Oct. 4, 1932. E. W. DAVIS 1,880,857

LUBRICANT DISPENSING DEVICE

Filed Oct. 15, 1928 3 Sheets-Sheet 1

Fig. 1.

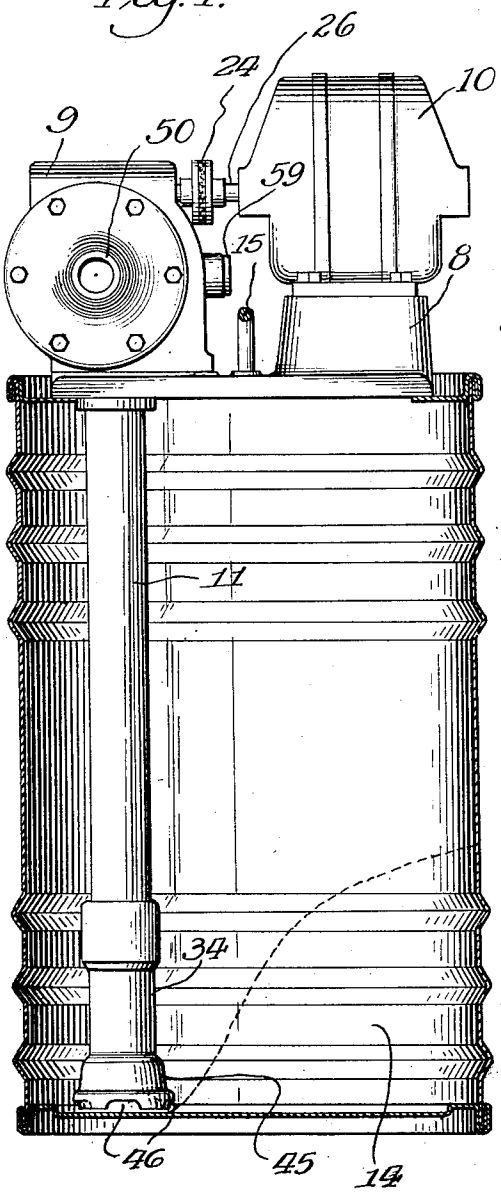
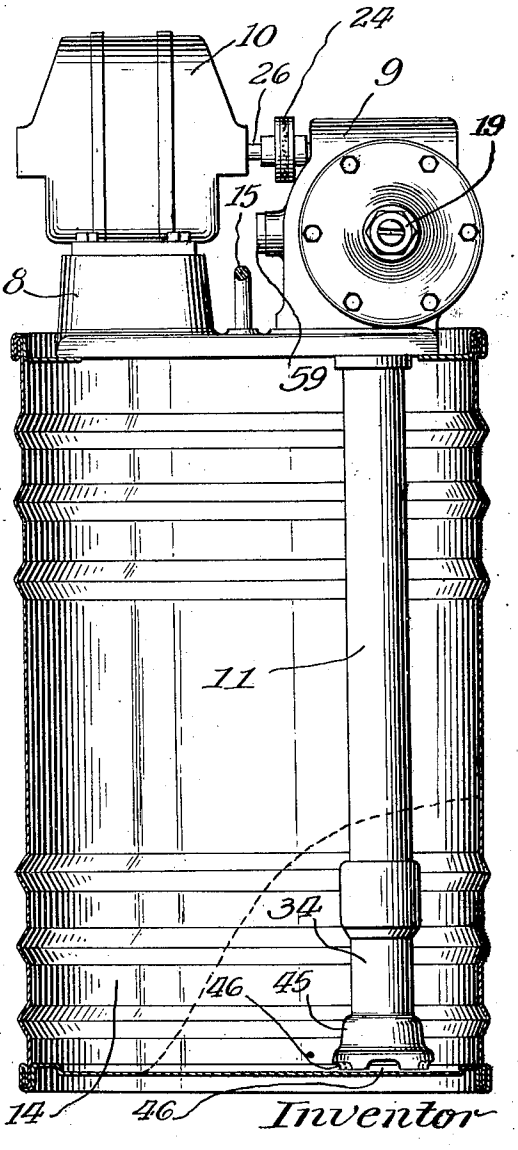


Fig. 2



Inventor

Ernest W. Davis.

By Williams, Bradbury, McCaleb & Hinkle

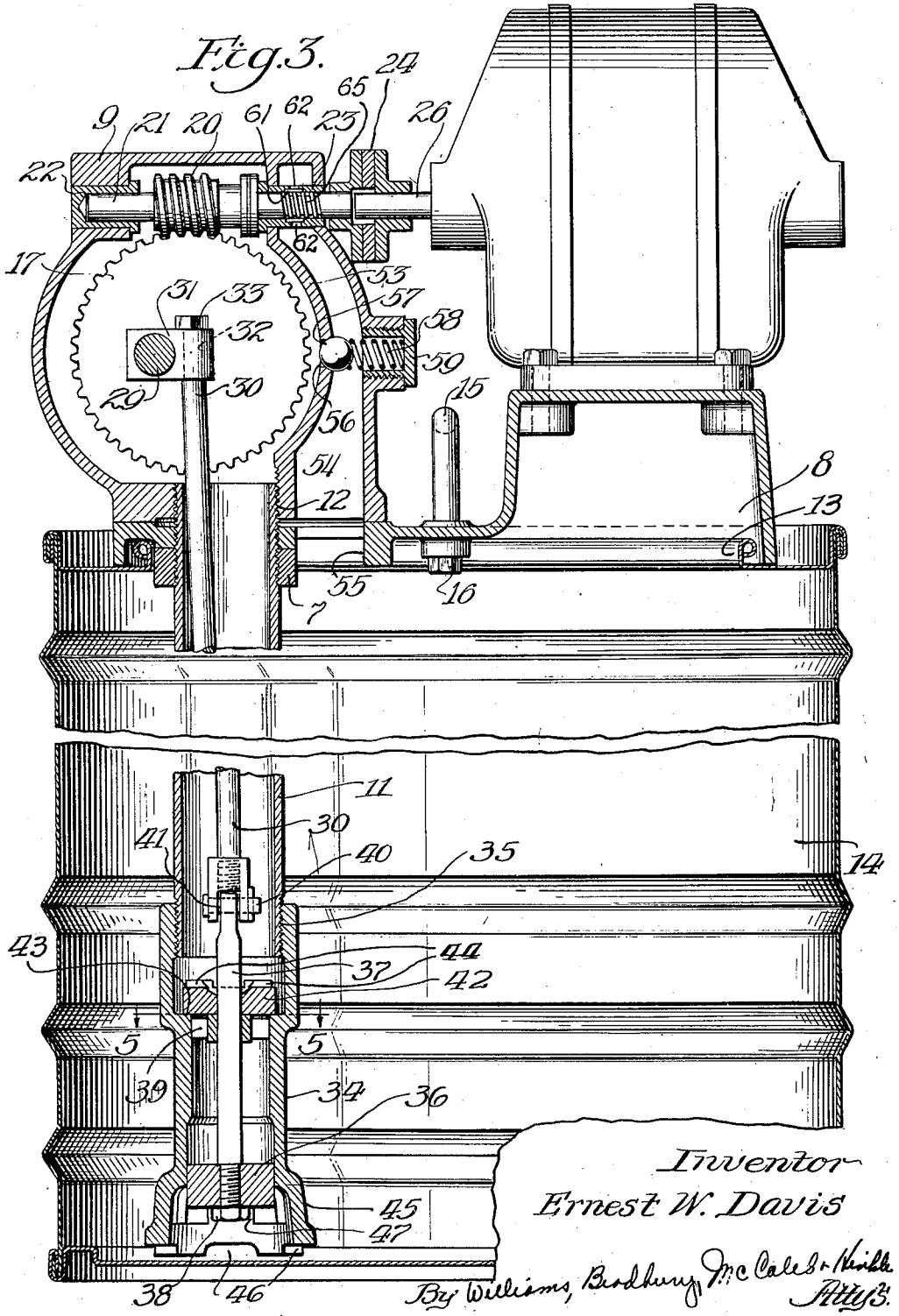
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LUBRICANT DISPENSING DEVICE

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Fig. 3.



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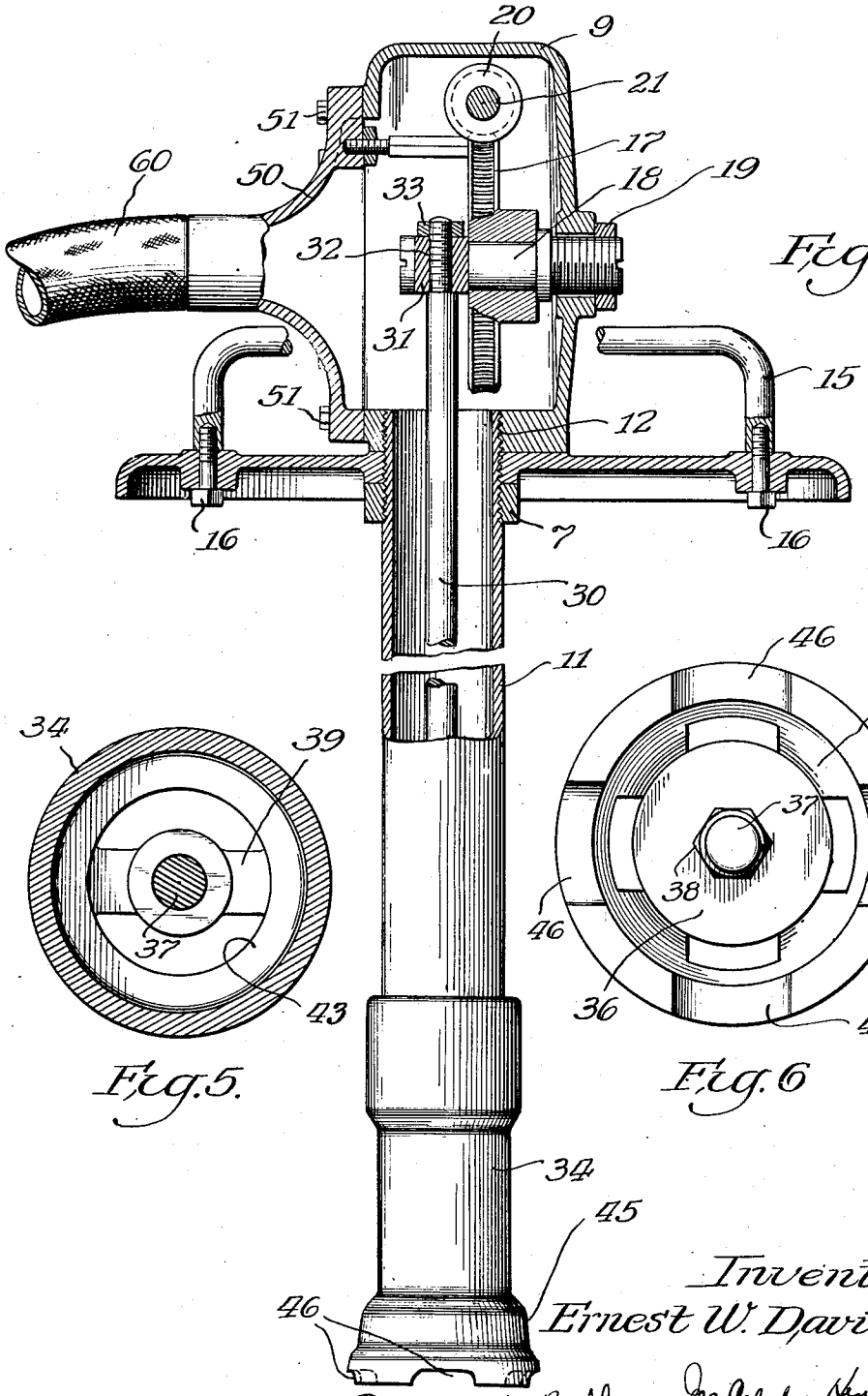


Fig. 4.

Fig. 5.

Fig. 6

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UNITED STATES PATENT OFFICE

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LUBRICANT DISPENSING DEVICE

Application filed October 15, 1928. Serial No. 312,446.

My invention relates to lubricating apparatus and more particularly to lubricant pumps for removing lubricant from containers.

It is an object of my invention to provide a motor driven pump for removing lubricant from lubricant supply barrels.

Another object of my invention is to provide in a motor driven pump for removing lubricant from a barrel, means to automatically stop the flow of lubricant from the pump independently of the motor and driving mechanism.

Another object of my invention is to provide a pump for removing lubricant from a supply barrel and having an intake so disposed relative to the center of the barrel as to readily afford changes of position whereby the barrel may be completely emptied.

Another object of my invention is to provide a pump for removing lubricant from a supply barrel wherein the operating mechanism of the pump is so arranged as to be lubricated by the lubricant which passes from the supply barrel.

Still another object of my invention is to provide in a motor driven pump for removing lubricant from a supply barrel, means to prevent leakage of lubricant from the pump housing where the motor drive shaft enters the housing.

Other objects and advantages of my invention will become more apparent through the following detailed description and accompanying drawings, in which

Figure 1 is a side elevation of the lubricant pump of my invention, illustrating the manner in which it is mounted on a lubricant barrel which is shown in section;

Figure 2 is another side elevation of my lubricant pump shown mounted on a lubricant barrel with the pump rotated to a different position within the barrel;

Figure 3 is an enlarged cross sectional view of my lubricant pump looking at it from the side;

Figure 4 is an enlarged end view of my pump partly in section;

Figure 5 is an enlarged cross section taken on the line 5—5 of Figure 3; and

Figure 6 is an enlarged bottom view of the intake of my pump.

Referring, now, to the drawings in detail, in which like numerals designate like parts throughout the several views, the numeral 8 indicates a supporting base on which is suitably mounted a gear housing 9 and an electric motor 10. A conduit cylinder 11 is secured to the supporting base 8 by screw threads 12 and extends up into the gear housing 9, and a lock nut 7 secures the cylinder 11 in position. The base 8 is adapted to snugly fit over a cover opening 13 in the top of a lubricant container or supply barrel 14 and rests upon the top of the barrel with the conduit cylinder 11 depending from the base 8 down into the barrel. A handle 15 is suitably secured to the supporting base 8 by means of screw studs 16 and this handle facilitates moving of the pump apparatus.

A geared crank disc 17 is rotatably mounted on a shaft 18 which shaft is screw threaded in the side of the gear housing 9 and secured by a lock nut 19. A worm gear 20, which meshes with the geared crank disc 17, is secured to a shaft 21 which is rotatably mounted at one end in a bushing 22 near the top of the housing 9. The other end of the shaft 21 passes through a bushing 23 and is secured to a suitable flexible coupling 24 of any well known type, which is in turn connected with a drive shaft 26 of the electric motor 10.

A crank pin 29 is suitably mounted on the crank disc 17, offset from the center of the crank disc. A connecting rod 30 is connected with the crank pin 29 by means of a crank 31 which is rotatably mounted on the crank pin 29 and has a bore 32 in one end thereof to support the connecting rod 30 which is held in place by a nut 33. The lower end of the connecting rod 30 extends downwardly within the conduit cylinder 11 which depends from the gear housing 9. A pump cylinder 34 is suitably mounted at the lower end of the conduit cylinder 11 by screw threads 35 and a pump piston 36 is secured to the lower end of a second piston rod 37 by means of a nut 38, and this piston is adapted to reciprocate within the lower end of the pump cylinder 34. The piston rod 37 is reciprocably

mounted in a spider 39 which is formed within the pump cylinder 34 and the upper end of the piston rod 37 is apertured to receive a pin 40 which passes through a clevis 41 formed at the lower end of the connecting rod 30, whereby the rod 30 and rod 37 are connected together.

It will be noted that the upper end of the rod 37 has been reduced in size so that the space within the bifurcated portions of the clevis will allow for some rocking motion. The pin 40 will also be slightly less in diameter than the aperture within the upper end of the rod 37 to compensate for the rocking motion of the connecting rod 30 when the crank disc 17 is in operation. The pin 40 is in a position perpendicular to the crank pin 29 which arrangement is possible because of the rocking motion just described. If the connection formed by the clevis 41 and rod 37 were relied on to provide the motion necessary when the crank 31 is operating, the pin 40 would have to be parallel to the crank pin 29 and in the same plane with this crank pin. In the assembly of the parts and manufacture of the apparatus great care would necessarily have to be exercised which would add to the time necessary to assemble one of the devices.

The piston rod 37 may also move relative to the connecting rod 30 in a direction perpendicular to the plane of the rotation of the crank disc 17, because of its pivotal connection with the rod 30.

The upper end of the pump cylinder 34 is enlarged to provide room for a disc valve 42 which is reciprocably mounted upon the piston rod 37 and rests upon a shoulder 43 formed within the pump cylinder and also upon the spider 39 therein. A plurality of apertures 44 are cut in the upper end of the disc valve 42 to allow passage of lubricant thereby when the upward movement of the valve 42 is limited by its engagement with the lower end of the conduit cylinder 11. The lower end of the pump cylinder 34 is flared out to form a bell-shaped housing 45 in the lower end of which are cut openings 46 to allow for the passage of lubricant into the cylinder should the bottom of the housing 45 rest upon the bottom of the lubricant container 14.

The inner walls of the bell-shaped housing 45 are provided with serrated bosses 47 which serve as guide members for the pump piston 36 as it reciprocates within the pump cylinder 34. This construction allows the pump piston 36 to be moved downwardly into the bell-shaped housing 45 beyond the end of the pump cylinder 34 and allows passage of lubricant between the bosses 47 so that lubricant may enter the pump cylinder 34.

A removable cap 50 is suitably secured at one side of the gear housing 9 by means of studs 51, as shown in Figure 4, to provide an outlet for lubricant raised from the container 14. A discharge conduit 60 is screwthreaded into the removable cap 50 through which the lubricant is discharged to the bearing to be lubricated. A control valve (not shown) is located in this discharge conduit whereby the operator may open the conduit to allow discharge of lubricant or close it to prevent discharge at will. A wall 53 is formed within the gear housing 9 to define a chamber within which is confined the driving mechanism of the pump. All lubricant raised from the container 14 passes through this chamber before it enters the discharge conduit 60 whereby the driving mechanism of the pump is thoroughly lubricated at all times.

The wall 53 also forms a chamber 54 which is in alignment with an opening 55 located in the supporting base 8. A bore 56 is formed in the wall 53 and affords a seat for a ball check valve 57 which is held in position by a compression spring 58 set in a screw plug 59 which plug is screwthreaded into the gear housing 9. This ball check valve normally remains on its seat, closing the bore 56 so that lubricant which is raised by the pumping mechanism will not enter the chamber 54 but will pass out through the discharge conduit 60. When the lubricating operation is completed and the discharge conduit closed off, the lubricant raised by the pumping mechanism may be discharged through the opening 56 into the chamber 54 by compression of the ball check valve and thereupon returned through the opening 55 into the container 14.

Another feature of my invention is the prevention of leakage of lubricant through the motor drive shaft opening in the housing 9 by providing a helical groove 65 on the shaft 21 at the place where it is rotatably mounted in the bushing 23, and a chamber 61 is formed within the bushing 23. Cross drill holes 62 are drilled in the bushing 23 so that as the shaft rotates the helical groove 60 will tend to return or screw back toward the worm gear 20 any lubricant which might leak between the shaft 21 and bushing 23. Thus, the lubricant may fall back through the cross drill holes 62 into the chamber 54 and back into the container 14.

In the operation of this device a container full of lubricant is placed in a convenient position and the cover removed and my lubricant pump placed in the position illustrated in Figures 1, 2 and 3. Upon starting the electric motor 10, the worm 20 will drive the crank disc 17, thereby reciprocating the piston rod 37, as hereinbefore described, and the pump piston 36 will be lowered into the bell-shaped housing 45. The vacuum created within the pump cylinder 34 by the down stroke of the pump piston 36 will cause lubricant within the container to enter the pump

cylinder. As the pump piston 36 moves upwardly the lubricant will be carried upwardly thereby through openings in the spider 39, raising the valve 42 and passing through openings 44 into the conduit cylinder 11. As the pump continues to operate the conduit cylinder 11 will be filled and lubricant raised into the gear housing 9 from whence it is discharged through the discharge conduit 60 and into the transmission, differential or bearing to be lubricated. As long as the motor runs and the discharge outlet is open, lubricant will be raised from the container and forced outwardly as described, under pressure, through the discharge conduit 60. When the discharge outlet is closed, the motor may be allowed to run continuously with no damage to any of the parts or overflow of lubricant because of the ball check valve 57 and opening 56 through which the lubricant will be returned to the container 14. As the lubricant is removed from the container it will tend to cling to one edge of the container, as illustrated in Figure 1, which shows the approximate condition of a container after the lubricant has nearly all been removed. At this stage of the operation the operator will notice a sucking or gurgling noise denoting that the bell-shaped housing 45, which forms the lubricant inlet, has removed all of the lubricant near it. For this reason the conduit cylinder 11 and pump apparatus have been located at a point laterally spaced from the center of the barrel. The operator may now grasp the handle 15 and rotate the entire pump mechanism to the position illustrated in Figure 2 where the inlet in the bell-shaped housing 45 will be surrounded by the remaining lubricant in the container and continue to discharge lubricant from the container 14, the advantage of this construction being to allow a complete and efficient removal of all of the lubricant contained within the supply barrel and also to prevent the annoyance of the sudden exhausting of the supply within the container without giving the operator some warning so that the lubrication of the particular mechanism being lubricated may be completed without the necessity of opening a new barrel and changing the pump mechanism before the particular job is completed.

The crank arrangement illustrated in my invention, with the crank pin offset from the center and the crank 31 arranged as shown, is to allow the pumping mechanism to be arranged close to the driving motor so that none of the parts will extend beyond the diameter of the lubricant supply barrel.

The invention is capable of wide variation within equivalent limits and I contemplate such variation as may be desirable or useful in the particular adaptation of the invention shown, or in its adaptation to other devices. I do not restrict myself in any unessential particulars, but what I claim and desire to secure by Letters Patent is:

1. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, operably connected to both said motor and said connecting rod for actuating said piston upon operation of the motor.

2. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, operably connected to both said motor and said connecting rod for actuating said piston upon operation of the motor, a casing over said disc disposed to receive lubricant from said cylinder, and means communicating with said casing for receiving and dispensing lubricant therefrom.

3. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, operably connected to both said motor and said connecting rod for actuating said piston upon operation of the motor, a casing over said disc disposed to receive lubricant from said cylinder, means communicating with said casing for receiving and dispensing lubricant therefrom, a partition extending through said casing forming an over-

flow compartment communicating with said container and yieldingly held valve means normally closing an opening through said partition to permit the return of lubricant to said container.

4. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, means forming a driving connection between said motor and said disc for rotating said disc, an eccentrically disposed crank pin on said disc, and an offset arm operably connecting said connecting rod to said pin whereby operation of the motor actuates said piston.

5. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, means forming a driving connection between said motor and said disc for rotating said disc, an eccentrically disposed crank pin on said disc, an offset arm operably connecting said connecting rod to said pin whereby operation of the motor actuates said piston, a casing over said disc disposed to receive lubricant from said cylinder, means communicating with said casing for receiving and dispensing lubricant therefrom.

6. In a lubricating apparatus of the class described, a supporting base including a circular bearing portion adapted to be placed concentrically over a large opening in the upper end of a lubricant container, a motor mounted on said base, a pump cylinder on said base eccentrically of the axis of the base, depending therefrom and having a lubricant inlet adjacent the bottom of the container eccentrically of the axis of the container, a piston in said cylinder, a piston rod for said piston, a connecting rod for reciprocating said piston rod having one end extending through said base, a crank disc mounted above said base, means forming a driving connection between said motor and said disc for rotating said disc, an eccentrically disposed crank pin on said disc, an offset arm operably connecting said connecting rod to said pin whereby operation of the motor actuates said piston, a casing over said disc disposed to receive lubricant from said cylinder, means communicating with said casing for receiving and dispensing lubricant therefrom, a partition extending through said casing forming an overflow compartment communicating with said container and yieldingly held valve means normally closing an opening through said partition adapted to yield upon subjection to a predetermined pressure to permit the return of lubricant to said container.

In witness whereof, I hereunto subscribe my name this 10th day of October, 1928.

ERNEST W. DAVIS.