April 11, 1961 F. J. LYDEN 2,979,161

CONSTANT LEVEL OILERS

Filed July 2, 1958

FIG. 4

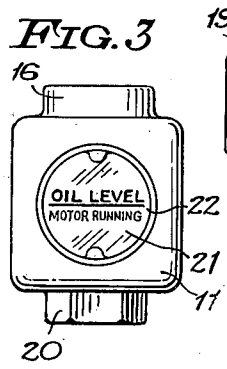


FIG. 3

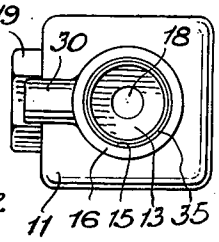


FIG. 5

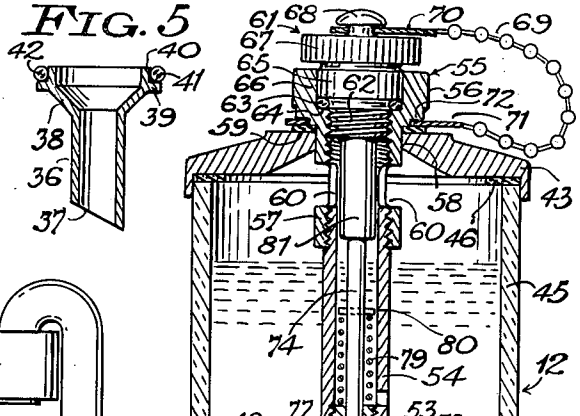


FIG. 1

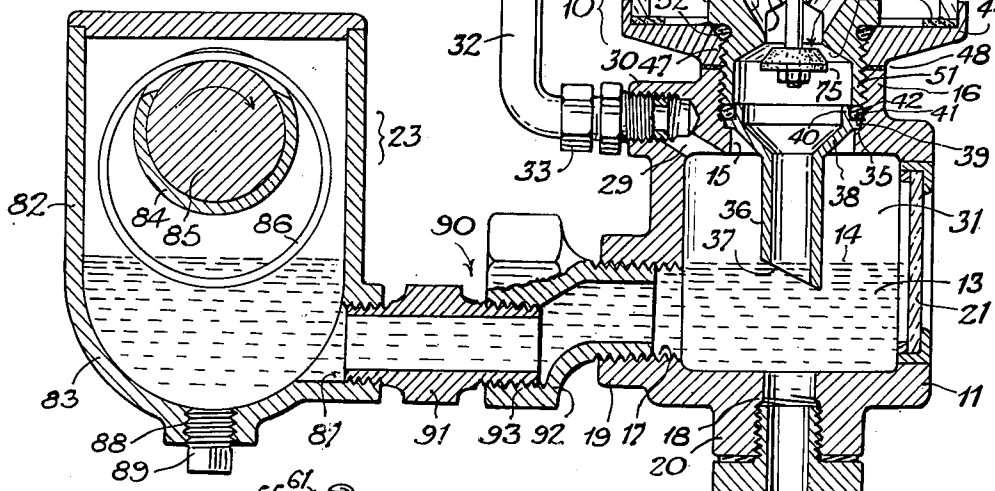


FIG. 6

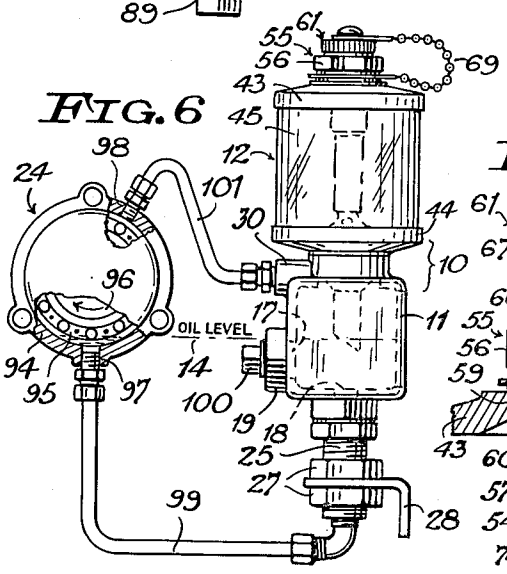


FIG. 2

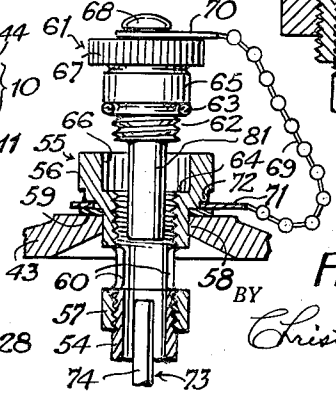
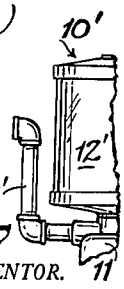


FIG. 7



INVENTOR.
FRANK J. LYDEN
BY
Christopher L. Waal
ATTORNEY

United States Patent Office

2,979,161

Patented Apr. 11, 1961

2,979,161

CONSTANT LEVEL OILERS

Frank J. Lyden, 1115 N. 9th St., Manitowoc, Wis.

Filed July 2, 1958, Ser. No. 746,220

5 Claims. (Cl. 184—103)

The present invention relates to liquid feeding devices and more particularly to constant level oilers for bearings and other lubricated mechanisms.

An object of the invention is to provide an improved constant level oiler including an oil reservoir which can readily be replenished without removing the reservoir and without changing the feed level of the oil, and which facilitates the selective use of reservoirs of various capacities.

Another object is to provide a constant level oiler which will afford an ample surge capacity for oil returned to the oiler from a bearing or other lubricated device of a machine when the machine is shut down.

Still another object is to provide a constant level oiler which can readily be vertically shifted with respect to the lubricated device to adjust the oil level.

A further object of the invention is to provide a constant level oiler which is of simple, inexpensive and easily assembled construction, and which is reliable in operation.

The invention further consists in the several features hereinafter described and claimed.

In the accompanying drawing,

Fig. 1 is a sectional elevational view of a constant level oiler of the invention applied to a ring-oiled bearing assembly;

Fig. 2 is a fragmentary sectional elevational view of the upper portion of the oiler, a filling closure thereof being in open position;

Fig. 3 is a detail side elevation of an oil cup or receptacle of the oiler;

Fig. 4 is a detail top view of the cup;

Fig. 5 is a detail sectional elevational view of a spout member of the oiler;

Fig. 6 is an elevational view of the oiler, on a reduced scale, applied to an anti-friction bearing assembly, parts of the bearing being shown in section, and the oiler having a modified form of vertically adjustable mounting, and

Fig. 7 is a fragmentary elevational view, on a reduced scale, of a modified form of oiler having a larger oil reservoir and larger surge extension.

In the drawing, the oiler of the invention is designated generally by the numeral 10 and comprises a feed cup or hollow base 11 and a superposed supply container or reservoir 12, the latter holding therein a quantity of oil which is fed by gravity into an oil chamber 13 of the cup wherein the oil is barometrically maintained at a constant level 14 as hereinafter described.

The feed cup or base 11 is here shown to be in the form of a metal casing of generally cubical shape. A screw-threaded inlet opening 15 is formed coaxially in the top wall of the cup for attachment of the reservoir 12, as hereinafter described, the inlet opening being surrounded by an upstanding boss 16. A screw-threaded outlet opening 17 is formed in the lower portion of a side wall of the cup, and another screw-threaded outlet opening 18 is formed coaxially in the bottom

wall of the cup. The outlet openings 17 and 18 are surrounded by respective polygonal bosses 19 and 20 which form wrench-holds. The outlet openings may be used selectively or conjointly for connection to bearings or other lubricated devices. If only one outlet is used the other is suitably plugged and serves as a drain outlet. The side wall of the cup opposite the outlet 17 is provided with glass sight 21, Figs. 1 and 3, having an indicator mark 22 at the normal oil level. As hereinafter more fully described, the installation of Fig. 1 includes a ring-oiled bearing assembly 23 which is supplied with oil through the side outlet 17 of the cup, and the installation of Fig. 6 includes an anti-friction bearing assembly 24 which is supplied with oil through the bottom outlet 18 of the cup. A tubular mounting shank 25 is screwed into the bottom outlet boss 20, and in the installation of Fig. 1 this shank is inactive except to form a sediment well and is closed at its lower end by a screw plug 26. The mounting shank carries a pair of clamping nuts 27 which are not in use in the installation of Fig. 1, but are employed in some cases, as in the installation of Fig. 6, to secure the oiler at an adjusted elevation on a mounting bracket 28 through which the shank extends.

At its upper portion the cup is provided with a laterally extending vent opening 29 a part of which is formed in an internally screw-threaded hollow boss 30 projecting laterally from the cup. The upper portion of the oil chamber 13 in the cup forms a surge space 31 above the oil level 14, and the inner end of the vent opening 29 communicates with the top of this surge space. The surge space serves to accommodate oil returned to the cup from the bearing or other lubricated device of an associated machine when the operation of the machine is stopped.

In the installation of Fig. 1, a surge extension adapter or standpipe 32 is connected to the vent opening 29, as by a coupling 33, to increase the surge capacity of the oiler, and is here shown to be provided with an air filter 34 at its reversely turned upper end.

The inlet opening 15 of the cup is provided with an upwardly facing annular shoulder or seat 35 near its lower portion. A vertical nozzle or spout member 36 extends downwardly into the cup and preferably has its lower discharge end 37 formed or cut at an angle, the highest part of the discharge end of the spout being at the oil level 14. At its upper end the spout member is formed with a funnel 38 having an outturned annular flange 39 and an upstanding coaxial annular flange 40, the flange 39 resting on the seat 35, and the flanges 39 and 40 forming a peripheral rabbet 41 for receiving a sealing O-ring 42.

The reservoir 12 comprises marginally flanged upper and lower annular heads 43 and 44 and an intervening cylindrical shell 45 of transparent plastic or glass clamped therebetween, the opposite ends of the shell being seated against gaskets 46 in the heads. The lower reservoir head 44, which is provided with a coaxial bore 47, is coaxially seated on the upper boss 16 of the cup or base 11 through a shim-forming washer 48 and is secured to the cup by an adapter or valve cage 49, the adapter having a peripheral flange 50 engageable with the reservoir head, and having a skirt portion 51 threaded into the cup boss 16. The lower end of the skirt portion engages the O-ring 42 for clamping the spout member 36 in position. A sealing O-ring 52 is carried by the valve cage below the flange 50 thereof and engages the upper end of the bore 47 in the lower reservoir head.

The adapter 49 has a reduced externally screw-threaded upper end extension or nipple 53 onto which the lower end of a connector tube 54 is screwed. A nut or bushing 55 with a polygonal head 56 has a down-

wardly projecting sleeve portion 57 which rotatably fits in a coaxial bore 58 in the upper reservoir head 43 and is internally screw-threaded to engage the upper end of the connector tube 54, thus clamping the transparent reservoir shell 45 between the upper and lower heads. A sealing washer 59 is interposed between the upper face of the upper reservoir head and the head portion of the bushing. The bushing forms a filling fitting, and its sleeve portion 57 is provided with side ports 60 to admit oil into the reservoir.

A filler plug or cap 61 has a reduced threaded portion 62 screwed into the bushing 55 and is provided with a sealing O-ring 63 engageable with an annular shoulder 64 within the bushing. In some instances, the plug has a cylindrical portion 65 above the sealing ring, and the bushing 55 has a cylindrical bore 66 within which the plug portion 65 and O-ring 63 have a piston-like fit when the plug is screwed in and out. The plug is provided with a knurled head 67 having a central button 68. A retaining chain 69 has an eye member 70 at one end swivelled on the button, and the other end of the chain has an eye member 71 which is swivelled on an annularly shouldered portion 72 of the filler plug. Loss of the filler plug is thus avoided.

The downward flow of oil from the reservoir 12 to the cup 11 is controlled by a valve 73 actuated to open position by closing of the filler plug 61. The valve comprises a vertical valve stem 74 slidably fitting in the upper portion or nipple 53 of the cage-forming adapter 49 and provided with a valve disk 75 at its lower end engageable with a downwardly-facing beveled valve seat 76 formed in the adapter. Above the valve seat 76 the adapter has a coaxial bore 77 which communicates with inclined ports 78 in the adapter to form oil passages. The valve is normally urged upwardly to closed position by a compressed coiled spring 79 surrounding the valve stem, the lower end of the spring bearing on the upper end of the adapter nipple 53, and the upper end of the spring bearing on across pin 80 in the valve stem.

The upper end of the valve stem 74 is adapted to bear on the bottom face of a reduced bottom extension 81 of the filler plug 61 so as to depress the valve to open position when the plug is screwed inwardly and thus permit downward flow of oil from the reservoir into the cup. Removal of the filler plug for refilling of the reservoir will allow the valve stem to be spring-displaced upwardly to close the valve. The piston-like fit of the screw plug in the bushing will insure an air-tight seal for the reservoir until the valve is fully closed during removal of the plug, and will also insure such seal while the plug is being reinserted to closed position after a refilling operation.

The bearing assembly 23 of Fig. 1, which may form a part of an electric motor or other machine, is here shown to include a housing 82 with an oil well 83 therein and a journal or sleeve bearing 84 supporting a rotatable shaft 85 above the oil level in the well. The bearing is lubricated by a rotatable oil ring 86 resting on the shaft and dipping into the oil a short distance below the oil level. The housing 82 is provided at its lower portion with a lateral screw-threaded opening 87 forming an oil inlet, and with a bottom screw-threaded opening 88 forming a drain outlet, the latter being closed by a screw plug 89. An oil conduit 90 connects the lateral oil outlet 17 of the feed cup 11 with the lateral oil inlet 87 of the bearing housing and serves to support the oiler from the bearing housing. The oil conduit 90 is here shown to comprise a nipple 91 and an eccentric screw coupling 92, an end of the nipple being screwed into an offset end bore 93 of the coupling. The other or concentric end of the coupling is screwed into the oil cup outlet 77, and the other end of the nipple is screwed into the bearing housing oil inlet 87. By this arrangement the oil level in the bearing housing 82 can readily be adjusted by turning the eccentric coupling 92 to selected positions.

When the installation of Fig. 1 is to be placed in service, the oiler reservoir 12 is filled with oil through the then open filler bushing 55, the spring-urged valve 73 being closed in the absence of the filler plug 61. The filler plug is then screwed into the bushing, an air-tight seal being established at the O-ring 63 before the valve 73 is depressed to open position by the plug. Oil then flows by gravity through the spout member 36 and into the cup 11, and flows from the cup through the conduit 90 into the bearing housing well 83. Simultaneously, venting air passes upwardly through the spout member and bubbles upwardly through the oil in the reservoir to the top of the reservoir. In some instances, it may be necessary to refill the reservoir one or more times before the oil reaches the normal oil level 14 in the cup. It is also possible to fill at least some of the oil directly into the bearing housing, but considerable care would then be necessary to avoid exceeding the proper oil level.

When the machine is started in operation, the rotating oil ring 86 picks up oil from the bearing oil well 83 and supplies the bearing surfaces with oil. The oil ring also throws oil onto the inner walls of the bearing housing. This causes the oil level in the oil cup 11 to drop, thereby uncovering the discharge end 37 of the spout member 36, whereupon venting air passes upwardly into the reservoir from the surge space 31 and permits oil to feed into the cup from the reservoir to restore the normal oil level. As oil is consumed during the operation of the machine the normal oil level is similarly maintained. If desired, refilling of the reservoir may be effected while the machine is running. When the machine is shut down, the oil on the moving parts and bearing housing walls drains back into the oil well, raising the oil level in the oil cup 11. The oil thus returned to the oil cup is accommodated in the surge space 31 of the cup. When the machine is again placed in operation, the excess oil in the surge space will be delivered to the lubricated device, and the oil level will drop to its normal position. In some types of lubricated devices, such as gear housings, the quantity of oil returned to the cup may be considerable and such returned oil will then rise in the surge extension adapter or standpipe 32.

In the modified form of oiler 10′ shown in Fig. 7, a larger oil reservoir 12′ is mounted on the cup or base 11, and a larger surge extension adapter or standpipe 32′ is connected to the cup. Standpipes of various sizes can be provided without requiring a change in the oiler proper. The oiler of Fig. 7 is otherwise the same as that of Fig. 1 and is used in the same manner.

In the installation of Fig. 6, the oiler 10 for the bearing assembly 24 is supported at a selected elevation on the mounting bracket 28 to adjust the oil level with respect to the bearing assembly. The bearing assembly is here shown to include a housing 94 having mounted therein an anti-friction bearing 95 of the ball or roller type supporting a rotatable shaft 96, the bearing having the usual outer race fitted in the housing and the usual inner race carrying the shaft. The housing is provided with a screw-threaded oil inlet 97 at its bottom portion and a screw-threaded vent opening 98 at its upper portion. The bottom outlet 18 of the oiler cup 11 is connected to the oil inlet 97 of the bearing housing by a conduit 99, the lateral outlet 17 of the cup being closed by a screw plug 100. The preferred oil level is slightly above the lowest point of the inner diameter of the outer bearing race. The vent boss 30 of the oiler cup is connected to the vent opening 98 of the bearing housing by a conduit 101. The conduits 99 and 101 are preferably formed of copper tubing or flexible Saran or nylon tubing, thus permitting vertical adjustment of the oiler and also accommodating vibration of the bearing. This type of oiler mounting is also desirable in the case of a relatively large and heavy oiler. The venting and equalizing conduit 101 connected between the oiler and the bearing housing is particularly desirable in the case of a bearing

having excessive back pressure or vacuum, such as a fan bearing, and is also desirable in the case of dusty surroundings. The conduit **101** also forms a standpipe for increasing the surge capacity of the oiler. In some instances, the standpipe **32** of Fig. 1 may be used instead of the conduit **101**.

I claim:

1. In an oiler, a cup member having an oil chamber therein and a surge space above the oil level in said chamber, said cup member having an oil outlet below said oil level and a vent opening above said oil level, means including a reservoir disposed in fixed superposed relation to said cup member for feeding oil into said cup member to maintain the oil level therein, and means for supporting said cup member at an adjusted elevation with respect to a device to be lubricated, said means comprising a conduit connecting said oil outlet with the lubricated device, and said conduit including a rotatively adjustable eccentric coupling rotatively adjustable on a horizontal axis to adjust the oil level in the lubricated device.

2. In an oiler, a cup member having an oil chamber therein and a surge space above the oil level in said chamber, said cup member having an oil outlet below said oil level and a vent opening above said oil level, means including a reservoir for feeding oil into said cup member to maintain the oil level therein, said reservoir having a top filling opening with a screw-threaded portion and a coaxial cylindrical bore above said screw-threaded portion, said bore being of larger diameter than said screw-threaded portion, a closure plug detachably screwed into said screw-threaded portion and having a piston-like fit in said cylindrical bore to seal the reservoir while the plug is screwed in and out, a sealing ring carried by and surrounding said plug and having a slidable sealing fit in said cylindrical bore, a valve for controlling communication between said reservoir and cup member and normally spring-urged upwardly to closed position, said valve including a stem projecting upwardly adjacent to said closure plug, and said closure plug when inserted to closed position depressing said valve stem to open the valve after said plug has sealingly engaged said cylindrical bore.

3. In an oiler, a cup member having an oil chamber therein and a surge space above the oil level in said chamber, said cup member having an oil outlet below said oil level and a vent opening above said oil level, means including an oil reservoir for feeding oil into said cup member to maintain the oil level therein, said oil feeding means further including a tubular valve cage having a screwed connection with said cup member and having a downwardly facing valve seat, said oil reservoir being connected to said cup member and including top and bottom members and an interposed transparent shell, said reservoir having a downwardly extending discharge portion communicating with said oil chamber, said top member having an opening, a headed filler-forming bushing having a sleeve portion extending into said top member opening, a central clamping tube connecting said top and bottom members, the upper end of said tube having a screw-threaded connection with said sleeve portion, and the lower end of said tube having a screw-threaded connection with the upper end of said valve cage, a closure member detachably screwed into said bushing, a valve for closing communication between said reservoir and cup member and having a stem extending upwardly in said tube, the lower portion of said valve stem being slidably guided in said valve cage, and a coiled spring in said tube urging said valve upwardly to closed position against said valve seat, said closure member when screwed into said bushing depressing said valve stem to open the valve.

4. In an oiler, a cup member having an oil chamber therein and a surge space above the oil level in said chamber, said cup member having an oil outlet below said oil level and a vent opening above said oil level, said cup member further having a top opening with an annular seat, a spout member projecting downwardly into said cup member and having an upper peripheral portion resting on said seat, an oil reservoir superposed on said cup member and including a lower head, a passage-forming valve cage screwed into said cup member top opening to clamp said reservoir to said cup member and to clamp said spout member in position, said cage having a coaxial valve seat therein, a valve normally urged upwardly to closed position against said seat, and a filling closure at the upper end of said reservoir displaceable to open and closed positions, said closure being operatively associated with said valve for opening said valve when said closure is displaced to closed position.

5. In an oiler, a cup member having an oil chamber therein and a surge space above the oil level in said chamber, said cup member having an oil outlet below said oil level and a vent opening above said oil level, said oil outlet being adapted for connection to a device to be lubricated, an oil reservoir above said cup member and having a feeding passage thereto with a discharge aperture opening at said oil level, said reservoir further having a filling opening at the upper portion of said reservoir, a closure for said filling opening displaceable to open and closed positions, a valve for said feeding passage normally spring-urged to closed position and operatively associated with said closure for movement to open position when said closure is displaced to closed position, and a standpipe connected to and projecting upwardly from said vent opening to increase the surge capacity of the oiler for accommodating oil returned to said chamber from the lubricated device.

References Cited in the file of this patent

UNITED STATES PATENTS

1,077,727	Loepsinger	Nov. 4, 1913
1,424,974	Barnett	Aug. 8, 1922
1,483,545	Evers	Feb. 12, 1924
1,606,519	Exten	Nov. 9, 1926
1,725,987	Kersten	Aug. 27, 1929
2,274,473	Davis	Feb. 24, 1942
2,579,039	Evans	Dec. 18, 1951
2,727,709	Weber	Dec. 20, 1955