Aug. 27, 1946. B. E. FOLKE 2,406,599

MECHANICAL LUBRICATOR

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FIG. 1

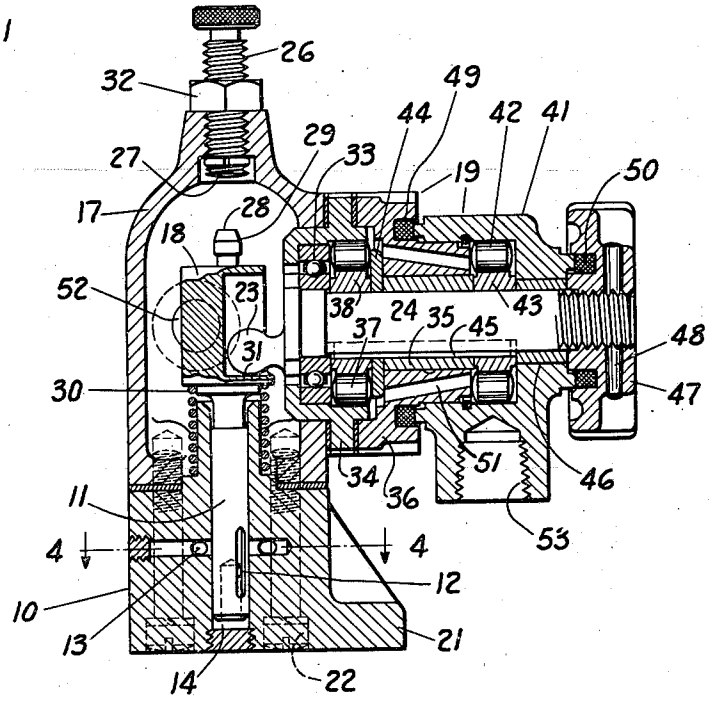
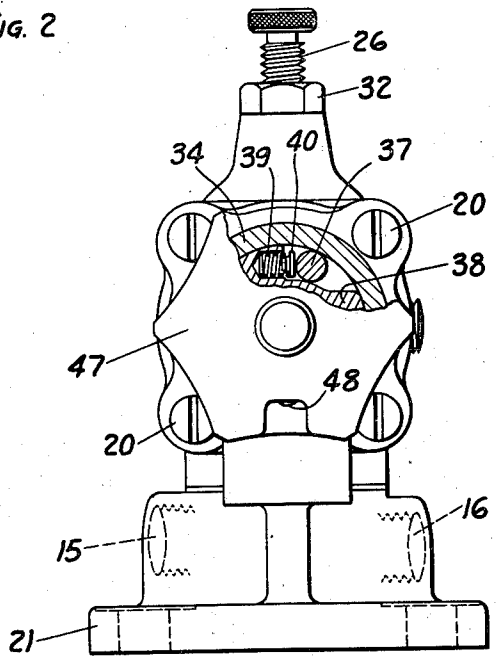


FIG. 2



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FIG. 3

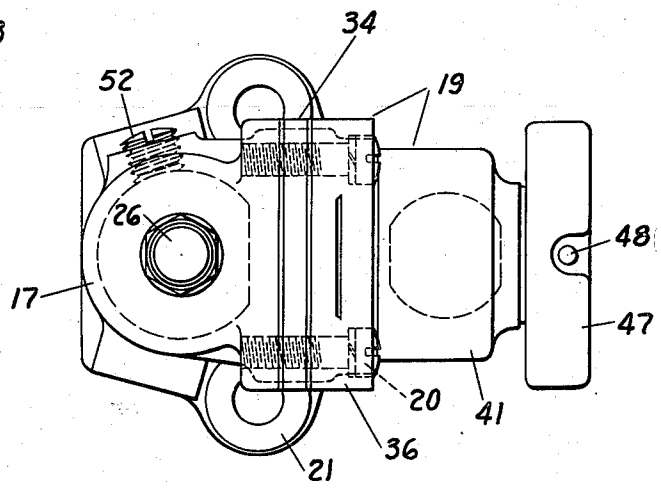
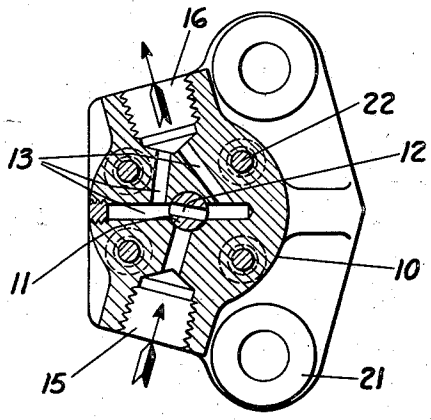


FIG. 4



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MECHANICAL LUBRICATOR

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Application February 28, 1944, Serial No. 524,208

8 Claims. (Cl. 184—27)

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One of the objects of this invention is to provide new and useful improvements in mechanical or force feed lubricators operated by ratchet drive mechanisms.

Another object is to provide a ratchet drive mechanism having its shaft supported immediately adjacent to the driving ratchet for the purpose of reducing to a minimum the bending stress on the ratchet shaft.

A further object is to provide a compact self-contained ratchet drive unit arranged to be lubricated by the leakage of oil from the lubricator pumping unit.

A still further object is to provide a compact combination of a mechanical lubricator pumping element and a ratchet drive mechanism having the working parts sealed in such a manner as to permit operation in dusty or gritty atmosphere, and in locations where the lubricator mechanism is exposed to extreme atmospheric conditions.

Still further objects will become apparent from the following specification and the drawings in which a preferred embodiment of the invention is shown.

In the drawings,

Fig. 1 is a longitudinal sectional view of a mechanical lubricator embodying my invention;

Fig. 2 is a front elevation of the lubricator partially in cross-section;

Fig. 3 is a plan view of the lubricator and ratchet assembly; and

Fig. 4 is a cross-sectional view along the plane of line 4—4 in Fig. 1.

Like characters of reference denote similar parts throughout the several views and in the following specification.

Referring to Figs. 1, 10 is a cylinder base into which is fitted a piston 11 provided with suitable ports 12 arranged to communicate with passages 13 in the base for the purpose of admitting fluid into and discharge it from a chamber 14 below the piston.

The cylinder base 10 is provided with an inlet 15 and an outlet 16 as shown in Fig. 4.

Referring again to Fig. 1, the cylinder base 10 is provided with a housing 17 enclosing a cross-head 18 of the pumping piston 11 and supporting a ratchet mechanism 19, Fig. 3, by means of screws 20 shown in Figs. 2 and 3. The cylinder base 10 is provided with bolting lugs 21 to permit the lubricator to be attached to a suitable bracket (not shown). The housing 17 is attached to the cylinder base 10 by means of bolts 22.

A reciprocating and oscillating movement is

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imparted to pumping piston 11 by means of a ball pin 23 mounted eccentrically in relation to a ratchet shaft 24 and moving inside a slot of the cross-head 18 of the piston 11. An adjusting screw 26 serves to limit the travel of the piston 11 by contact between a bottom surface 27 of the adjusting screw 26 with the top surface 28 of an extension 29 to the piston 11, when the piston 11 is in its top position. A spring 30 acting on the cross-head 18 serves to maintain contact between the piston 11 and the ball pin 23 at a point 31. The adjusting screw 26 is locked in position by means of a lock nut 32.

The ratchet shaft 24 is supported at one end in an anti-friction bearing 33 located in a ratchet support 34 and at the other end by a bushing 35 adapted to rotate in a shaft bearing 36 attached to the ratchet support 34 by means of the screws 20. Counter-rotation of the shaft 24 is prevented by means of counter ratchet rollers 37 wedged between a ratchet disc 38 and the ratchet support 34 by means of springs 39 and followers 40. Rotating of the ratchet shaft is imparted by a casing 41 acting through ratchet rollers 42 and a ratchet disc 43. The ratchet discs 43 and 38 are keyed to the shaft 24, the bushing 35 and a thrust washer 44, by means of a key 45. The ratchet rollers 42 are identical with the counter ratchet rollers 37 and the ratchet springs 39, and the followers 40 are alike for both the driving ratchet and the counter ratchet. The driving ratchet rollers 42 and disc 43 are arranged to rotate the ratchet shaft in one direction only, counter-rotation being prevented by the counter ratchet rollers 37 and the disc 38 as described above.

The ratchet casing 41 is supported and adapted to rotate around the outside of the shaft bearing 36. The outer end of the casing 41 is guided on a small bushing 46. A handwheel 47 is threaded on to the ratchet shaft 24 and serves to hold the bushing 46 in fixed relation to the shaft 24 and also locks the ratchet discs 38 and 43, retaining washer 44 and the bushing 35 into a fixed relation with the shaft 24. The handwheel 47 is secured to the shaft 24 by means of a taper pin 48. The handwheel 47 permits turning the ratchet shaft 24 by hand for the purpose of priming the lubricator and for increasing the oil supply momentarily when so desired. The casing 41 is provided at one end with an oil seal 49 and at the other end with an oil seal 50 which serve to prevent leakage of lubricant from around the internal working parts of the ratchet mecha-

nism and prevent foreign matter from entering from the outside into it.

Initial lubrication for the ratchet mechanism is provided for by partially filling the housing 17 with oil through a filling plug 52 located at its side. The pumping piston 11 is fitted without packing into the cylinder base 10 with a very nearly oil tight fit. While the oil leakage around the piston is very small, it is nevertheless sufficient to replenish the oil supply inside the housing 17 for lubricating the outer pumping piston and the ratchet mechanism. It will be noted that the shaft bearing 36 is provided with several drilled openings 51 to permit the lubricant to enter around the ratchet rollers 42 and to assure adequate lubrication of all internal working parts.

The roller casing 41 is provided with a threaded connection 53 which permits the application of any suitable type of lever for the purpose of transmitting back and forth movement of any magnitude to the casing 41 and in turn to the ratchet shaft 24. This movement may be obtained in a manner well known in the art by means of a crank or a cam, or it may be obtained by vibration or relative movement between parts as described in my co-pending application, Serial #482,363, now Patent Number 2,359,905 of October 10, 1944.

Inspection clearly shows that the driving ratchet mechanism 42 and 43 is located immediately adjacent the outer end of shaft bearing 36. For all purposes, this bearing 36, support 34 and the housing 17 may be considered one integral unit inasmuch as they are bolted together. Thus the overhang of a ratchet drive shaft from the drive mechanism to its support common to ratchet drives as made heretofore, and which determines the bending stress on the shaft, is reduced to the lowest possible minimum inasmuch as the shaft is fully supported directly up to the point where the ratchet drive elements operate the shaft.

The entire ratchet mechanism is effectively sealed against grit and other impurities or against water, snow or atmospheric influences, by oil seals 49 and 50 which are held in place by the hand wheel 47 secured to the shaft 24.

The lubrication of the ratchet mechanism is entirely automatic after the housing 17 has been filled with oil through plug 52, the slight leakage of oil past piston 11 being sufficient to supply make-up oil for that purpose, as explained above.

While I have shown the lubricator equipped with one pumping unit only, it is obvious that the same can be modified for two or more such units, the ratchet drive operating them in a manner similar to that disclosed in Patent #1,722,136 issued July 23, 1929, to Louis Friedmann for instance, or in any other suitable manner.

Many other changes in the form, proportion and combination of parts and minor details of construction may be resorted to without departing from the principles or sacrificing any of the advantages of the invention, as defined in the appended claims.

What I claim as new is:

1. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply outside the lubricator, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, said piston and walls having minute clearance between them for slight leakage of oil, a housing over said exteriorly projecting piston secured to said base, ratchet mechanism secured to said housing in operative relation with said piston, and means to admit oil from a separate source of supply into said housing for lubricating said ratchet mechanism, the oil in said housing being automatically replenished by the slight leakage of oil from said chamber during the sliding engagement of the piston with the walls of the chamber.

2. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply outside the lubricator, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, said piston and walls having minute clearance between them for slight leakage of oil, a housing over said exteriorly projecting piston secured to said base, ratchet mechanism secured to said housing in operative relation with said piston, said mechanism having operating parts including a shaft, driving means and counter rotation preventing means, and means to admit oil from a separate source of supply into said housing for lubricating said ratchet mechanism, the oil in said housing being automatically replenished by the slight leakage of oil from said chamber during the sliding engagement of the piston with the walls of the chamber.

3. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply outside the lubricator, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, said piston and walls having minute clearance between them for slight leakage of oil, a housing over said exteriorly projecting piston secured to said base, ratchet mechanism secured to said housing in operative relation with said piston, said mechanism having operating parts including a shaft, driving means and counter rotation preventing means, and means to admit oil from a separate source of supply into said housing for lubricating said operating parts through passages in said ratchet mechanism, the oil in said housing being automatically replenished by the slight leakage of oil from said chamber during the sliding engagement of the piston with the walls of the chamber.

4. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply outside the lubricator, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, said piston and walls having minute clearance between them for slight leakage of oil, a housing over said exteriorly projecting piston secured to said base, ratchet mechanism secured to said housing, said mechanism having operating parts including a shaft, driving means, and counter rotation preventing means, eccentric means at said shaft in operative connection with said piston for imparting an oscillating and reciprocating motion to the piston, and means to admit oil from a separate source of supply into said housing for lubricating said eccentric means and through passages in said mechanism said operating parts, the oil in said housing being automatically replenished by the slight leakage of oil from said chamber during the sliding engagement of the piston with the walls of the chamber.

5. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, a housing over said exteriorly projecting piston secured to said base and containing oil, ratchet mechanism in operative relation with said piston including a support, a shaft and a shaft bearing,

said support and bearing being secured to said housing, driving members immediately adjacent the outer end of said bearing, counter rotation preventing members disposed within said support and adjacent the inner end of said bearing, a casing over and engaging said driving members adapted to rotate said shaft and being supported by said bearing, a hand wheel at the extreme outer end of the shaft and oil seals between, respectively, one end of said casing and said bearing and the other end of said casing and said hand wheel, said support and bearing having passages in communication with the oil in said housing for lubricating said ratchet mechanism.

6. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, a housing over said exteriorly projecting piston secured to said base and containing oil, ratchet mechanism in operative relation with said piston including a support, an anti-friction bearing, a shaft and a shaft bearing, said support and shaft bearing being secured to said housing, driving members immediately adjacent the outer end of said shaft bearing, counter rotation preventing members disposed within said support adjacent the inner end of said shaft bearing and adjoining said anti-friction bearing, a casing over and engaging said driving members adapted to rotate said shaft and being supported by said shaft bearing, a hand wheel at the extreme outer end of the shaft, and oil seals between, respectively, one end of said casing and said shaft bearing and the other end of said casing and said hand wheel, said support and shaft bearing having passages in communication with the oil in said housing for lubricating said ratchet mechanism.

7. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, a housing over said exteriorly projecting piston secured to said base and containing oil, ratchet mechanism in operative relation with said piston including a support, a shaft and a shaft bearing,

eccentric means at said shaft for imparting an oscillating and reciprocating motion to said piston, said support and bearing being secured to said housing, driving members immediately adjacent the outer end of said bearing, counter rotation preventing members disposed within said support and adjacent the inner end of said bearing, a casing over and engaging said driving members adapted to rotate said shaft and being supported by said bearing, a hand wheel at the extreme outer end of the shaft, and oil seals between, respectively, one end of said casing and said bearing and the other end of said casing and said hand wheel, said support and bearing having passages in communication with the oil in said housing for lubricating said ratchet mechanism.

8. In a mechanical lubricator, a base having a chamber receiving oil from a source of supply, a pumping piston slidingly engaging walls of said chamber and projecting exteriorly thereof, a housing over said exteriorly projecting piston secured to said base and containing oil, ratchet mechanism in operative relation with said piston including a support, a shaft and a shaft bearing, said support and bearing being secured to said housing, driving members immediately adjacent the outer end of said bearing, counter rotation preventing members disposed within said support and adjacent the inner end of said bearing, a casing over and engaging said driving members adapted to rotate said shaft and being supported by said bearing, a hand wheel at the extreme outer end of the shaft, oil seals between, respectively, one end of said casing and said bearing and the other end of said casing and said hand wheel, and means to admit oil from a separate source of supply into said housing for lubricating said ratchet mechanism through passages in said support and bearing in communication with the housing, the oil in said housing being automatically replenished by natural leakage of oil from said chamber during the sliding engagement of the piston with the walls of the chamber.

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