

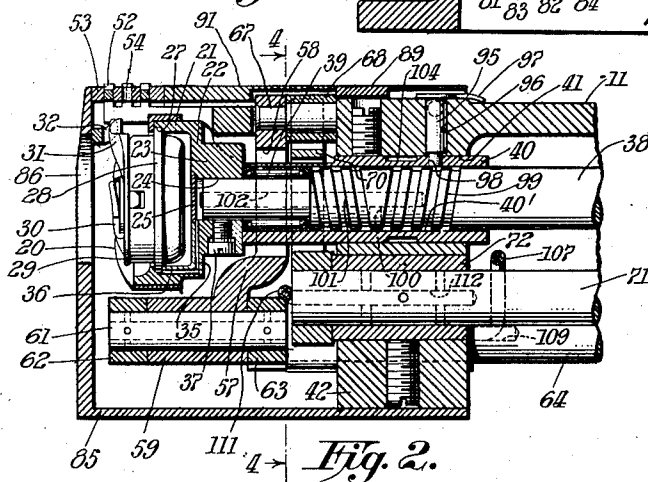
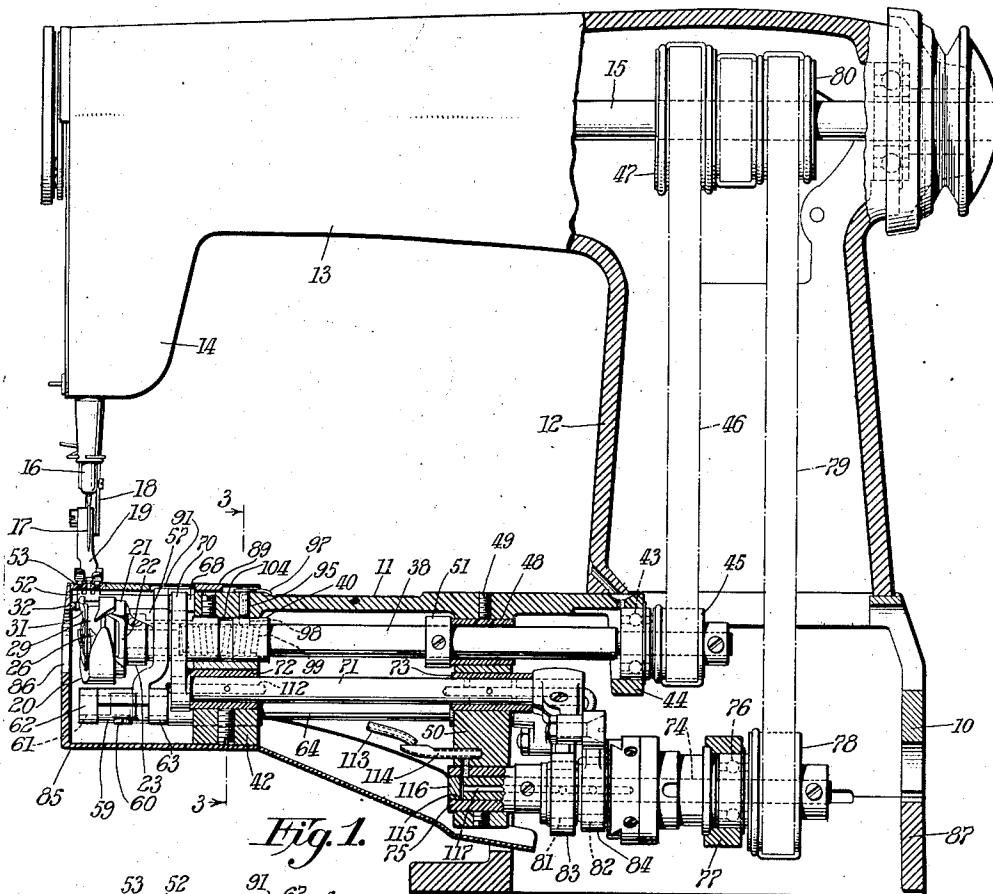
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2,385,299

LUBRICATING DEVICE FOR SEWING MACHINES

Original Filed April 11, 1942 2 Sheets-Sheet 1



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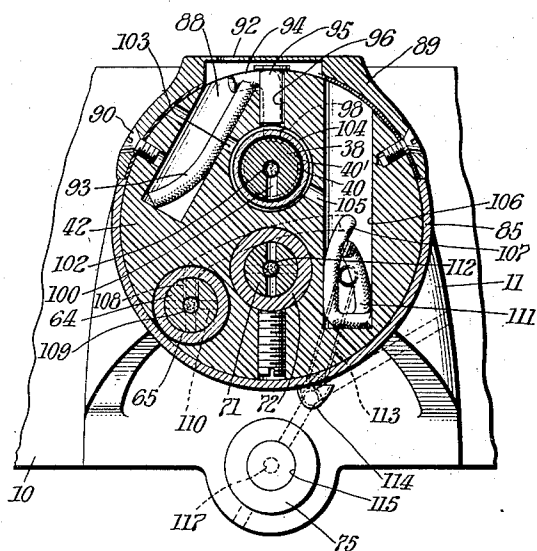


Fig. 3.

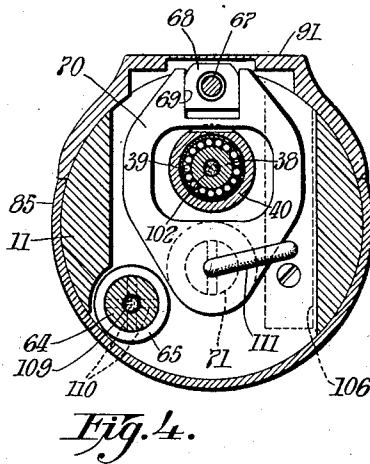


Fig. 4.

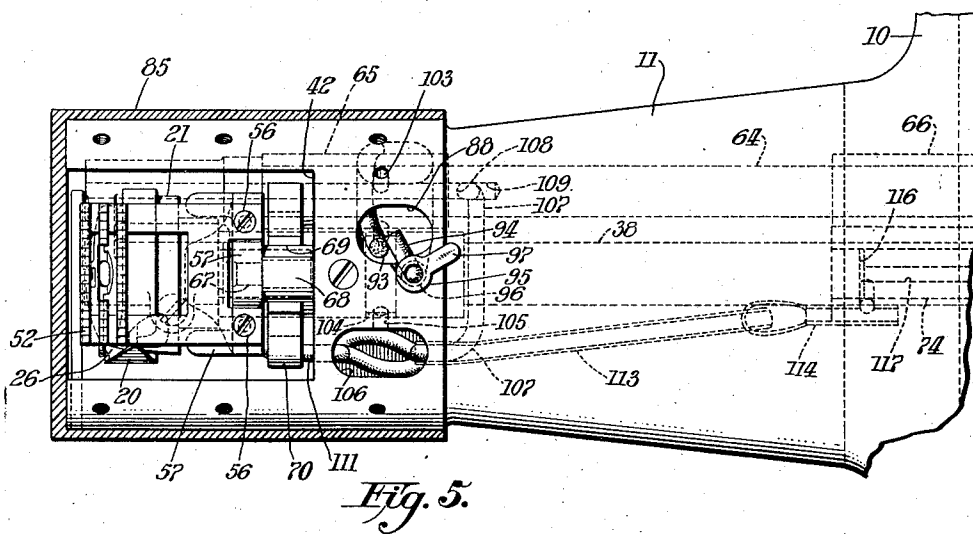


Fig. 5.

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2,385,299

LUBRICATING DEVICE FOR SEWING MACHINES

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Original application April 11, 1942, Serial No. 438,516. Divided and this application June 14, 1943, Serial No. 490,733

4 Claims. (Cl. 112—256)

This invention relates to lubricating devices for sewing machines and has for an object to provide conveniently disconnectible lubricant-conducting connections between a lubricant-supply reservoir and the thread-carrier raceway of a sewing machine rotary loop-taker.

Another object of this invention is to provide a work-arm type of sewing machine with simple means for delivering lubricant to bearings, including the thread-carrier bearing of a rotary loop-taker, disposed within the work-arm of the machine.

Other and more specific objects of the invention will be apparent from the following description and claims.

This application is a division of my prior patent application Ser. No. 438,516, filed April 11, 1942, now matured into Patent No. 2,333,438, dated November 2, 1943; the present invention consisting in the lubricating devices, combinations and arrangements of parts hereinafter described in connection with the accompanying drawings, which illustrate a preferred embodiment of the invention and in which:

Fig. 1 is a front elevation, partly in vertical section, of a work-arm type of sewing machine containing the present improvement. Fig. 2 is an enlarged vertical section longitudinally of the free end portion of the work-arm; the section being taken in substantially the vertical plane containing the axis of rotation of the loop-taker shaft. Fig. 3 represents an enlarged cross-section of the work-arm on substantially the line 3—3 of Fig. 1. Fig. 4 represents a transverse section of the work-arm on substantially the line 4—4 of Fig. 2. Fig. 5 is an enlarged top-plan view of the work-arm broken away from its supporting base; the throat-plate and cover-plates being removed from the work-arm and the work-arm end-cap being shown in section.

As illustrated in the drawings, the sewing machine has a hollow supporting base 10, from which extends a horizontally disposed work-supporting arm 11 of the cylinder-bed type having a free outer end; said work-supporting arm being preferably integral with the base 10. Rising from the base 10 is the hollow standard 12 of a bracket-arm 13 which terminates at its free end in a head 14 overhanging the free end of the work-arm 11.

Rotatably journaled in the bracket-arm 13 is a horizontally disposed rotary actuating or main shaft 15 suitably connected to impart endwise reciprocatory movements to a vertically disposed needle-bar 16 carrying at its lower end an eye-

pointed needle 17. Also supported by the bracket-arm head 14 for endwise movement is the usual vertically disposed and spring-depressed presser-bar 18 carrying at its lower end a presser-foot 19.

Complemental to the needle 17, in the formation of lock-stitches, is a rotary loop-taker 20 of the horizontal-axis rotary hook type disposed within the work-arm 11 at the free end thereof. The loop-taker 20 has a cylindrical side wall 21 and an end wall 22 from which extends a reduced hub 23 having a shaft-aperture 24 closed at the inner side of the end wall 22 by a disk 25 set into the end wall 22. The side wall 21 of the loop-taker is partly cut away to provide a needle-thread loop seizing beak 26; said side wall 21 being also internally grooved circumferentially to provide a raceway 27. Journaled in the raceway 27 is the peripheral bearing-rib 28 of a thread-carrier 29. The thread-carrier 29 houses the usual thread-case 30 which contains a mass of under thread about which the needle-thread loops are cast by the loop-taker. The thread-carrier 29 is restrained against rotation with the loop-taker and to that end the thread-carrier is provided with a lug 31 having the usual stop-notch entered by a stationary stop-lug 32. The hub-aperture 24 has the usual lubricant-conducting connections with the raceway 27; said connections comprising a radial duct 35 formed in the end wall 22 of the loop-taker and open to an axially extending duct 36 in the loop-taker side wall 21.

The hub 23 of the loop-taker is secured by screws, as 37, upon the reduced end of a horizontally disposed loop-taker shaft 38 extending lengthwise of the work-arm 11. The end of the shaft 38 is preferably spaced from the disk 25 of the loop-taker end wall, thereby to provide the loop-taker with a lubricant-collecting cavity beyond the end of the shaft and open to the radial duct 35 which is connected with the loop-taker raceway.

As illustrated more particularly in Fig. 2 of the drawings, the loop-taker shaft 38 is rotatably journaled in a needle-roller bearing 39 disposed directly adjacent the hub 23 of the loop-taker, whereby the shaft 38 is adequately supported close to the loop-taker. The roller-bearing 39 is disposed within and carried by a bushing 40 having the longitudinal shaft-opening 40' thereof slightly larger, diametrically, than the shaft 38, whereby the inner face of the bushing is spaced slightly from the shaft. The bushing 40 is suitably secured in a horizontal hole 41 formed in a trans-

verse wall 42 of the work-arm 11 near the free end thereof.

At its opposite end, the loop-taker shaft 38 is journaled in a ball-bearing 43 supported by a lug 44 depending from the upper wall of the base 10. Carried by the shaft 38 within the base 10 is a belt-pulley 45 connected by a clip-belt 46, extending through the arm-standard 12, to a belt-pulley 47 carried by the main or bracket-arm shaft 15. The pulleys 45 and 47 are proportioned so that the loop-taker shaft 38 rotates twice for each rotation of the main shaft 15, and the loop-taker shaft 38 is located in the work-arm so that the axes of rotation of the shafts 15 and 38 are disposed in a common vertical plane. Between its ends, the loop-taker shaft 38 passes freely through a bushing 48 secured by a screw 49 in another transverse wall 50 of the work-arm; said wall 50 being located at the juncture of the base 10 and work-arm 11. A collar 51 is secured upon the shaft 38 to engage one end of the bushing, thereby to restrain said shaft against endwise movement in one direction.

The work is advanced across the work-arm 11 by a drop-feed feed-dog 52, operating through a suitably slotted and flattened portion of a throat-plate 53 having a needle-aperture 54; said throat-plate being suitably secured upon the work-arm. The feed-dog 52 overhangs the loop-taker 20 and is secured by screws 56 upon the upper end of an upright feed-bar 57 having a clearance opening 58 for the end portion of the bushing 40 which supports the roller-bearing 39; said feed-bar 57 being disposed directly adjacent to the loop-taker hub 23.

The lower end of the feed-bar 57 has a horizontally apertured split sleeve 59 disposed below the loop-taker 20 and clamped by a screw 60 upon a fulcrum-pin 61 which lengthwise extends parallel to the loop-taker shaft 38 and is preferably disposed vertically below said shaft. The opposite ends of the fulcrum-pin 61 are pivotally journaled in a feed-lift rocker comprising horizontally spaced arms 62 and 63 suitably carried by one end of a feed-lift rock-shaft 64 disposed substantially parallel to the loop-taker shaft 38 and rearward of the vertical plane containing the axis of rotation of said shaft 38. At its forward end, the feed-lift rock-shaft 64 is journaled in a bearing-bushing 65 suitably secured in an aperture in the transverse wall 42 of the work-arm. At its opposite end, the rock-shaft 64 is journaled in a bushing 66 carried by the frame wall 50.

Extending toward the wall 42 laterally from the upper end of the feed-bar 57 is a supporting pin 67 of a pivot-block 68. The pivot-block 68 is slidably disposed in an upwardly open rectangular guideway 69 provided in a feed-advance rocker 70. The feed-advance rocker 70 extends upwardly from one end of a feed-advance rock-shaft 71 which is also disposed substantially parallel to the loop-taker shaft 38 and axially in the vertical plane containing the rotation-axes of the arm-shaft 15 and the loop-taker shaft 38. Adjacent the rocker 70, the feed-advance rock-shaft 71 is journaled, in a bushing 72 suitably secured in the wall 42 of the work-arm. At its opposite end, the feed-advance rock-shaft 71 is journaled in a bushing 73 carried by the frame wall 50.

The feed-advance rock-shaft 71 and the feed-lift rock-shaft 64 derive their actuation from a primary feed-actuating shaft 74 having one end thereof journaled in a bearing-bushing 75 suitably secured in the lower portion of the work-arm wall 50. The opposite end of the shaft 74 is

journaled in a ball-bearing 76 supported by a base-wall 77. Adjacent the ball-bearing 76, the rotary shaft 74 carries a belt-pulley 78 connected by a clip-belt 79 to a pulley 80 carried by the main or arm-shaft 15; said pulleys 78 and 80 being proportioned so that the shafts 15 and 74 rotate in one-to-one relation. The feed-actuating shaft 74 is disposed vertically below the loop-taker shaft 38 so that its axis of rotation is contained in the vertical plane containing the axes of rotation of the main-shaft 15 and the loop-taker shaft 38.

The feed-actuating shaft 74 carries an adjustable feed-advance eccentric 81 and a feed-lift eccentric 82, both disposed between the frame walls 50 and 77; said eccentrics being embraced by straps of pitmans 83 and 84, respectively. As more fully described in my prior patent application Serial No. 438,516, the pitmans 83 and 84 are operatively connected to the rock-shafts 71 and 64 to impart work-advancing movements to the feed-dog 52.

A segmental end-cap 85 is removably applied to the work-arm 11 to enclose the lower and front end portions thereof; the end wall of said end-cap having an opening 86 to provide for removal of the thread-case 30 without requiring removal of the end-cap. The base 10 of the machine is preferably supported by a sub-base 87 of any suitable height.

As illustrated in Fig. 3 of the drawings, the transverse wall 42 of the work-arm 11 is provided at the rearward side thereof with an upwardly open and forwardly inclined lubricant-pocket or primary lubricant-supply reservoir 88; the open upper end of the reservoir 88 being disposed below and spaced from the flattened portion of a cover-plate 89 which is removably secured by screws 90 upon the work-arm wall 42. Between the cover-plate 89 and the throat-plate 53, another and similarly shaped cover-plate 91 is suitably secured upon the work-arm 11 to provide for access to the feed-mechanism below said cover-plate 91. Lubricant may be supplied to the reservoir 88 through an aperture 92 provided in the cover-plate 89.

Disposed in the reservoir 88 is a lubricant-conducting wick 93 extending upwardly from the bottom wall of the reservoir to the open upper end thereof. Adapted disconnectibly to engage the upper end portion of the wick 93 is one limb of a bent connection-wick 94, of which the other limb extends downwardly through a pivot-sleeve 95 free for turning movement in an upwardly open aperture 96 formed in the wall 42 vertically above the bushing 40. The pivot-sleeve 95 has a short crank-arm 97 extending laterally from said pivot-sleeve beyond the edge of the cover-plate 89 so as to be accessible externally of the work-arm for manually turning the pivot-sleeve, thereby to provide for at will shifting the connection-wick 94 into and out of engagement with the wick 93; it being understood that the connection-wick 94 is carried by the pivot-sleeve 95 to turn therewith. The lower end of the connection-wick 94 extends downwardly from the pivot-sleeve 95 through a radial aperture 98 in the bushing 40, thereby to deliver lubricant into the shaft-opening 40' of the bushing 40 when the wicks 93 and 94 are in engagement with each other.

Within the bushing 40, the loop-taker shaft 38 is externally provided with a spiral lubricant-impelling thread 99 disposed directly below the bushing-aperture 98 and leading to a radial aperture 100 in the shaft 38. The shaft 38 is

additionally provided with an oppositely spiraling lubricant-impelling thread 101 at the opposite side of and also leading to the shaft-aperture 100. The shaft-aperture 100 opens into a longitudinal bore 102 of the shaft 38; said bore being open at the end of the shaft within the hub 23 of the loop-taker.

The wick 93 serves to feed lubricant from the reservoir 88 to the connection-wick 94 when said wicks are in contact with each other. The wick 94 feeds the lubricant into the bushing 40, and the spiral thread 99 impels the lubricant, thus supplied thereto, lengthwise of the shaft 38 to the shaft-aperture 100. The counter-spiralling thread 101 guards against escape of excess lubricant from the end of the bushing 40 adjacent the loop-taker, while permitting a modicum of the lubricant to find its way to the needle-roller bearing 39. The lubricant thus supplied to the hub-cavity 24 is delivered to the raceway 27 of the loop-taker in the usual manner.

The work-arm wall 42 is provided with a lubricant-duct 103 connecting the reservoir 88 with the bushing-hole 41 of said wall; the bushing 40 having a circumferential groove 104 located to receive lubricant passing through the duct 103. Another duct 105 in alinement with the duct 103, is provided in the wall 42 and connects the bushing-hole 41 with a supplemental lubricant-reservoir 106 comprising an upwardly open and substantially vertical pocket formed in the wall 42 below the cover-plate 89.

Extending from and through a side wall aperture of the supplemental reservoir 106 is a lubricant-conducting wick 107 having the opposite end thereof entering a radial aperture 108 of the feed-lift rock-shaft 64 beyond the end of the bushing 65. The radial shaft-aperture 108 opens into a longitudinal bore 109 of the shaft 64, through which shaft-bore lubricant is supplied to additional radial ducts 110 of the shaft 64 within said bushing 65. Another wick 111 extends from the supplemental reservoir 106, through a side wall aperture of said reservoir and into the open end of a longitudinal bore 112 of the feed-advance rock-shaft 71; said bore 112 being connected by suitable radial shaft-apertures with the bearing-face of the bushing 72 in which one end portion of the shaft 71 is journaled.

The supplemental reservoir 106 has a third side wall aperture into which extends one end of a tubular lubricant-conduit 113 lengthwise inclined downwardly from said reservoir. The opposite end of the conduit 113 overhangs a catch-basin at the free end of a short tube 114 supported in an aperture of the work-arm wall 50 to extend horizontally from said wall. An aperture of the tube 114 is connected by suitable ducts, provided in the wall 50 and in the bushing 75, with the bearing-opening 115 of said bushing 75; said bearing-opening 115 being closed at the work-arm side of the bushing 75 by a suitable plug 116 spaced slightly from the end of the shaft 74. The shaft 74 is provided with a longitudinal bore 117 and with suitable radial apertures connecting said bore with the bearings of the straps of the pitmans 83 and 84 which embrace the feed-lift eccentric 82 and the feed-advance eccentric 81.

From the foregoing description, it will be understood that when lubricant is supplied through the aperture 92 of the work-arm cover-plate 89 to the primary lubricant-reservoir 88, the lubricant rising in the reservoir 88 will flow through

the duct 103 to the circumferential bushing-groove 104 and then through the duct 105 into the supplemental reservoir 106. As the lubricant rises in the reservoir 106, it flows through the conduit 113 to the described lubricant-conducting connections with the bore 117 of the feed-actuating shaft for delivery to the pitman strap bearings of the feed-lift and feed-advance eccentrics carried by the shaft 74.

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

1. In a sewing machine having a frame including a wall provided with a lubricant-supply reservoir, a rotary shaft journaled in said frame and provided longitudinally thereof with a bore, a loop-taker carried by one end of said shaft and having a thread-carrier raceway, said bore having lubricant-conducting connections with said raceway, a primary lubricant-conducting wick disposed in said reservoir, a sleeve journaled for turning movement in said frame, a connection-wick carried by said sleeve for turning movement therewith, said connection-wick having one end thereof extending laterally from said sleeve and disposed for engagement with said primary wick, and lubricant-conducting connections between the other end of said wick and the bore of said shaft.

2. In a sewing machine having a frame including a work-supporting arm free at one end thereof, said arm having a wall provided with a lubricant-supply reservoir, a shaft rotatably journaled in said arm and longitudinally provided with a bore, a loop-taker carried by one end of said shaft and having a thread-carrier raceway, said bore having lubricant-conducting connections with said raceway, separable lubricant-conducting wicks including a shiftable connection-wick between said reservoir and the bore of said shaft, and manually operable means including an arm accessible exteriorly of said work-supporting arm for shifting said connection-wick out of and into effective lubricant-conducting position.

3. In a sewing machine having a frame including a work-supporting arm free at one end thereof, said arm having a wall provided with a lubricant-supply reservoir, a cover-plate detachably secured upon said work-supporting arm and overlying said reservoir, a shaft rotatably journaled in said arm and longitudinally provided with a bore, a loop-taker carried by one end of said shaft and having a thread-carrier raceway, said bore having lubricant conducting connections with said raceway, a primary lubricant-conducting wick disposed in said reservoir, a sleeve journaled for turning movement in said wall of the work-supporting arm and disposed below said cover-plate, a connection-wick carried by said sleeve for turning movement therewith, said connection-wick having one end thereof extending laterally from said sleeve and disposed for engagement with said primary wick, an arm extending laterally from said sleeve beyond said cover-plate, and lubricant-conducting connections between the other end of said connection-wick and the bore of said shaft.

4. In a sewing machine having a frame including a horizontally disposed work-supporting arm free at one end thereof, said arm having a transverse wall spaced from the free end of said arm, a bushing carried by said wall, a horizontally disposed loop-taker shaft extending lengthwise of said arm and rotatably journaled in said bushing, a loop-taker carried by said shaft at the arm-free-end side of said wall and having a thread-

carrier raceway, said shaft being provided with a longitudinal bore having lubricant-conducting connections with said raceway, a feed rock-shaft having a bearing in said wall, said rock-shaft having its longitudinal axis disposed in substantially the vertical plane containing the axis of rotation of said loop-taker shaft, primary and supplemental lubricant-supply reservoirs in said wall of the work-supporting arm, said reservoirs being dis-

posed at opposite sides of said plane, lubricant-conducting connections in said wall between said reservoirs, lubricant-conducting connections between said primary reservoir and the bore of said loop-taker shaft, and lubricant conducting connections between said supplemental reservoir and the rock-shaft bearing in said wall.

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