Oct. 27, 1942. F. PARRY 2,300,388

LUBRICATING MEANS FOR SEWING MACHINE LOOP-TAKERS

Filed Oct. 17, 1940

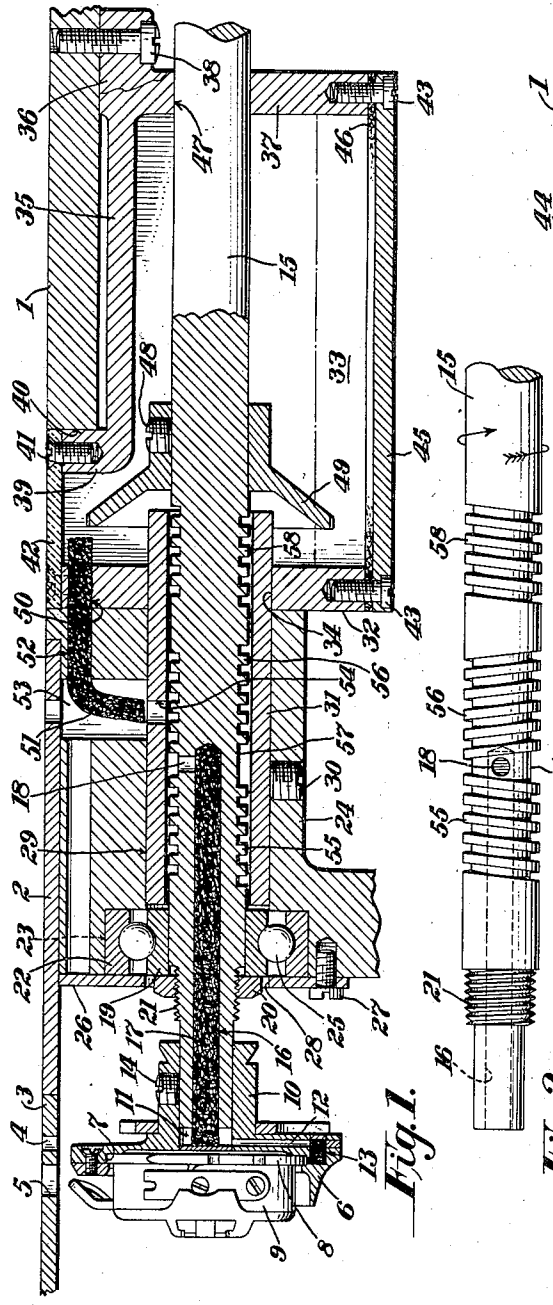


Fig. 1.



Fig. 3.

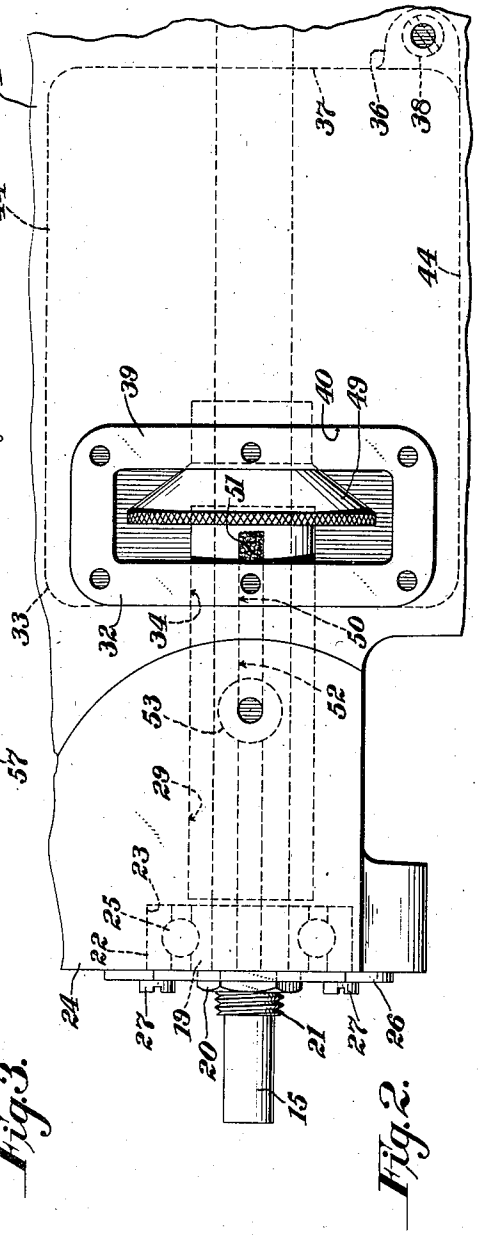


Fig. 2.

Inventor
Frank Parry

Witness:
John N. Cave

By John F. Heine
Attorney

Patented Oct. 27, 1942 2,300,388

# UNITED STATES PATENT OFFICE

2,300,388

## LUBRICATING MEANS FOR SEWING MACHINE LOOP TAKERS

Frank Parry, Bridgeport, Conn., assignor to The Singer Manufacturing Company, Elizabeth, N. J., a corporation of New Jersey

Application October 17, 1940, Serial No. 361,524

9 Claims. (Cl. 184—6)

This invention relates to loop-taker mechanisms of sewing machines of the lock-stitch type in which a thread-carrier is journaled in the raceway of a cup-shaped loop-taker body, the invention having for its primary object to provide simple and effective means for supplying lubricant to the thread-carrier raceway of a sewing machine loop-taker.

More specifically, the present invention aims to provide simple and effective means for delivering a requisite quantity of lubricant, from a substantial supply contained in a lubricant-reservoir, to the longitudinal bore of a loop-taker shaft at a point intermediate the ends of said shaft and in a manner such that the delivery of the lubricant from the reservoir will be automatically discontinued upon stopping of the machine.

A further object of the invention is to provide for requisite lubrication of a thread-carrier raceway of a loop-taker in a manner insuring against flooding of said raceway at different speeds of operation of the machine, as well as when the machine is idle. Other objects of the invention will be apparent from the following description and claims.

The invention consists in the provision, below the work-support of a sewing machine, of a lubricant-supply reservoir and in the means for delivering lubricant supplied from said reservoir to the bore of a loop-taker shaft connected with the thread-carrier raceway of the loop-taker, as well as in the specific construction and relative arrangement of the reservoir and the loop-taker shaft as hereinafter described in connection with the accompanying drawing which illustrates a preferred embodiment of the invention and in which:

Fig. 1 represents a vertical section of a portion of the work-supporting bed-plate of a sewing machine containing the present improvement, the section being taken lengthwise of the horizontally disposed loop-taker shaft below the bed-plate. Fig. 2 represents a top plan view of a portion of the bed-plate of the sewing machine, the bed cover-plates, and the loop-taker shown in Fig. 1 being omitted. Fig. 3 represents a top plan view of a portion of the loop-taker shaft as shown in Fig. 1.

The sewing machine in part illustrated in the drawing has a work-supporting bed-plate 1 which is recessed in its upper face to receive a removable cover-plate 2 disposed in edgewise abutting relation to a throat-plate 3 provided with a needle-aperture 4 and a feed-slot 5.

Disposed below the throat-plate 3 is a rotary loop-taker 6 which is complemental to a thread-carrying needle (not shown) in the formation of lock-stitches, said loop-taker being of the horizontal-axis type and being constructed substantially in accordance with the loop-taker disclosed in the U. S. patent to G. A. Fleckenstein et al., No. 2,103,899, Dec. 28, 1937.

In general, the loop-taker 6 has a cup-shaped body provided in the cylindrical side wall thereof with an annular raceway 7, and journaled in said race-way is the peripheral bearing-rib 8 of a thread-carrier 9 restrained against rotation with the loop-taker in any usual or suitable manner. The loop-taker 6 also has a hub 10 formed with a central shaft-aperture 11, the bottom wall of the loop-taker body being provided with a radial lubricant-duct 12 connecting the shaft-aperture 11 of the hub with a transverse wick-filled duct 13 opening into the raceway 7.

The hub 10 of the loop-taker 6 is secured by one or more set-screws, as 14, upon the reduced end of a horizontally disposed loop-taker shaft 15 provided with a longitudinal bore 16 open at the loop-taker end of the shaft 15. The shaft-bore 16 preferably contains a lubricant-conducting wick 17 extending slightly beyond the open end of the shaft-bore and into the shaft-aperture 11 in the loop-taker hub 10. The opposite end of the shaft-bore 16 terminates within the length of the shaft 15, and the latter is provided with a radial lubricant-inlet aperture 18 connected with the shaft bore 16 adjacent the inner end of said bore.

The loop-taker end portion of the shaft 15 is rotatably journaled in an antifriction bearing, which in the present case comprises a ball-bearing of which the inner race-ring 19 is force-fitted upon the shaft for rotation therewith, and is held thereupon by a nut 20 engaging a threaded portion 21 of the shaft 15. The outer race-ring 22 of the ball-bearing is stationary, being force-fitted into an annular recess 23 provided in the end face of a lug 24 depending from the bed-plate 1. The proximate faces of the race-rings 19 and 22 are grooved, as usual, to receive a series of balls 25, and a cover-plate 26 secured by screws 27 to the end-face of the lug 24 serves to retain the outer race-ring 22 in the lug-recess 23 and also as an obstruction to the entrance of lint and the like into the ball-bearing. An aperture 28 in the cover-plate 26 provides clearance for the race-ring securing nut 20.

The lug-recess 23 constitutes a counter-bored portion of a horizontal aperture 29 provided in the bed-plate lug 24. Disposed in said aperture

and secured by a set-screw 30 to the lug 24 is a sleeve 31 encompassing the shaft 15 and spaced slightly therefrom, one end of said sleeve 31 being disposed adjacent to but spaced slightly from the inner race-ring 19 of the shaft ball-bearing, and its other end projecting beyond the end face of the bed-plate lug 24 opposite to that containing said ball-bearing. Seated upon the projecting end of the sleeve 31 is one end wall 32 of a generally rectangular lubricant reservoir 33, said end wall 32 having an aperture 34 snugly receiving the portion of the sleeve 31 which extends into said reservoir.

The top wall 35 of the lubricant-reservoir 33 has an ear 36 extending outwardly beyond the reservoir end wall 37 which is disposed opposite to the end wall 32 thereof, said ear 36 being secured by a screw 38 to the under side of the bed-plate 1. The top wall 35 of the reservoir also has an upturned flange 39 shaped to fit into a generally rectangular opening 40 provided in the bed-plate 1, the flange 39 constituting a continuation of the upper portion of the end-wall 32. Removably secured by screws 41 upon the upper ends of the reservoir wall 32 and the flange 39 is a cover-plate 42 which is substantially flush with the upper face of the bed-plate 1 and is preferably made of some transparent material such as lucite or the like. Secured by screws 43 to the lower edges of the depending end-walls 32 and 37, and of the front and rear side walls 44 of the reservoir 33 is a bottom closure-plate 45, a sealing gasket 46 being preferably interposed between the closure-plate 45 and the reservoir walls.

The loop-taker shaft 15, which is loosely embraced by the sleeve 31 as above described, extends through the reservoir 33 and passes through a close fitting aperture 47 in the reservoir end-wall 37, said shaft being rotated in any usual or suitable manner (not shown).

Secured by a screw 48 upon the portion of the loop-taker shaft 15 within the reservoir 33 is the hub of a generally conical oil-slinging member 49, said member 49 being disposed directly adjacent the end portion of the sleeve 31 within the reservoir 33, so that the periphery of said member 49 extends into the rectangular reservoir cavity defined by the upturned flange 39 and by the upper portion of the end-wall 32 of said reservoir.

The upper portion of the end-wall 32 is provided with an aperture 50 which is preferably disposed vertically above the longitudinal axis of the shaft 15. Extending horizontally through said aperture 50 is a lubricant-conducting wick 51 having one end thereof disposed closely adjacent the periphery of the oil-slinging member 49 and close to the under side of the cover-plate 42. The wick 51 extends through a horizontal aperture 52 in the bed-plate 1 and into a cavity 53 extending downwardly from the recessed upper face of said bed-plate to terminate at its lower end in the sleeve-receiving aperture 29 of the bed-plate lug 24. The wick 51 is bent downwardly within the cavity 53 and terminates directly above a vertically disposed lubricant-duct 54 in the sleeve 31, said duct 54 connecting the cavity 53 with the interior of the sleeve 31.

The loop-taker shaft 15 is peripherally provided with convergingly spiralling threads 55 and 56, of which the proximate end convolutions terminate at opposite sides of and directly adjacent to the radial inlet aperture 18 of the shaft, thereby defining a peripheral shaft-groove 57 between the proximate ends of said threads 55 and 56. The shaft threads 56 are preferably disposed directly below the sleeve-aperture 54, the shaft-aperture 18 being disposed at one side of the sleeve-aperture 54. The loop-taker shaft 15 is furthermore peripherally provided with a spiral thread 58 within the end portion of the sleeve 31 extending into the reservoir 33, the thread 58 spiralling in the same direction as the thread 55.

It is to be understood from the foregoing description that the sleeve 31 does not constitute a bearing for the shaft 15, and that it merely serves to confine lubricant so that the threads 55, 56 and 58 may serve to feed the lubricant lengthwise of the shaft 15.

By removal of the upper cover-plate 42 therefor, the reservoir 33 may be conveniently supplied with a substantial quantity of lubricant, preferably to the level indicated by a dot-dash line in Fig. 1 of the drawing so that the oil-slinging member 49 merely dips into the lubricant. The cover-plate 42 having been replaced, and the machine brought into operation, the oil-slinging member 49 throws lubricant centrifugally towards the cover-plate 42 and into contact with the end of the wick 51 which protrudes into the reservoir 33. As the cover-plate 42 is transparent, the adequacy of the lubricant supply may be readily observed.

The wick 51 feeds the lubricant lengthwise thereof and discharges it from the depending end of the wick within the bed-plate cavity 53. Lubricant dripping from the depending end of the wick 51, within the cavity 53, will pass through the sleeve-duct 54 and will be fed by the shaft-threads 56 to the shaft-groove 57. As the shaft-threads 55 spiral oppositely to the shaft-threads 56, said threads 55 likewise feed lubricant toward the shaft-groove 57, thereby forcing the lubricant to enter the radial shaft-aperture 18. The wick 17 then feeds the lubricant lengthwise of the loop-taker shaft 15, from which shaft the lubricant is supplied to the loop-taker raceway 7 in the usual manner.

It will be noted that no lubricant is supplied to the wick 51 when the machine is not in operation, so that there is no tendency to flood the loop-taker raceway 7 when the machine is idle. The wick 51 controls the supplying of lubricant to the loop-taker shaft bore during the operation of the machine, so that a minimum of excess lubricant is supplied. Any lubricant which is supplied in excess through the sleeve-duct 54 and is not fed through the shaft-aperture 18, is free to drain along the inner face of the sleeve 31 into the reservoir 33, and this drainage is materially assisted during the operation of the machine by the lubricant feeding action of the shaft threads 58. The shaft threads 58 also function to prevent entry of lubricant into the sleeve 31 endwise thereof and directly from the reservoir 33. When the machine is idle, a minimum portion of the excess lubricant within the sleeve 31 will seep along the sleeve in the direction of the loop-taker and will be supplied to the ball-bearing for the shaft adjacent the loop-taker.

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

1. In a sewing machine having a work-support, stitch-forming mechanism including a rotary loop-taker provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, and a bearing for said shaft adjacent said loop-taker, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said

shaft, the improvement which consists in the provision below said work-support of a lubricant-supply reservoir, a stationary sleeve encompassing said shaft and spaced therefrom, said sleeve being radially provided with a lubricant-duct, a lubricant-conducting wick overhanging said lubricant-duct and extending into said reservoir above the level of the supply of lubricant contained therein, means rendered effective upon operation of the machine for supplying lubricant from said reservoir to said lubricant-conducting wick, and means rendered effective by rotation of said shaft for impelling lubricant lengthwise of said shaft and within said sleeve to the radial aperture of said shaft.

2. In a sewing machine having a work-support, stitch-forming mechanism including a rotary loop-taker disposed below said work-support and provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, and an antifriction bearing for said shaft adjacent said loop-taker, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said shaft, the improvement which consists in the provision below said work-support of a lubricant-supply reservoir having apertured end-walls through which said shaft extends, a sleeve encompassing said shaft in spaced relation thereto, said radial aperture of the loop-taker carrying shaft being disposed externally of said reservoir and within said sleeve, and means effective during the operation of the machine for delivering lubricant to the radial aperture of said shaft from a supply of lubricant contained in said reservoir.

3. In a sewing machine having a work-support, stitch-forming mechanism including a rotary loop-taker disposed below said work-support and provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, and an antifriction bearing for said shaft adjacent said loop-taker, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said shaft, the improvement which consists in the provision below said work-support of a lubricant-supply reservoir having apertured end-walls through which said shaft extends, said radial aperture of the loop-taker carrying shaft being disposed externally of said reservoir, a sleeve encompassing said shaft in spaced relation thereto and having one end terminating in said reservoir, said sleeve having a radial aperture disposed externally of said reservoir, lubricant-conducting means extending from said reservoir to the radial aperture of said sleeve, lubricant-impelling means carried by said shaft within said reservoir for supplying lubricant to said conducting means during the operation of the machine, and means carried by said shaft for impelling lubricant lengthwise of and within said sleeve to the radial aperture of said shaft.

4. In a sewing machine having a work-support, stitch-forming mechanism including a rotary loop-taker disposed below said work-support and provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, and a bearing for said shaft adjacent said loop-taker, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said shaft, the improvement which consists in the provision below said work-support of a lubricant-supply reservoir, a sleeve encompassing said shaft and having one end terminating in said reservoir, said sleeve having a radial aperture disposed externally of said reservoir, a lubricant-conducting wick having one end disposed within said reservoir above the level of a supply of lubricant within the reservoir, said wick having its other end overhanging the radial aperture of said sleeve, lubricant-impelling means carried by said shaft for supplying lubricant to said wick during the operation of the machine, lubricant-impelling means carried by said shaft and coacting with said sleeve for feeding lubricant within and lengthwise of said sleeve to the radial aperture of said shaft, and lubricant-impelling means carried by said shaft for feeding lubricant into said reservoir from the end portion of said sleeve within the reservoir.

5. In a sewing machine having stitch-forming mechanism including a rotary loop-taker provided with a thread-case raceway, and a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, said shaft having a radial aperture connected to the shaft-bore intermediate the ends of said shaft, the improvement which consists in the provision upon said shaft of two sets of uniformly spaced and converging spiralling lubricant-impelling threads spaced from each other longitudinally of the shaft, the proximate ends of said threads defining in said shaft a circumferential groove containing said radial aperture of the shaft, a sleeve encompassing the threaded portion of said shaft and spaced therefrom, said sleeve having a radial aperture in the zone of said threads, a lubricant reservoir, and means effective during the operation of the machine for delivering lubricant from a supply in said reservoir to the lubricant-duct of said sleeve.

6. In a sewing machine having stitch-forming mechanism including a rotary loop-taker provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said shaft, an an antifriction bearing for said shaft adjacent said loop-taker, the improvement which consists in the provision upon said shaft of convergingly spiralling lubricant-impelling threads spaced longitudinally of said shaft and disposed at opposite sides of said radial aperture of the shaft, a lubricant reservoir, a sleeve encompassing the threaded portion of said shaft, one end of said sleeve providing lubricant-conducting connections with said antifriction bearing and the other end of said sleeve extending into said reservoir above the level of the supply of lubricant therein, and means effective during the operation of the machine for delivering lubricant from the supply in said reservoir to the lubricant-duct of said sleeve.

7. In a sewing machine having stitch-forming mechanism including a rotary loop-taker provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, said shaft having a radial aperture connected to said shaft-bore intermediate the ends of said shaft, the improvement which consists in the provision of a lubricant-supply reservoir, a sleeve encompassing said shaft and provided with a radial lubricant-duct, said sleeve having one end thereof extending into said reservoir above the level of a supply of lubricant therein, lubricant-impelling means dis-

posed within said reservoir, lubricant conducting means extending from said reservoir for delivering lubricant to the radial lubricant-duct of said sleeve, and means effective during the operation of the machine for preventing direct entrance of lubricant into the sleeve from said reservoir.

8. In a sewing machine, a rotary loop-taker provided with a thread-case raceway, a rotary loop-taker carrying shaft provided with a longitudinal bore having lubricant-conducting connections with said raceway, said shaft having a lubricant-inlet aperture intermediate the ends of the shaft and open to said shaft bore, a bearing for said shaft adjacent said loop-taker, a lubricant-supply reservoir housing a portion of the length of said shaft, a sleeve encompassing said shaft in spaced relation thereto, and radially provided with a lubricant-duct, said sleeve having an open end thereof terminating in said reservoir, lubricant-conducting means spaced from a supply of lubricant within said reservoir and disposed to feed lubricant to the lubricant-duct of said sleeve, lubricant-impelling means carried by said shaft within said reservoir for supplying lubricant to said conducting means during the operation of the machine, and means rendered effective by rotation of said shaft for impelling lubricant lengthwise of said shaft and within said sleeve to said lubricant-inlet aperture of the shaft.

9. In a sewing machine, a rotary loop-taker provided with a thread-case raceway, a rotary loop-taker carrying shaft having a longitudinal bore connected to said raceway, said shaft having a lubricant-inlet aperture intermediate the ends of the shaft and open to said shaft bore, a sleeve encompassing said shaft in spaced relation thereto and provided with a lubricant-duct intermediate the ends of said sleeve, an antifriction bearing for said shaft adjacent said loop-taker, a lubricant-supply reservoir, a lubricant-feeding wick disposed to deliver lubricant supplied from said reservoir into the lubricant-duct of said sleeve, and means rendered effective by rotation of said shaft for impelling lubricant lengthwise of said shaft and within said sleeve to said lubricant-inlet aperture of the shaft.

FRANK PARRY.