March 19, 1963 S. KOSTENOWCZYK 3,081,723

AUTOMATIC LUBRICATION FOR A FEED-OFF-THE-ARM SEWING MACHINE

Filed Nov. 25, 1960 3 Sheets-Sheet 1

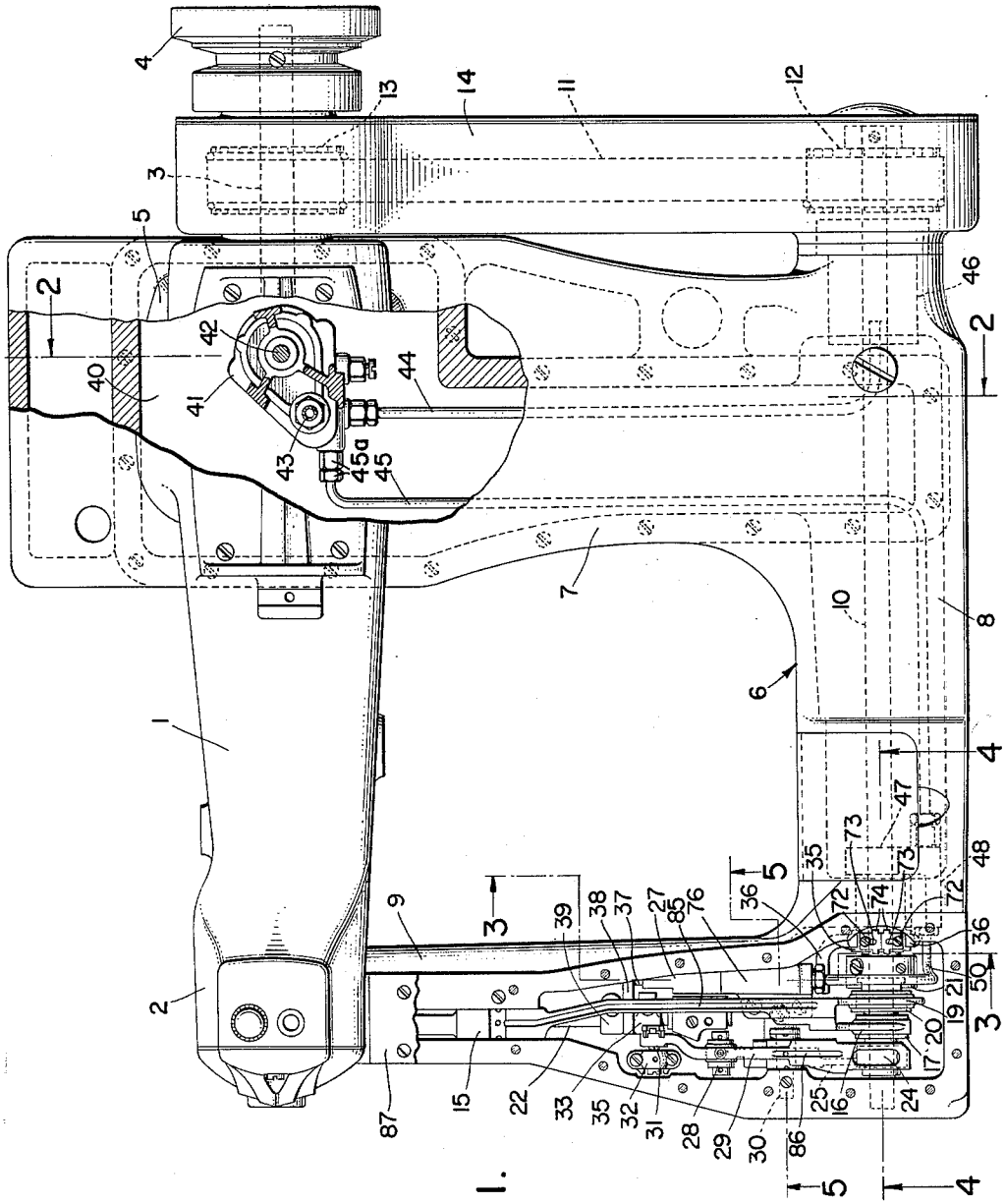


Fig. 1.

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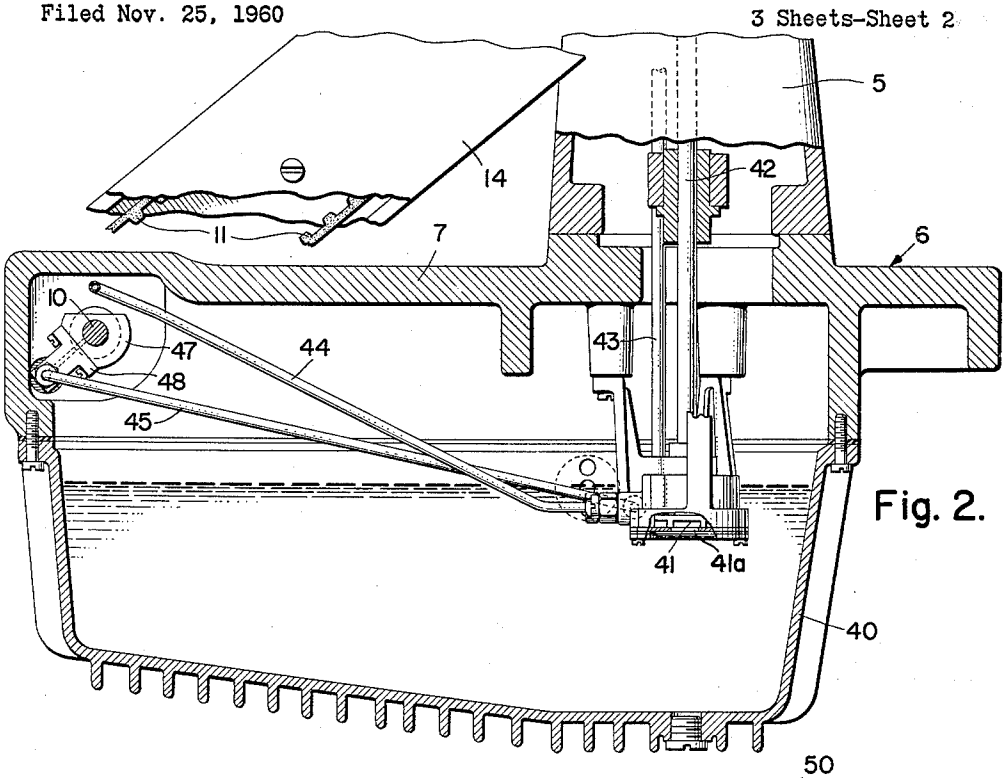


Fig. 2.

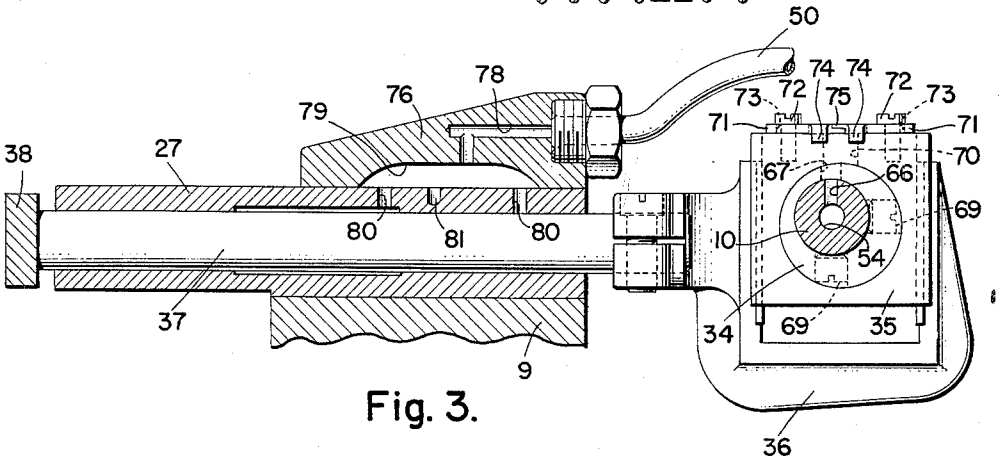


Fig. 3.

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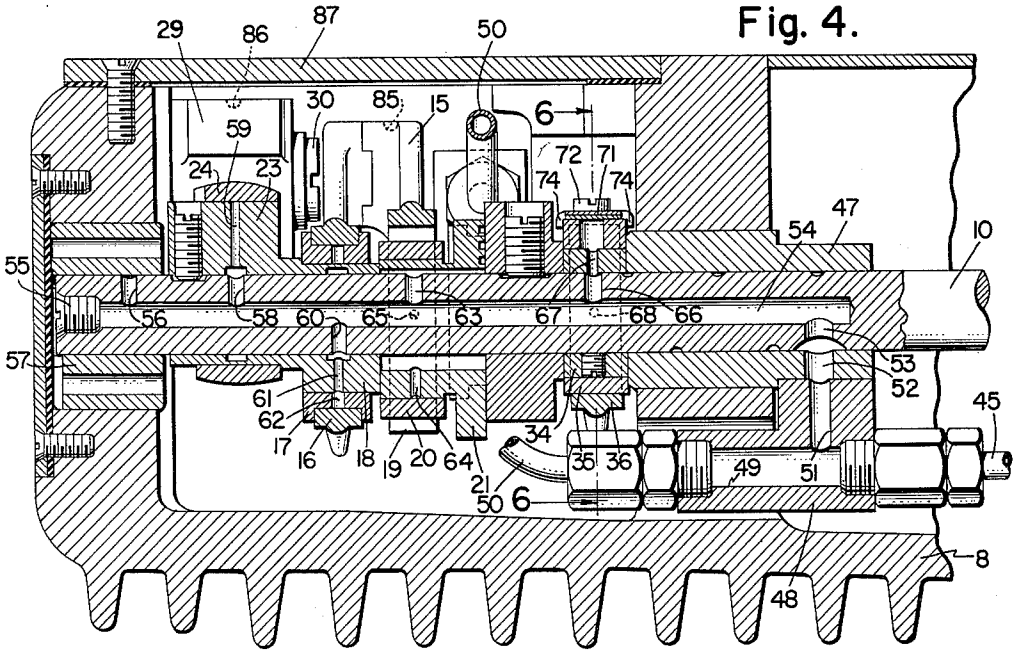
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Fig. 4.



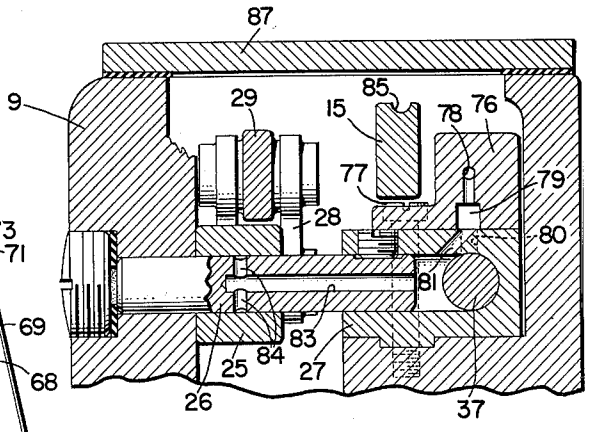


Fig. 5.

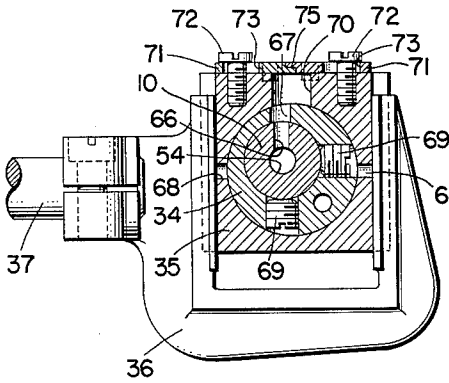


Fig. 6.

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3,081,723

Patented Mar. 19, 1963

3,081,723

AUTOMATIC LUBRICATION FOR A FEED-OFF-THE-ARM SEWING MACHINE

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Filed Nov. 25, 1960, Ser. No. 71,550
5 Claims. (Cl. 112—256)

The present invention relates to means for automatically lubricating a feed-off-the-arm sewing machine.

The object of this invention is to provide in a feed-off-the-arm sewing machine an automatic lubrication system that is simple, economical, effective and dependable, and that will provide for operation of the machine at very high sewing speeds.

Having in mind the above and other objects that will be evident for an understanding of this disclosure, the invention comprises the devices, combinations and arrangements of parts as illustrated in the presently preferred embodiment of the invention which is hereinafter set forth in such detail as to enable those skilled in the art readily to understand the function, operation, construction and advantages of it when read in conjunction with the accompanying drawings in which:

FIG. 1 is a top plan view of a sewing machine embodying the present invention, parts of the machine being broken away to show the underlying mechanism.

FIG. 2 is a fragmentary vertical sectional view taken substantially on the line 2—2 of FIG. 1.

FIG. 3 is a detail sectional view taken substantially on the line 3—3 of FIG. 1.

FIG. 4 is a fragmentary sectional view taken substantially on the line 4—4 of FIG. 1.

FIG. 5 is a fragmentary sectional view taken substantially on the line 5—5 of FIG. 1.

FIG. 6 is a detail sectional view taken substantially on the line 6—6 of FIG. 4.

With reference to the drawings, the present invention is illustrated as embodied in a feed-off-the-arm sewing machine substantially as illustrated in the United States patent of Clayton, No. 1,996,040, March 26, 1935.

The illustrated machine comprises a frame including a bracket arm 1 which terminates at its free end in a head 2 in which is mounted the usual needle-carrying needle bar and presser bar (not shown). Actuation is imparted to the needle bar by a main shaft 3 journaled longitudinally of the bracket arm 1 and extending through the end wall thereof at the end opposite from the head 2. Upon the free end of the main shaft 3 is mounted a belt pulley 4 by means of which the machine is driven.

The bracket arm 1 is carried at the upper end of a standard 5 integral therewith and in turn mounted upon a bed 6. The bed 6 is U-shaped and comprises an arm 7 upon the rear portion of which the standard 5 is mounted, and which extends horizontally forwardly therefrom, a horizontal arm 8 extending laterally from the forward portion of the arm 7, and a horizontal work arm 9 extending forwardly from the arm 8 and terminating in a free end directly beneath the head 2.

A bed shaft 10 is journaled longitudinally of the arm 8 on an axis parallel to the axis of the main shaft 3. Rotation is imparted to the bed shaft 10 by means of a belt 11 entrained about a pulley 12 on the free end of the shaft 10 and a pulley 13 on the free end of the main shaft 3. A belt cover 14 encloses the belt 11 and pulleys 12 and 13.

The feeding mechanism of the machine comprises a feed bar 15 arranged longitudinally of the work arm 9 and slidably pivoted intermediate its ends within the arm. At its forward end, the feed bar 15 is provided with a fork 16 having horizontal slideway that receives a slide block 17

mounted on a feed lift eccentric 18 on the bed shaft 10 and with a fork 19 having a vertical slideway that receives a slide block 20 mounted on an adjustable feed advance eccentric 21 on the bed shaft 10.

A looper bar 22 is mounted in the work arm 9 for oscillation and for endwise sliding and is adapted to carry loopers (not shown) for cooperating with the needles to form two thread chain stitches. Oscillations of the looper bar 22 imparts advance or loop seizing mtoions to the loopers and endwise sliding of the looper bar 22 imparts loop spreading or needle avoiding motions to the loopers.

Oscillation is imparted to the looper bar 22 by an eccentric 23 on the bed shaft 10 and integral with the feed lift ececntric 18. The eccentric 23 is embraced by the strap end 24 of a pitman 25 (FIG. 1) which is slidingly pivoted intermediate its ends on a rod 26 (FIG. 5) mounted at one end in a wall of the work arm 9 and at the other end in a lateral extension of a bushing 27. The free end of the pitman 25 is connected by a substantially vertical link 28 to an intermediate point on a lever 29 pivoted on the side wall of the work arm 9 by a stationary pivot pin 30 (FIG. 1) that is located directly above the rod 26. The free end of the lever 29 has a laterally extending stud 31 that is connected by a substantially vertical link 32 to a laterally extending crank arm (not shown) on a collar 33 secured to the looper bar 22.

Endwise motion is imparted to the looper bar 22 by an eccentric 34 on the bed shaft 10 that is embraced by a block 35 slidably mounted in a vertical slideway in a fork 36 on the forward end of a slide shaft 37. The shaft 37 is mounted in the bushing 27 for endwise sliding and is connected at its end by a laterally extending arm 38 disposed between the collar 33 on the looper bar 22 and a collar 39.

Secured to the open underside of the arm 7 of the bed 6 is a lubricant reservoir 40. Lubricant from the reservoir 40 is distributed under pressure by a pump 41 which is similar to and actuated as disclosed in the United States patent of Kaier No. 2,206,285, July 2, 1940. Briefly, the pump 41 is secured to the underside of the bed directly beneath the standard 5 and has an intake 41*a* in communication with the lubricant in the reservoir 40. The pump 41 is driven by a vertical axis shaft 42 journaled in the standard 5 and connected by gears (not shown) to the main shaft 3. The pump 41 has three outlet conduits 43, 44 and 45. The conduit 43 rises vertically through the standard 5 and is adapted to lubricate the mechanism within the bracket arm 1, for example, in the manner disclosed in the above Kaier patent. The conduit 44 directs lubricant to the bearing surface of the bed shaft 10 in a bushing 46 at the standard end thereof. The conduit 45 which is connected to one of the outlets of the pump 41 by a nut 45*a*, FIG. 1, directs lubricant to a bushing 47 that provides an intermediate bearing for the bed shaft 10, and to the mechanism in the work arm 9.

The conduit 45 is connected to a T coupler 48 secured to a flat provided on the periphery of the bushing 47, the coupler 48 having a through bore 49 connected to a second conduit 50 and a radial bore 51 that communicates with a radial bore 52 in the bushing 47, which in turn communicates with a radial bore 53 in the bed shaft 10 and intersecting a longitudinal bore 54 in the shaft 10. The bore 54 extends inwardly from the one end of the shaft 10 and is closed at the end by a screw 55. The shaft 10 is provided with a series of radial bores for directing lubricant from the bore 54 to the various lubrication points along the shaft and including a bore 56 for lubricating the bearing surface of the shaft 10 in an end bushing 57, a bore 58 that communicates with a bore 59 in the eccentric 23 for lubricating the bearing surface of the strap 24 on the eccentric 23, a bore 60 that communicates

successively with a bore 61 on the eccentric 18 and bores 62 in the block 17 for lubricating the bearing surfaces between the eccentric 18, block 17 and fork 16, a bore 63 that communicates successively with a bore 64 in the eccentric 21 and bores 65 in the block 20 for lubricating the bearing surfaces between the eccentric 21, block 20 and fork 19, and a bore 66 that communicates successively with a bore 67 in the eccentric 34 and a bore 68 in the block 35 for lubricating the bearing surfaces between the eccentric 34, block 35 and fork 36.

The eccentric 34 imparting for the needle-avoiding motion to the loopers is secured on the bed shaft 10 in angularly adjusted position by a pair of set screws 69. In order to provide access to these screws to effect the adjustment, an aperture 70 is provided in the accessible portion of the block 35, that is, the exposed portion that is angularly disposed in relation to the opposed surfaces engaged by the fork 36 and is made large enough to insert a screw driver therethrough. To prevent the dissipation of the pressure of the lubricant in the bore 54 through the bores 66 and 67 and aperture 70, the latter is adapted to be closed by a gate member comprising a pair of sheet metal elements 71 slidably mounted upon the top of the block 35 by a screw 72 extending loosely through an elongated slot 73 in each of the elements 71 and threaded into the block 35. The elements 71 have depending ears 74 bent from the edges thereof and engaging the sides of the block 35 to prevent turning of the elements, and have overlapping meeting edges 75 to make the joint more leak-proof. From the above it will be seen that, when the screws 72 are backed off, the elements 71 can be separated to provide access to the screws 69 through the aperture 70. When the elements 71 are held in abutment by the screws 72, the aperture 70 is effectively closed to prevent lubricant from issuing therethrough.

The conduit 50 communicates with the bore 49 of the coupler 48 and leads from there to a lubricant distributor or block 76 disposed upon the top of the bushing 27 and secured in place by screws 77, FIG. 5, which also secure the bushing 27. The block 76 has bores 78 communicating with the conduit 50 and with a groove 79 that in turn communicates with bores 80 for lubricating the bearing surface of the shaft 37 in the bushing 27. A diagonally extending bore 81 also communicates with the groove 79 and directs lubricant into the bore 82 in the bushing 27 in which the rod 26 is received. The rod 26 has an axial bore 83 opening into the bore 82 for receiving lubricant and directing it through a radial bore 84 to the bearing surface between the pitman 25 and the rod 26.

The upper surface of the feed bar 15 is provided with a groove 85 in which is disposed excess lubricant that is thrown off by the various eccentrics on the bed shaft 10. Lubricant is led by the groove 85 to the sliding pivot of the feed bar 15. The lever 29 is provided with a similar groove 86 that directs lubricant to the sliding pivot thereof. The various other lubricant points in the work arm 9 are lubricated by the oil laden atmosphere within the work arm. The open top of the work arm 9 is closed by a cover plate 87. The underside of the reservoir 40 and arm 8 are provided with fins as can be seen in FIGS. 2 and 4 for the dissipation of heat. The bottom wall of the arms 9 and 8 are sloped toward the reservoir 40 to drain the excess.

Numerous alterations of the structure herein disclosed will suggest themselves to those skilled in the art. However, it is to be understood that the present disclosure relates to a preferred embodiment of my invention which is for purposes of illustration only and not to be construed as a limitation of the invention. All such modifications which do not depart from the spirit of the invention are intended to be included within the scope of the appended claims.

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

1. A feed-off-the-arm sewing machine having a frame including a horizontal bed, a bed shaft journaled in said bed, means for imparting actuation to said bed shaft, feeding mechanism and looper mechanism in said bed, a plurality of rotary actuating elements on said bed shaft and including an eccentric having a peripheral bearing surface and means for securing said eccentric on said bed shaft in angularly adjusted position comprising a radially extending internally threaded bore in said eccentric and intersecting said bearing surface and a set screw mounted in said bore, a block surrounding said peripheral bearing surface of said eccentric and having an aperture providing access to said set screw, means operatively connecting said rotary actuating elements and said looper mechanism and said feeding mechanism for imparting actuation to the latter upon rotation of said bed shaft and including a fork cooperating with said block on opposed surfaces spaced angularly from said aperture, said bed shaft having an endwise extending bore, means for providing lubricant under pressure to said bore during the operation of the machine, radial bores in said shaft and said actuating elements and intersecting said endwise bore and the bearing surfaces of said rotary actuating elements, means for closing said aperture in said block, and means for releasably securing said closure means in position to prevent the escape of lubricant through said aperture and to expose said aperture to provide access to said set screw for the purpose of angularly adjusting said eccentric.

2. In a feed-off-the-arm sewing machine in accordance with claim 1 in which said looper mechanism includes an endwise movable looper bar in said work arm for imparting loop spreading movements to said looper mechanism upon reciprocation of said looper bar and said eccentric is adapted to impart reciprocation to said looper bar.

3. A feed-off-the-arm sewing machine having a frame including a horizontal U-shaped bed comprising an interconnected forwardly extending arm, a laterally extending arm, and a rearwardly extending work arm, a bed shaft journaled in said laterally extending arm, means for imparting actuation to said bed shaft, feeding mechanism and looper mechanism in said work arm, rotary actuating elements on said bed shaft, means operatively connecting said rotary actuating elements to said feeding mechanism and said looper mechanism for imparting actuation to the same upon actuation of said bed shaft, and means for automatically lubricating the bearing surfaces in said laterally extending arm and said work arm comprising a reservoir on the underside of said forwardly extending arm, a lubricant pump having an intake in said reservoir, means for driving said pump during the operation of the machine, a conduit connected at one end to the discharge of said pump and adapted to receive lubricant under pressure from said pump, a bushing in said bed in which said bed shaft is journaled, a coupler mounted on said bushing and having a bore, means connecting the other end of said conduit to the bore in said coupler, said bed shaft having a bore extending endwise thereof, means including communicating bores in said coupler, said bushing and said bed shaft for delivering lubricant to the endwise bore in said bed shaft, said bed shaft and said rotary actuating elements having communicating bores intersecting said endwise bore in said bed shaft and intersecting the bearing surfaces of said rotary actuating element.

4. In a feed-off-the-arm sewing machine in accordance with claim 3 in which there is provided a second conduit, means connecting one end of said second conduit to said coupler and in communication with the lubricant bore thereof, said second conduit extending into said work arm, and means including a block secured in said work arm and communicating bores for directing lubricant from said conduit to lubrication points in said work arm.

5. A feed-off-the-arm sewing machine having a frame including a horizontal U-shaped bed comprising a forwardly extending arm, a laterally extending arm on the front of said forwardly extending arm, and a rearwardly extending work arm on the free end of said laterally

extending arm, a standard rising from the rear portion of said forwardly extending arm, a bracket arm carried by said standard and terminating in a head overhanging the free end of said work arm, a main shaft journaled longitudinally of said bracket arm, a bed shaft journaled longitudinally of said laterally extending arm on an axis parallel to the axis of said main shaft, means interconnecting said main shaft and said bed shaft for unitary rotation, means for imparting rotation to said shafts, looper mechanism and feeding mechanism in said work arm, a plurality of rotary actuating elements on said bed shaft, means operatively connecting said rotary actuating elements and said looper mechanism and said feeding mechanism for imparting actuation to the same upon actuation of said bed shaft, a lubricant reservoir on the underside of said forwardly extending arm, a lubricant pump having an intake in said reservoir, means for driving said pump during the operation of the sewing machine, said bed shaft having an endwise extending bore, a conduit, means connecting one end of said conduit to the discharge of said pump and the other end of said conduit to said bore for delivering lubricant under pressure to said bore, said bed shaft and said rotary actuating elements having communicating bores intersecting said endwise extending bore and the bearing surfaces of said rotary actuating elements.

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