity of the eccentric, a connection between said cam and eccentric for effecting adjustment of the eccentric upon relative rotation of the cam and eccentric, a spring-pressed detent carried by said cam in engagement with said rack to insure unison rotation of the eccentric and cam, and a manually operable latch member adapted to enter the stop notch of said cam and shiftably engage said detent to release the detent and to restrain said cam against rotation.

4. In a feeding mechanism for sewing machines, a rotary shaft, a feed-actuating eccentric disposed upon said shaft for adjustment as to eccentricity, said eccentric having an end flange provided with an arcuate toothed rack, an adjusting cam rotatably disposed upon said shaft adjacent to the eccentric flange, said cam having a radial aperture terminating in a peripheral stop-notch, a spring-pressed detent having a shank slidably disposed in said radial aperture of the cam and having a transverse head positioned in said stop-notch for normal engagement with the teeth of said rack, a connection between said cam and eccentric for effecting adjustment of the eccentric upon relative rotation of the cam and eccentric, means for maintaining said cam and eccentric in cooperative relation, and a latch-member adapted to be manually operated to enter the stop-notch of said cam and shiftably engage said

detent to release the detent and to restrain said cam against rotation.

5. In a sewing machine, a rotary shaft, an eccentric disposed upon said shaft for radial adjustment, an adjusting cam rotatably mounted upon said shaft adjacent one end of said eccentric, a connection between said cam and eccentric whereby relative rotation thereof effects adjustment of the eccentric radially of the shaft, and opposed collars secured upon said shaft for restraining said cam and eccentric against movement endwise of said shaft, said eccentric being adjustably keyed to one of said collars to confine the eccentric to rotation with said shaft and to provide for radial adjustment of the eccentric.

6. In a sewing machine, a rotary shaft, an eccentric disposed upon said shaft for radial adjustment, an adjusting cam rotatably mounted upon said shaft adjacent one end of said eccentric, a connection between said cam and eccentric whereby relative rotation thereof effects adjustment of the eccentric radially of the shaft, a collar secured upon said shaft adjacent the end of said eccentric opposite to the cam end thereof, said collar having a tongue-and-groove connection with said eccentric to confine the eccentric to rotation with said shaft, means maintaining said cam and eccentric in cooperative relation, and means normally effective during the operation of the machine to effect rotation of said cam in unison with said eccentric.

7. In a sewing machine, a rotary shaft, an actuating eccentric, means for securing said eccentric for rotation with said shaft and providing for adjustment of the eccentricity of the eccentric, an adjusting cam loosely mounted upon said shaft and operatively connected with said eccentric to effect adjustment of the eccentricity of the eccentric upon relative rotation of the cam and eccentric, interengaging locking means provided upon said eccentric and cam effective to positively secure said cam for rotation with said eccentric, and manually operable means for effecting release of said locking means.

8. In a sewing machine, a rotary shaft, an actuating eccentric provided with an arcuate rack having its center of curvature non-coincident with the center of curvature of the peripheral face of said eccentric, means for securing said eccentric for rotation with said shaft and providing for adjustment of the eccentricity of the eccentric, an adjusting cam rotatably mounted upon said shaft, a connection between said cam and eccentric whereby relative rotation of the cam and eccentric effects adjustment of the eccentricity of the eccentric, a spring-pressed detent carried by said cam for engagement with said rack, and manually operable means for effecting release of said detent.

JAKE H. STEARNS.