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FEED ADJUSTING AND REVERSING MECHANISM FOR SEWING MACHINES

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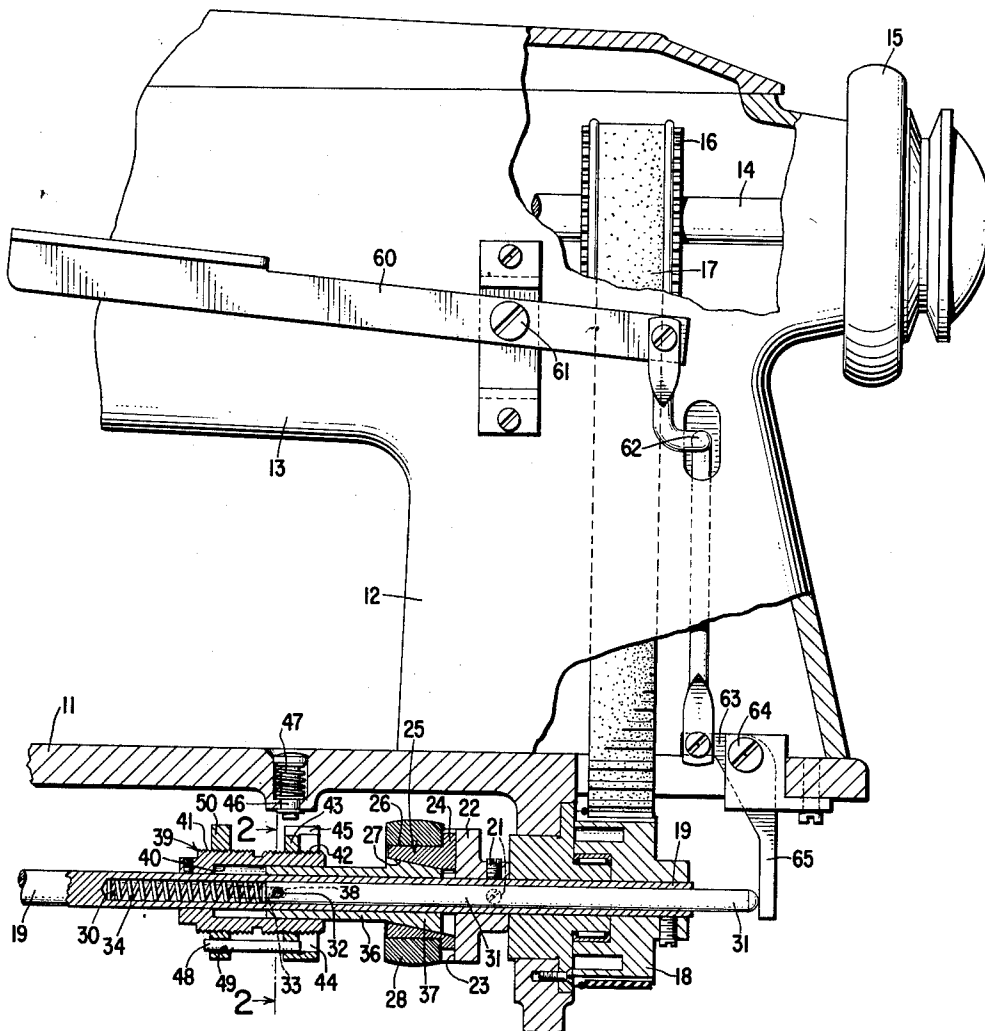


Fig. 1

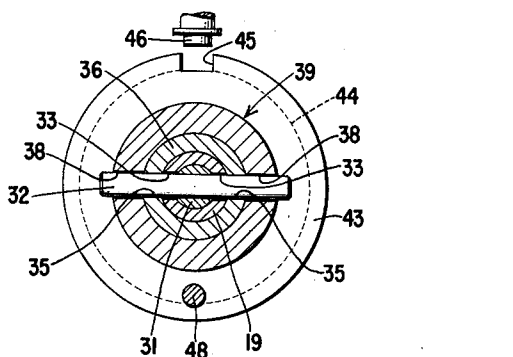


Fig. 2

WITNESS

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FEED ADJUSTING AND REVERSING MECHANISM FOR SEWING MACHINES

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This invention relates to sewing machines having work feeding mechanisms driven by the actuating mechanism of the sewing machine, and more particularly, to a novel and improved arrangement in a feed driving mechanism for adjusting the stitch length and for reversing the direction of feed of the work.

It is an object of this invention to provide a compact and efficient stitch length adjusting device for a feed driving mechanism in a sewing machine.

Another object of this invention is to provide a novel and effective device for simultaneously adjusting the stitch length determining means in both the forward and reverse directions of work feed.

In the accompanying drawings of a preferred embodiment of this invention:

FIG. 1 represents a side elevational view of a portion of a sewing machine partly broken away and illustrated in vertical cross section to expose the work feed driving mechanism, and

FIG. 2 is a cross sectional view taken transversely of the sewing machine bed shaft substantially along line 2-2 of FIG. 1.

In the drawing, 11 indicates the bed of a sewing machine from which rises a standard 12 formed above the bed with a bracket arm 13. Journaled in the bracket arm is a main shaft 14 carrying a hand wheel pulley 15 and a sprocket 16. A lug belt 17 in the standard operatively connects the sprocket 16 on the main shaft with a sprocket 18 on a bed shaft 19. The main shaft and bed shaft form a part of the actuating mechanism of the sewing machine and serve in conventional fashion to operate the stitch forming instrumentalities in timed relation.

Fast on the bed shaft 19 by means of set screws 21 is a flange 22 formed in one face with an undercut transverse guideway 23 which slidably accommodates a tongue portion 24 of an eccentric member 25 formed with a cylindrical outer surface 26 having an axis substantially parallel with that of the bed shaft, and with a cylindrical inner surface 27 having an axis inclined with respect to that of the bed shaft. Embracing the outer surface 26 is a pitman 28 which may be operatively connected to drive the work feeding mechanism of the sewing machine. Reference is made to the United States patent of F. Parry No. 2,798,408, June 4, 1957, which discloses a type of work feeding mechanism adapted to be driven by a pitman such as the pitman 28 shown in the accompanying drawing.

For influencing the stitch length as well as the direction of work feed, the bed shaft 19 is preferably formed with an axial bore 30 in which a rod 31 is axially slidable. The rod 31 is fitted with a transverse pin 32 which extends radially of the bed shaft through a longitudinal slot 33 in the bed shaft, thus constraining the rod in the bed shaft bore in engagement with a compression spring 34 bottomed within the shaft bore.

The pin 32 extends at each side through clearance apertures 35 in a sleeve 36 integral with a cylindrical eccentric adjusting portion 37 which is inclined relatively to the axis of the bed shaft. The pin 32 thus couples the eccentric adjusting portion to slide longitudinally of the bed shaft with the rod 31. The pin 32 also extends radially through longitudinal slots 38 in a base member 39 formed with an axial bore 40 slidably accommodating the sleeve 36. The base member 39 is made fast on the bed shaft, as by a set screw, and is formed externally with a portion 41

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of left hand screw threads and a portion 42 of right hand screw threads.

Threadedly engaging the right hand threaded portion 42 is a stop nut 43 formed with a flanged extension 44 at one side, the periphery of the nut and the flange being formed with a transverse slot 45 adapted to accommodate a plunger 46 constrained in the bed and biased upwardly by a spring 47. Fixed in the nut 43 is a pin 48 arranged substantially parallel to the axis of the bed shaft and slidably accommodated in a clearance aperture 49 in a stop nut 50, threadedly engaging the left hand threaded portion 41 of the base member 39.

As illustrated in FIG. 2, the transverse pin 32 carried by the rod 31 extends radially beyond the base member 39 and into a position to abut the stop nut 50 as the rod 31 is shifted to the left as viewed in FIG. 1, and to abut the stop nut 43 as the rod 31 is returned by the spring 34.

When the plunger 46 is depressed and seated in the slot 45, turning of the hand wheel 15 will shift both of the stop nuts 43, 50 causing the stop nuts to converge or diverge depending upon the direction of rotation imparted to the hand wheel. The stop nuts 43, 50 are preferably arranged on the threaded portions 41, 42 so as to converge each into abutting engagement with the transverse pin 32 in the position of the pin 32 which corresponds to concentric position of the eccentric member 25, or in other words a position in which the feed mechanism is ineffective because the stitch length is zero.

The range of positions of the transverse pin 32 against the stop nut 43 in response to the spring 34 corresponds to the range of forward stitch lengths while the corresponding range of position of the pin 32 against the stop nut 50 corresponds to the range of stitch lengths in the opposite or reverse direction.

For effecting reversal of the direction of feed, an operator influenced lever 60 is fulcrummed on the sewing machine standard, as at 61, and is connected by means of a link 62 to one arm 63 of a bell crank fulcrummed, as at 64, to the machine frame. The other arm 65 of the bell crank abuts the rounded free extremity of the rod 31 so as to shift the rod to the left, as viewed in FIG. 1, when the lever 60 is depressed by the operator.

Having thus set forth the nature of the invention, what is claimed herein is:

1. In a sewing machine having a frame, an actuating means in said frame including a rotary shaft for actuating a work feeding mechanism, a feed drive means including a feed driving eccentric, means supporting said feed driving eccentric for rotation with said rotary shaft and for shifting movement transversely of said rotary shaft to vary the eccentricity thereof, an eccentric adjusting member rotatable with said shaft and slidable lengthwise thereon, an eccentric engaging surface on said adjusting member inclined relatively to said rotary shaft, a radial abutment element fixed for rotation and lengthwise sliding movement with said eccentric adjusting member, operator influenced means for shifting said eccentric adjusting member lengthwise relatively to said rotary shaft for reversing the direction of feed, and means for limiting the lengthwise sliding movement of said radial abutment element and said eccentric adjusting member comprising means fixed relatively to said rotary shaft and having adjacent portions formed with screw threads of the opposite hand, a pair of stop nuts disposed one at each side of said radial abutment element and threadedly engaged each with one of said portions formed with screw threads of the opposite hand, and operator influenced means for restraining said stop nuts from rotation with said rotary shaft and thus move the stop nuts lengthwise relatively to said rotary shaft and vary the limits of lengthwise motion of said radial abutment member and said eccentric adjusting member.

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2. A device as set forth in claim 1 in which means are provided between said stop nuts for interlocking said stop nuts rotationally relatively to each other, and in which said operator influenced means for restraining said stop nuts from rotation with said rotary shaft comprises a means carried by said sewing machine frame and engageable with only one of said stop nuts.

3. A device as set forth in claim 2 in which said operator influenced means for restraining said stop nuts from rotation with said rotary shaft comprises a plunger, means shiftably supporting said plunger for endwise movement in said sewing machine frame, and a plunger accommodating recess formed in one of said stop nuts.

4. In a sewing machine having a frame, an actuating means in said frame including a rotary shaft for actuating a work feeding mechanism, said rotary shaft being formed with an axial bore, a feed drive means including a feed driving eccentric, means supporting said feed driving eccentric for rotation with said rotary shaft and for shifting movement transversely of said rotary shaft to vary the eccentricity thereof, an eccentric adjusting member comprising a sleeve slidable lengthwise on said rotary shaft, an eccentric engaging surface on said sleeve inclined relatively to said rotary shaft, operator influenced means for shifting said eccentric adjusting member lengthwise relatively to said rotary shaft for reversing the direction of feed including a rod slidable within the axial bore of said rotary shaft, a radial pin secured in said rod and in said sleeve, said rotary shaft being slotted lengthwise to accommodate said radial pin, and

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means for limiting the lengthwise sliding movement of said eccentric adjusting member comprising, means fixed relatively to said rotary shaft and having adjacent portions formed with screw threads of the opposite hand, a pair of stop nuts disposed one at each side of said radial pin and threadedly engaged each with one of said portions formed with screw threads of the opposite hand, and operator influenced means for restraining said stop nuts from rotation with said rotary shaft to vary the limits of lengthwise motion of said eccentric adjusting member.

5. A device as set forth in claim 4 in which said means fixed relatively to said rotary shaft and having adjacent portions formed with screw threads of the opposite hand comprises a collar fixed rotationally on said rotary shaft and formed externally with said threads of the opposite hand, said collar being formed with a counterbore slidably accommodating said sleeve, and said collar being slotted lengthwise to accommodate said radial pin.

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