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W. MYERS

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SEWING MACHINE

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4 Sheets-Sheet 1

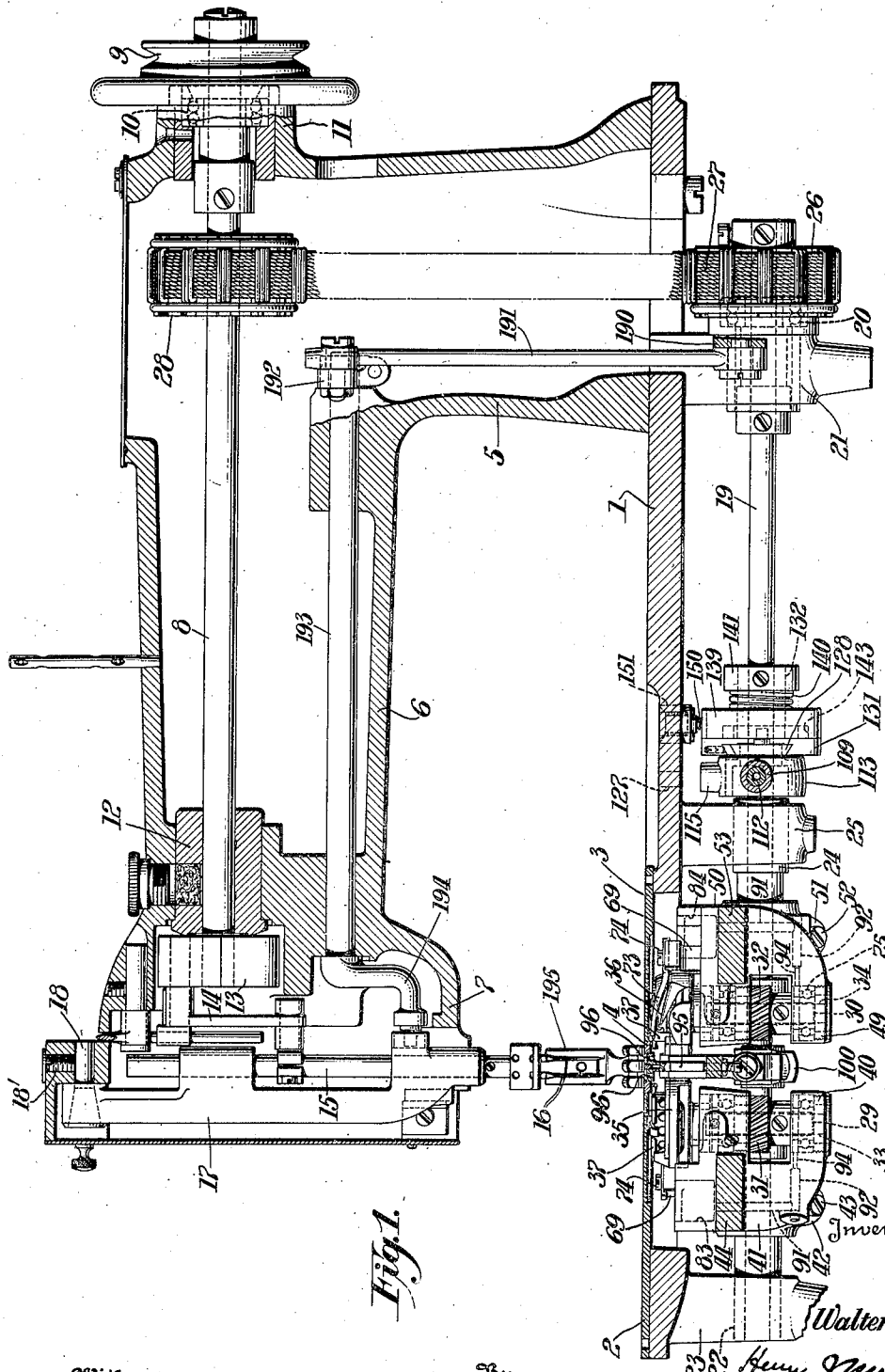


Fig. 1.

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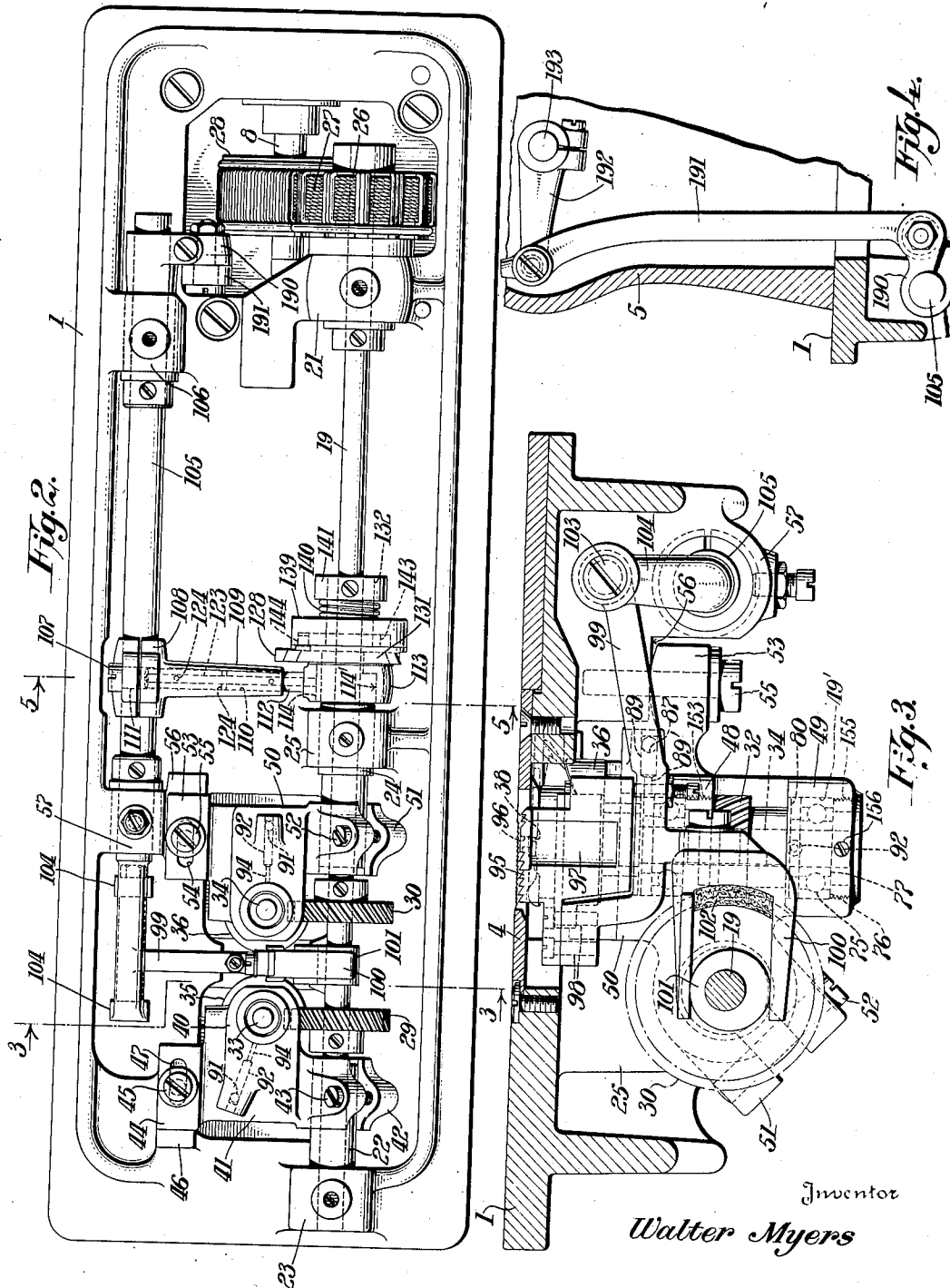
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SEWING MACHINE

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4 Sheets-Sheet 2



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SEWING MACHINE

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26 Claims. (Cl. 112—215)

This invention relates to improvements in work-feeding mechanisms for sewing machines and has for an object to provide a work-advancing mechanism which is particularly adapted for high speed operation.

Another object of the invention is to provide a sewing machine with an actuating eccentric of simple construction and capable of a wide range of adjustment as to eccentricity.

With the above and other objects in view, as will hereinafter appear, the invention comprises the devices, combinations and arrangements of parts described in connection with the accompanying drawings, which illustrate a preferred embodiment of the invention and in which:

Fig. 1 represents a vertical longitudinal section, partly in front elevation, of a sewing machine containing the present improvements. Fig. 2 is a bottom plan view of the sewing machine. Fig. 3 represents an enlarged transverse section of the bed-plate, substantially on the line 3—3 of Fig. 2. Fig. 4 represents a detail section of a portion of the bracket-arm standard, illustrating the link connection between the feed-rock shafts. Fig. 5 represents an enlarged transverse section of the bed-plate, substantially on the line 5—5 of Fig. 2. Fig. 6 represents a vertical section of the feed-advance eccentric, the section being taken longitudinally of the shaft carrying the eccentric. Fig. 7 represents a horizontal section of said feed eccentric, taken substantially on the line 7—7 of Fig. 5. Fig. 8 represents a face view of the feed-adjusting member, the hub of the eccentric driver being shown in section. Fig. 9 represents in perspective the component parts, disassembled, of the feed-eccentric and the adjusting means therefor. Fig. 10 is a detail sectional view illustrating the gib securing means of the eccentric driver. Fig. 11 represents a perspective view, partly in section, of the rotary hook bracket, including a portion of the rotary hook shaft and the bobbin-case opener. Fig. 12 is a top-plan, partly in section, of the adjacent rotary-hook brackets. Fig. 13 represents a section of one of the rotary-hook brackets, in substantially a plane containing the vertical axis of the hook-shaft. Fig. 14 represents a horizontal section of the hook-bracket, substantially on the line 14—14 of Fig. 13.

The sewing machine illustrated in the drawings has a frame including a horizontally disposed work-support comprising a bed-plate 1 provided with left and right slide-plates 2 and 3, and a throat-plate 4 intermediate said slide-plates. Rising from one end of the bed-plate 1 is the

hollow standard 5 of a tubular bracket-arm 6, terminating at its free end in a head 7.

Extending longitudinally of and disposed within the bracket-arm 6 is a horizontally disposed rotary main-shaft 8, one end of said shaft carrying a belt-pulley 9 and being journaled in a ball-bearing 10 disposed within a bearing-boss 11 projecting from the bracket-arm 6. The main shaft 8 is also journaled in a bearing bushing 12 and, at its end adjacent said bushing, carries a crank 13 connected by the usual link 14 with a needle-bar 15 carrying at its lower end a pair of needles 16 arranged abreast with respect to the direction of feed of the work.

The needle-bar 15 is journaled for vertical reciprocation in a pendulous frame 17 pivotally hung upon a taper-headed fulcrum-pin 18 for swinging movements within the head 7 about an axis substantially parallel to the axis of rotation of the main-shaft 8, said fulcrum-pin being secured by a screw 18' threaded into the head 7.

Disposed below and adjacent the rearward edge of the bed-plate 1, substantially parallel to the main-shaft 8, is a loop-taker and feed-actuating shaft 19. Adjacent one end thereof, the shaft 19 is journaled in a ball-bearing 20 sustained by a bearing-lug 21 depending from the bed-plate 1. At its opposite end, the shaft 19 is journaled in a bearing-bushing 22 secured in a lug 23 depending from the bed-plate 1, and intermediate its ends the shaft 19 is journaled in another bearing-bushing 24 secured in a lug 25 depending from said bed-plate. The bushings 22 and 24 are extended to project toward each other from proximate faces of the bearing-lugs 23 and 25. At its free end, adjacent to the ball-bearing 20, the shaft 19 carries a peripherally grooved belt-pulley 26 connected by a clip-belt 27 with a similar pulley 28, of the same size as said pulley 26 and carried by the main-shaft 8, whereby the shaft 19 is driven at the same speed as said main-shaft 8.

Carried by the shaft 19, between the proximate ends of the bearing-bushings 22 and 24, are two spiral-gears 29 and 30 in driving engagement with spiral-gears 31 and 32, respectively, the gear ratios being such that the driven gears 31, 32 are rotated at twice the speed of the driving gears 29, 30. The driven gears 31, 32 are carried by vertically disposed loop-taker shafts 33, 34, respectively, said shafts being of similar construction and each carrying at its upper end a loop-taker 35, or 36, of the vertical-axis rotary hook-type. These loop-takers cooperate with the needles 16 in the formation of

lock-stitches; the needle-thread loops seized by the loop-takers being each cast about a lower thread mass contained in a bobbin-case 37, journaled in the respective loop-taker and restrained against rotation therewith by a suitable stop-notch 38 at the under side of the throat-plate 4.

The loop-taker shaft 33 is journaled in vertically spaced bearing-lugs 39 and 40 projecting from a left-hand loop-taker bracket 41, said bracket 41 having at its rearward end a split bearing-boss 42 adjustably clamped upon the bushing 22 by a screw 43. At its forward end, the bracket 41 is provided with a foot 44 having a rounded upper face secured by a screw 45 against a seat afforded by the horizontally flattened lower end of a lug 46 depending from the bed-plate 1. The bracket-securing screw 45 passes through a slot 47 provided in the foot 44, said slot being elongated in a direction to provide for adjustment of the bracket 44 toward and from the path of needle reciprocation.

The loop-taker shaft 34 is likewise journaled in vertically spaced bearing-lugs 48 and 49 projecting from a right-hand loop-taker bracket 50, said bracket 50 having at its rearward end a split bearing-boss 51 adjustably clamped by a screw 52 upon the bushing 24. At its forward end, the bracket 41 is provided with a foot 53 having an elongated slot 54 entered by a screw 55 which secures the foot 53 against a horizontal seat 56 formed by suitably recessing a lug 57 depending from the bed-plate 1.

The loop-taker shafts 33 and 34 are similarly journaled in the brackets 41, 50. Referring more particularly to Figs. 13 and 14 of the drawings, the upper bearing-lug 48 of the bracket 50 has a vertical aperture 48'. Threaded into said aperture from the under side thereof is a bushing 153 secured in set position by a screw 154. The bushing 153 provides a seat for and serves to vertically locate an outer race-ring 58, which is preferably force-fitted to its seat and is thereby restrained against rotation. An inner race-ring 59 closely embraces the shaft 34 and is preferably caused to rotate with said shaft by a clutch-ball 60 disposed within said race-ring 59 and in a recess 61 peripherally provided in the shaft 34. The base of the recess 61 is preferably a plane surface and is formed so that the depth of said recess, medianly of its length, is preferably substantially equal to the diameter of the ball 60, to provide for assemblage of the parts. Upon rotation of the shaft 34, the ball 60 will instantly grip the inner race-ring 59 and will induce rotation with the shaft of the inner race-ring. This arrangement facilitates securing the inner race-ring to its shaft and obviates the distortion of the parts likely to occur by employment of ring-securing screws. A series of bearing-balls 62 is interposed between the race-rings 58 and 59 in the usual manner to complete the upper ball-bearing of the loop-taker shaft 34.

Resting upon the inner race-ring 59 is an oil-guard washer 63 which is undercut to overhang the outer race-ring 58 in spaced relation thereto, thereby providing a clearance-recess 64 above said race-rings for supplying lubricant to the bearing-balls 62. The washer 63 is held in place by an eccentric 65 formed or otherwise provided upon the shaft 34 directly below the loop-taker 36, said washer serving to guard against emission of lubricant from the upper end of the bearing-lug aperture 48'.

The eccentric 65 is embraced by the strap of a short pitman 66 pivotally connected by a stud-

bolt 67 to a horizontally vibratory arm 68 of an angular opener-carrier 68, 69. The arm 68 of the carrier is disposed in a suitably shaped cavity 70 provided in the upper face of the bracket 50, one end of said arm 68 being pivotally secured by a fulcrum-stud 71 fixed in the bracket 50 by a set-screw 72. The vertically disposed arm 69 of the opener-carrier extends above the bracket 50 and is horizontally grooved in its upper end to provide a seat for the shank of the usual opener-finger 73 adapted to engage intermittently and oscillate the bobbin-case 37, thereby to open a thread-passage in the bobbin-case rotation restraining means. The shank of the finger 73 is slotted to receive a finger-securing screw 74 and to provide for adjustment of said finger.

The lower end of the loop-taker shaft 34 is journaled in an aperture 49' provided in the bearing-lug 49, said aperture 49' being in vertical alignment with the upper lug aperture 48'. Similarly to the upper ball-bearing, the lower ball-bearing includes a series of balls 75 disposed between a fixed outer race-ring 76 and an inner race-ring 77, the inner race-ring 77 embracing and being caused to rotate with the shaft 34 by a clutch-ball 78 disposed in a recess 79 peripherally provided in said shaft. The outer race-ring is vertically located by a bushing 155 threaded into the lower lug from the under side thereof, said bushing being secured in set position by a screw 156. Overlying the lower ball-bearing is an undercut oil-guard washer 80 similar to the upper-bearing washer 63 and defining a clearance-recess 81 above the ball-bearing for supplying lubricant to the bearing-balls 75. The washer 80 is held in place by the hub of the driven gear 32, disposed between the bracket-lugs 48, 49 and secured to the shaft 34 by a set-screw 82.

The journaling of the loop-taker shaft 33 in the bearing-lugs 39, 40 of the bracket 41 and the bobbin-case opener mechanism actuated by said shaft 33 correspond in detail with the described journaling of the shaft 34 and its bobbin-case opener mechanism. Accordingly, the parts have been correspondingly designated in the drawings, so far as illustrated in detail.

Lubricant is supplied to the bearings of the loop-taker shafts from reservoirs carried by the respective loop-taker brackets and connected by sparate conduits with the shaft bearings. Referring more particularly to Figs. 11 and 12 of the drawings, the bracket 41, for example, is preferably integrally provided with a trapezoidal lubricant-supply reservoir 83 disposed adjacent to the opener-mechanism cavity 70 in said bracket. The rearward portion of the reservoir 83 is closed at the top by an overhanging roof-wall 83', which is preferably integral with the side walls of the reservoir and terminates short of the forward wall, thereby to provide a top opening 84 in the forward portion of the reservoir. The roof-wall 83' functions to retain lubricant within the reservoir 83 when the sewing machine is tilted back for access to the mechanism below the bed plate 1. Preferably, a lubricant-absorbent pad 85 is placed upon the bottom of the reservoir 83 to control the flow of lubricant therefrom.

The bottom of the reservoir 83 has an aperture 86 opening into an oil duct 87 provided in the bracket 41 below and extending horizontally crosswise of the front end of said reservoir. The outer end of the duct 87 is sealed by a plug 88

and its inner end is connected with a horizontal duct 89, provided in the bracket-bearing lug 39 and extending transversely of the duct 87. The outer end of the connecting duct 89 is sealed by a plug 90 and its inner end terminates in a reduced bore 89' communicating with the clearance-recess 64 above the shaft-bearing balls 62.

The bottom of the reservoir 83 has another aperture constituting the upper end of a vertical duct 91 provided in the bracket 41. The lower end of said duct 91 opens into a horizontally-transverse bracket-duct 92 closed at its outer end by a plug 93. At its inner end, the duct 92 has a restricted bore 94 in the bracket-lug 40, said bore 94 communicating with the clearance-recess 81 above the shaft-bearing balls 75.

The work is intermittently advanced past the stitch-forming mechanism by a so-called compound feeding mechanism including a lower four-motion or drop-feed and a needle-feed. To this end, the throat-plate 4 is suitably slotted to receive the toothed portions of a feed-dog 95 provided with adjacent needle-apertures 96 and with the usual needle-clearance and thread-loop guarding recesses 97 in opposite sides of the feed-dog. The feed-dog 95 is secured by screws 98 upon a feed-bar 99 provided with a fork 100 engaging a feed-lift actuating eccentric 101 carried by the lower rotary shaft 19, thereby to impart rising and falling movements to the feed-dog 95. Intermediate the spaced arms thereof, the fork 100 is provided at its base with the usual lubricant-supply pad 102.

The front end of the feed-bar 99 is pivotally secured, by a pivot-bolt 103, to a feed-rocker comprising upstanding arms 104 of a feed-advance rock-shaft 105 journaled in the frame-lug 57 and in another lug 106 also depending from the bed-plate 1 adjacent the front edge thereof. Clamped upon the rock-shaft 105, at the side of the lug 57 opposite to the feed-bar side thereof and by means of a screw 107, is a transverse split boss 108 at one end of a rearwardly extending tubular rock-arm 109. The longitudinal bore 110 of the tubular rock-arm 109 is preferably extended through the remote wall of the boss 108, and the rock-shaft 105 is provided with a transverse aperture 111 in alignment with the bore 110 of the rock-arm. Slidingly fitting the rock-arm bore 110 is a slide-pin 112 extending laterally from a strap 113 which embraces a feed-advance actuating eccentric 114, said eccentric being adjustably carried by the lower rotary shaft 19 and having an enlarged shaft-aperture 114'. The longitudinal axis of the slide-pin 112 passes substantially through the center of the eccentric 114, in addition to passing through the longitudinal axis of the rock-shaft 105, whereby the pin-and-socket connection constituted by said slide-pin 112 and rock-arm 109 has its median position of lateral movement in substantially the plane containing the longitudinal axes of the shafts 19 and 109. The described arrangement is not only of simple construction but is well balanced and adapted for high speed operation. The sidewise movements of the slide-pin 112 effect rocking movements of the rock-arm 109, thereby transmitting feed-advance and return movements to the feed-dog 95. In its end-wise movements, the pin 112 traverses the shaft-aperture 111, whereby the full length of the rock-arm 109 serves as a bearing for the slide-pin 112.

In order to adequately lubricate the working

surfaces of the eccentric-strap 113 and the pin 112, said eccentric-strap is provided at the upper side thereof with a lubricant reservoir in the form of a cup-shaped boss 115 containing lubricant-wicking 116 retained in said boss by a pin 117 spanning the boss-opening above the wicking. The bottom of the boss 115 is provided with apertures 118 and 119 opening into adjacent grooves 120 and 121 encircling the inner face of the strap 113. The grooves 120, 121 converge at one point to both open into a bore 123 provided in the pin 112 and extending lengthwise thereof. A plurality of transverse ducts 124 in the pin 112 serve to discharge lubricant upon the working faces of the pin 112 and rock-arm 109. Adjacent to its boss 108 the rock-arm 109 is provided in the upper portion thereof with an oil-duct 125 disposed directly below the discharge end of an oil-supply pipe 126, said pipe 126 being vertically sustained by the bed-plate 1 and providing means for supplying lubricant to the inner face of the rock-arm and to the eccentric form above the bed-plate. An opening 127 is provided in said bed-plate for supplying lubricant to the cup-shaped boss 115 of the eccentric-strap 113.

In its preferred form of construction, one end of the eccentric 114 is provided, preferably integrally, with a transverse guide-plate 128 having beveled side-edges 129. The guide-plate 128 is endwise adjustably disposed in a grooved guideway 130 provided, diametrically, in the flange 131 of a driver-member 132 secured by set-screws 133 upon the actuating shaft 19. The guideway 130 has undercut side edges 134, of which one is directly engaged by a beveled edge 129 of the guide-plate 128. Interposed between the other side-edge 134 of the guideway and the other beveled edge of the guideplate is a gib 135 provided in its face proximate to the adjacent side-edge 134 of the guideway with a plurality of recesses 136. Engaging said gib 135, in the recesses thereof, are gib-retaining screws 137 adjustably threaded into the flange 131, said screws being held in adjusted position by suitable jam-screws 138. This arrangement provides for taking up wear between the flange-guideway 130 and the guide-plate 128.

Embracing the hub of the driver-member 132, for complete turning movement thereupon, is an adjusting member 139 disposed at the side of the flange 131 opposite to the eccentric side thereof. The member 139 is normally held in angularly adjusted position by a coil spring 140 surrounding said driver-member, said spring 140 functioning to frictionally hold the adjusting member against the driver-member and being adjustably compressed by a collar 141 secured upon the driver-member by set-screws 142. In its face proximate to the driver-member flange 131, the adjusting member 139 is provided with a spiral cam-track 143, preferably describing at least 360°. Engaging the cam-track 143 to traverse the same is one end of a connecting stud 144, of which the opposite end is disposed in a suitable aperture provided in the guide-plate 128. Intermediate its ends, the stud 144 has a peripheral rib 145 disposed in a radial stud-clearance slot 146 formed in the driver-member flange 131. As the adjusting member 139 may make a complete rotation, it will be understood that the arrangement described provides for effecting a very substantial adjustment of the eccentricity of the eccentric 114. It will be obvious that the cam-track 143 may be still further lengthened to in-

crease the range of adjustment of the eccentric and, by suitably shaping the shaft aperture of the eccentric, the timing thereof may be changed to reverse the direction of feed.

5 The adjusting member 139 is also preferably provided with a series of threaded apertures 147 adjacent the cam-track 143, into selected ones of which apertures may be threaded stop-screws 148 to project into the path of movement of the 10 stud 144. This arrangement facilitates adjustment of the eccentricity of the eccentric between selectively predetermined limits, i. e., the change from one to another of predetermined stitch-lengths.

15 To conveniently effect adjustment of the eccentricity of the eccentric 114, the adjusting member 139 is peripherally provided with a stop-notch 149 and the bed-plate 1 is provided with a detent 150 which may be manually depressed to enter 20 said stop-notch 149, thereby to restrain the adjusting member 139 against rotation with the shaft 19. By turning the main-shaft 8 by hand, while continuing to restrain the adjusting member 139 against rotation, the induced travel of 25 the stud 144 relatively to the cam-rack 143 will shift the eccentric 114 transversely of the axis of the shaft 19. In its present embodiment, the detent 150 is disposed for endwise movement in a bushing 151 suitably fixed in an aperture in the 30 bed-plate 1 above the adjusting member 139, the detent being yieldingly held in retracted position by means of a suitable spring 152.

The feed-advance rock-shaft 105, adjacent one end thereof, carries a crank-arm 190 pivotally 35 connected to the lower end of a link 191 extending upwardly through a suitable opening in the bed-plate 1 and into the arm-standard 5. At its upper end, the link 191 is pivotally connected to a crank-arm 192 carried by one end of a 40 needle-feed rock-shaft 193, journaled within the bracket-arm 6 below and substantially parallel to the main-shaft 8. At its opposite end, the rock-shaft 193 carries a bent crank-arm 194 45 operatively connected to the lower end of the pendulous frame 17 to impart vibratory movements thereto about the fulcrum-pin 18. This arrangement provides simple and well-balanced means for transmitting unison work-advancing 50 and return movements to the feed-dog 95 and the needles 16. The work-engaging movements of the feed-dog 95 are opposed by the usual spring-depressed presser-foot 195.

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

55 1. In a sewing machine having a frame comprising a work-support and a bracket-arm overhanging said work-support, a rotary needle-reciprocating shaft journaled in said bracket-arm, a rotary actuating shaft journaled below 60 said work-support and disposed substantially parallel to said needle-reciprocating shaft, driving connections for rotating said shafts in one-to-one relation, and endwise reciprocatory and laterally vibratory needle-bar operatively 65 connected to said needle-reciprocating shaft, a needle carried by said needle-bar, a loop-taker operatively connected to said actuating shaft to rotate a plurality of times for each needle reciprocation, a feed-advance rock-shaft journaled below 70 said work-support and disposed substantially parallel to said actuating shaft, a work-advancing feed-dog operatively connected to said rock-shaft, a feed-advance eccentric carried by said actuating shaft, a strap embracing said eccentric, a 75 pin-and-socket connection between and having

component elements extending respectively from said strap and rock-shaft, means for imparting lifting movements to said feed-dog, a needle-feed rock-shaft journaled in said bracket-arm and disposed substantially parallel to said needle-reciprocating shaft, connections for actuating 5 said needle-feed rock-shaft from said feed-advance rock-shaft, and operative connections with said needle-feed rock-shaft for imparting lateral work-feeding movements to said needle 10 in unison with the work-advancing movements of said feed-dog.

2. In a sewing machine having a frame comprising a work-support and a bracket-arm overhanging said work-support, a rotary needle-reciprocating shaft journaled in said bracket-arm, a rotary actuating shaft journaled below 15 said work-support and disposed substantially parallel to said needle-reciprocating shaft, driving connections for rotating said shafts in one-to-one relation, an endwise reciprocatory and laterally vibratory needle-bar operatively connected to said needle-reciprocating shaft, a needle carried by said needle-bar, a loop-taker operatively 20 connected to said actuating shaft to rotate a plurality of times for each needle reciprocation, a feed-advance rock-shaft journaled below said work-support and disposed substantially parallel to said actuating shaft, a work-advancing feed-dog operatively connected to said rock-shaft, a 25 feed-advance eccentric adjustably carried by said actuating shaft, means providing for adjustment of the eccentricity of said eccentric by turning said actuating shaft, a strap embracing said eccentric, a pin-and-socket connection between 35 and having component elements rigidly attached respectively to said strap and rock-shaft, means for imparting lifting movements to said feed-dog, a needle-feed rock-shaft journaled in said bracket-arm and disposed substantially 40 parallel to said needle-reciprocating shaft, connections for actuating said needle-feed rock-shaft from said feed-advance rock-shaft, and operative connections with said needle-feed rock-shaft for imparting lateral work-feeding movements to said needle in unison with the work- 45 advancing movements of said feed-dog.

3. In a sewing machine having a frame comprising a work-support and a bracket-arm overhanging said work-support, a rotary needle-reciprocating shaft journaled in said bracket-arm, a rotary actuating shaft journaled below 50 said work-support and disposed substantially parallel to said needle-reciprocating shaft, driving connections for rotating said shafts in one-to-one relation, an endwise reciprocatory and laterally vibratory needle-bar operatively connected to said needle-reciprocating shaft, a needle carried by said needle-bar, a loop-taker operatively connected to said actuating shaft to 55 rotate a plurality of times for each needle reciprocation, a feed-advance rock-shaft journaled below said work-support and disposed substantially parallel to said actuating shaft, a work-advancing feed-dog operatively connected to said rock-shaft, a feed-advance eccentric carried by said actuating shaft, a strap embracing 60 said eccentric, a slide-pin extending from said strap transversely of said actuating shaft in a plane containing the axis of oscillation of said rock-shaft, a tubular rockarm secured upon said rock-shaft and embracing said slide-pin, means 65 for imparting lifting movements to said feed-dog, a needle-feed rock-shaft journaled in said bracket-arm and disposed substantially parallel 70 75

to said needle-reciprocating shaft, connections for actuating said needle-feed rock-shaft from said feed-advance rock-shaft, and operative connections with said needle-feed rock-shaft for imparting lateral work-feeding movements to said needle in unison with the work-advancing movements of said feed-dog.

4. Feeding mechanism for sewing machines comprising, a rotary actuating shaft, a rock-shaft, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting movements to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, and a pin-and-socket connection between and having component elements extending respectively from said strap and rock-shaft, said pin-and-socket connection having the median position of lateral movement of its longitudinal axis in substantially the plane containing the longitudinal axes of said shafts.

5. Feeding mechanism for sewing machines, comprising, a rotary actuating shaft, a rock-shaft, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting movements to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a pin-and-socket connection element extending from said strap and having its longitudinal axis passing substantially through the center of said eccentric, and a complementary pin-and-socket connection element rigidly carried by said rock-shaft in operative engagement with said first mentioned element to transmit rocking movements to said rock-shaft.

6. Feeding mechanism for sewing machines, comprising, a rotary actuating shaft, a rock-shaft, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting movements to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a slide-pin extending from said strap transversely of said rotary shaft, a tubular rock-arm embracing said slide-pin and having its longitudinal axis substantially intersecting said rock-shaft, and means for securing said rock-arm upon said rock-shaft.

7. Feeding mechanism for sewing machines, comprising, a rotary actuating shaft, a rock-shaft, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting movements to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a slide-pin extending from said strap and having its longitudinal axis passing substantially through the center of said eccentric and through the axis of said rock-shaft, and a tubular rock-arm embracing said slide-pin and carried by said rock-shaft to transmit rocking movements to said rock-shaft.

8. Feeding mechanism for sewing machines comprising, a rotary actuating shaft, a rock-shaft having a transverse aperture, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting movements to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a slide-pin carried by said strap and extending into said rock-shaft aperture, and a tubular rock-arm carried by said rock-shaft and embracing said slide-pin.

9. Feeding mechanism for sewing machines comprising, a rotary actuating shaft, a rock-shaft having a transverse aperture, a work-advancing feed-dog operatively connected to said rock-shaft, means for imparting lifting move-

ments to said feed-dog, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a slide-pin carried by said strap and extending into said rock-shaft aperture, a transversely apertured rock-arm embracing the apertured portion of said rock-shaft and said slide-pin, and means for securing said rock-arm to said rock-shaft.

10. In a sewing machine, a rotary shaft, an actuating eccentric disposed upon said shaft for adjustment as to eccentricity, a driver-member carried by said shaft and operatively connected to rotate said eccentric, an adjusting member mounted upon and adapted to turn in excess of 180° about said shaft, yielding means frictionally constraining said adjusting member to rotate normally with said shaft, a connection between said eccentric and adjusting member effective to progressively shift said eccentric continuously in one direction by relatively turning said shaft and adjusting member in excess of 180°, and a detent manually operable to restrain said adjusting member against rotation with said shaft.

11. In a sewing machine, a rotary shaft, an actuating eccentric disposed upon said shaft, a driver-member carried by said shaft and adjustably securing said eccentric for rotation therewith, an adjusting member mounted upon and adapted to turn in excess of 180° about said shaft, said adjusting member being provided with a cam-track, means normally constraining said adjusting member to rotate with said shaft, and a stud carried by said eccentric in engagement with the cam-track of said adjusting member.

12. In a sewing machine, a rotary shaft, an actuating eccentric disposed upon said shaft, a driver-member carried by said shaft and adjustably securing said eccentric for rotation therewith, an adjusting member mounted upon and adapted to make a substantially complete rotation about said shaft, said adjusting member having a spiral cam-track describing substantially 360°, means normally constraining said adjusting member to rotate with said shaft, and a stud carried by said eccentric in engagement with said cam-track.

13. In a sewing machine, a rotary shaft, an actuating eccentric, a driver-member carried by said shaft for rotation therewith, complementary guides carried by said eccentric and driver-member constraining said eccentric to rotate with said shaft and providing for adjustment of the eccentricity of said eccentric, and adjusting member rotatably disposed upon said shaft at the side of said driver-member opposite to the eccentric side thereof, means normally constraining said adjusting member to rotate with said shaft, and a connection between said adjusting member and eccentric effective to adjust the eccentricity of said eccentric upon relative rotation of said adjusting member and shaft.

14. In a sewing machine, a rotary shaft, an actuating eccentric adjustably disposed upon said shaft and provided at one end thereof with a guide-plate, an eccentric-driver member disposed adjacent said guide-plate and carried by said shaft for rotation therewith, said driver member having a guideway complementary to said guide-plate to provide for adjustment of the eccentricity of said eccentric, an adjusting member rotatably disposed upon said shaft at the side of said driver member opposite to the eccentric side thereof, yielding means normally constraining said adjusting member to rotate said shaft,

and a connection between said adjusting member and eccentric effective to adjust the eccentricity of said eccentric upon relative rotation of said adjusting member and shaft.

15. In a sewing machine, a rotary shaft, an actuating eccentric adjustably disposed upon said shaft, an eccentric-driver member carried by said shaft for rotation therewith and having a stud-clearance slot, complementary guides carried respectively by said eccentric and driver member and providing for adjustment of the eccentric crosswise of said shaft, adjustable means providing for taking up lost motion between said guides, an adjusting member rotatably mounted upon and normally constrained to rotate with said shaft, said adjusting member having a cam-track, and a stud extending from the eccentric-guide through the driver-member clearance slot into engagement with said cam-track of the adjusting member.

16. In a sewing machine, a rotary shaft, an actuating eccentric adjustably disposed upon said shaft and provided with a guide-plate extending transversely of the axis of said shaft, said guide-plate having beveled side edges, an eccentric-driver member carried by said shaft for rotation therewith and provided with a guideway having undercut side edges, said guideway slidably supporting said guide-plate for adjustment of said eccentric crosswise of said shaft, a gib adjustably disposed between adjacent side edges of said guide-plate and guideway, an adjusting member rotatably disposed upon and normally constrained to rotate with said shaft, and a connection between said eccentric and adjusting member effective to adjust the eccentricity of said eccentric upon relative rotation of said shaft and adjusting member.

17. In a sewing machine, a rotary actuating shaft, a rocking member, an eccentric carried by said rotary shaft, a strap embracing said eccentric, complementary pin-and-socket connection elements extending respectively from said strap and rocking member, means for supplying lubricant to the contacting faces of said strap and eccentric, and means for conducting lubricant from the inner face of said strap to the mutually contacting faces of said connection elements.

18. In a sewing machine, a rotary actuating shaft, a rocking member, an eccentric carried by said rotary shaft, a strap embracing said eccentric, complementary pin-and-socket connection elements extending respectively from said strap and rocking member, the connection element extending from said strap having a transverse duct and a longitudinal bore connected with said duct and terminating in the inner face of said strap, and means for supplying lubricant to said bore.

19. In a sewing machine, a rotary actuating shaft, a rocking member, an eccentric carried by said rotary shaft, a strap embracing said eccentric and provided with a lubricant reservoir communicating with the inner face of said strap, a slide-pin extending from said strap and having a longitudinal bore terminating at one end in the inner face of said strap, said slide pin having a transverse duct connecting said bore and the outer face of the slide-pin, and a tubular rock-arm extending from said rocking member and embracing said slide-pin.

20. In a sewing machine, a rotary actuating shaft, a rocking member, an eccentric carried by said rotary shaft, a strap embracing said eccentric and provided with a lubricant reservoir, a slide-pin extending from said strap and hav-

ing a transverse duct opening into a longitudinal bore terminating at one end in the inner face of said strap, the inner face of said strap having a lubricant conducting groove connecting said reservoir and bore, and a tubular rock-arm extending from said rocking member and embracing said slide-pin.

21. In a sewing machine, a rotary actuating shaft, a rocking member, an eccentric carried by said rotary shaft, a strap embracing said eccentric, a slide-pin extending from said strap and having a longitudinal bore terminating at one end in the inner face of said strap, said slide-pin having a transverse duct connecting said bore and the outer face of the slide-pin, and a tubular rock-arm extending from said rocking member and embracing said slide-pin, said rock-arm having a transverse lubricant receiving duct.

22. In a sewing machine, a rotary actuating shaft, a driver-member carried by said shaft for rotation therewith, an eccentric adjustably carried by said driver-member, an adjusting member rotatable with and relatively to said shaft, yielding means frictionally constraining said adjusting member to rotate normally with said shaft, a connection between said adjusting member and eccentric effective to progressively shift said eccentric in one direction during a substantially complete revolution, relatively, of said shaft and adjusting member, and manually operable means for restraining said adjusting member against rotation with said shaft.

23. In a sewing machine, a rotary actuating shaft, a driver-member carried by said shaft for rotation therewith, an eccentric adjustably carried by said driver-member at one side thereof, an adjusting member disposed at the side of said driver-member opposite to the eccentric side thereof for rotation with and relatively to said shaft, means normally constraining said adjusting member to rotate with said shaft, and a connection between said adjusting member and eccentric effective to adjust the eccentricity of said eccentric upon relative rotation of said adjusting member and shaft.

24. In a sewing machine, a rotary actuating shaft, a driver-member carried by said shaft for rotation therewith, an eccentric adjustably carried by said driver-member at one side thereof, an adjusting member provided with a cam-track and disposed at the side of said driver-member opposite to the eccentric side thereof for rotation with and relatively to said shaft, means normally constraining said adjusting member to rotate with said shaft, and a stud projecting from said eccentric into engagement with the cam-track of said adjusting member.

25. In a sewing machine, a rotary actuating shaft, a slotted driver-member carried by said shaft for rotation therewith, an eccentric adjustably carried by said driver-member at one side thereof, an adjusting member disposed at the side of said driver-member opposite to the eccentric side thereof for rotation with and relatively to said shaft, said adjusting member having a spiral cam-track in its side face proximate to said driver-member, means normally constraining said adjusting member to rotate with said shaft, a stud carried by said eccentric and projecting through the slot of said driver-member into engagement with said cam-track of the adjusting member, and manually operable means for restraining said adjusting member against rotation with said shaft.

26. In a sewing machine, a rotary actuating

shaft, a driver-member carried by said shaft for rotation therewith, an eccentric slidably disposed upon one side face of said driver-member for rotation therewith and for adjustment crosswise of said shaft, an adjusting member disposed adjacent the opposite side of said driver-member for rotation with and relatively to said shaft, said adjusting member being provided with a cam-track, yielding means frictionally constraining said adjusting member to rotate with said shaft, a stud carried by said eccentric and engaging said cam-track of the adjusting member, and a detent engageable with said adjusting member, 5 thereby at will to restrain the adjusting member against rotation with said shaft.

WALTER MYERS.