July 9, 1929. E. F. PIERCE ET AL 1,720,376

LUBRICANT COMPRESSOR

Filed June 14, 1924

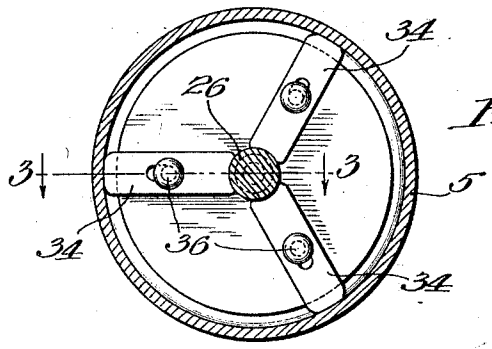


Fig. 2.

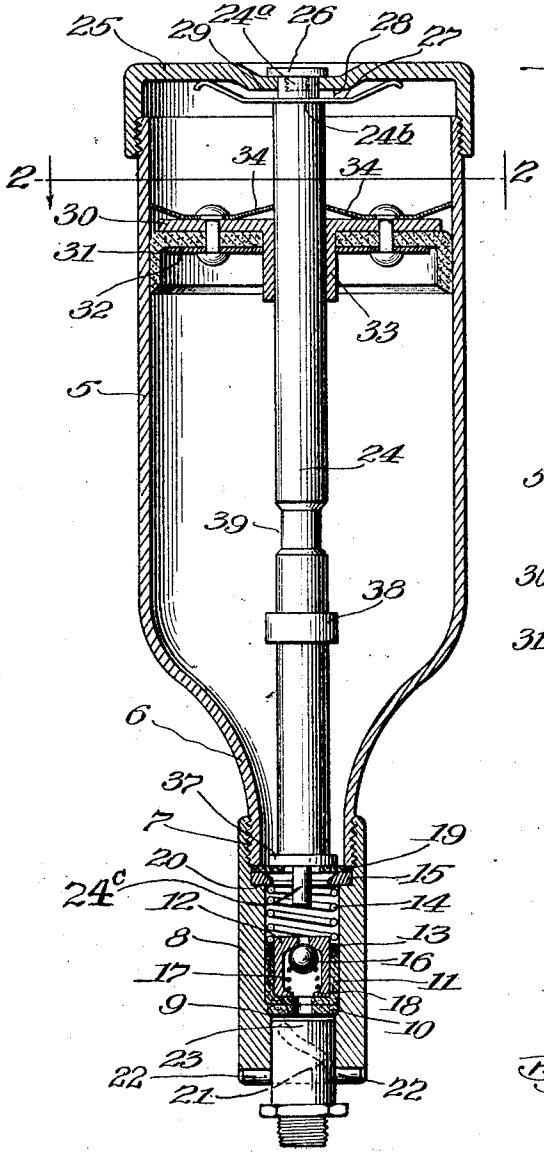


Fig. 1.

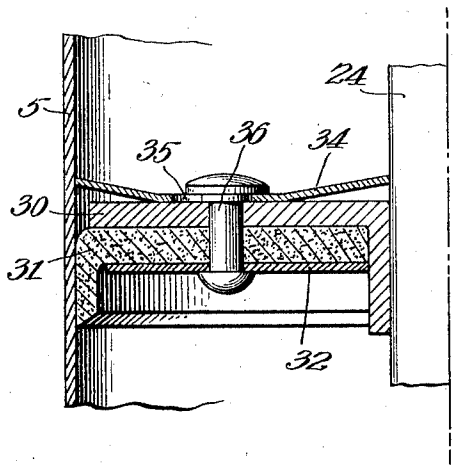


Fig. 3.

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UNITED STATES PATENT OFFICE.

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LUBRICANT COMPRESSOR.

Application filed June 14, 1924. Serial No. 720,019.

Our invention relates to improvements in lubricant compressors, and is particularly concerned with the provision of a novel type of compressor for supplying lubricant under pressure to bearings.

The objects of our present invention are

First: to provide a compressor comprising a barrel or reservoir for holding a quantity of lubricant, and a cylinder communicating with the reservoir, means being provided for ejecting the lubricant from the cylinder under comparatively high pressure;

Second: to provide a compressor of the character described, embodying means for automatically priming the cylinder during each return stroke of the ejecting means;

Third: to provide a compressor of the character described comprising a piston reciprocable in said barrel or reservoir, and means for advancing the piston to force lubricant into the cylinder upon each operation of the ejecting means, the advancing means being automatically actuated through the operation of the ejecting means, and

Fourth: to provide a compressor of the character described that is simple in construction, economical to manufacture, and easy to operate.

Other objects of our invention will appear as this description progresses, reference being had to the accompanying drawings, in which

Figure 1 is a central longitudinal section through our improved compressor;

Figure 2 is a transverse section taken on line 2—2 of Figure 1, and

Figure 3 is an enlarged sectional detail taken on line 3—3 of Figure 2.

Throughout the several views, similar reference characters will be used for referring to similar parts.

Referring to the drawings, our improved compressor comprises a barrel or reservoir 5 adapted to hold a substantial quantity of lubricant. One end of this barrel gradually decreases in diameter, as shown at 6, and terminates in the threaded portion 7 on which is threaded the inner end of the sleeve or cylinder 8. The bore of this cylinder decreases in diameter adjacent the outer end, as shown at 9, to provide a shoulder or abutment for the perforated leather gasket 10. This gasket is backed by the cup leather 11. A cylindrical displacing element 12 is positioned in the cup leather 11 and extends inwardly therefrom a short distance as shown in the drawings. A beveled metal ring 13 surrounds the inner end of the displacer 12 and is urged outwardly by the compression spring 14 confined between it and the ring or washer 15. The inner end of the displacer 12 is flanged inwardly to provide a seat for the ball valve 16. The latter is yieldingly held upon its seat by the compression spring 17 confined between the valve and the inturned flange 18.

A flexible annular valve 19 rests against the inner face of the ring or gasket 15, and these two elements are clamped between the end 7 of the barrel and the shoulder 20, formed at the inner end of the cylinder 8.

The outer end of the cylinder 8 has a pair of bayonet or cam slots 21 formed therein for receiving the pins 22 projecting from opposite sides of a lubricant receiving fitting 23 of well known construction, so that when the barrel 5 and the cylinder 8 are rotated relatively to the pin 22, the cam slots will cause the barrel 8 to move downwardly over the end of the fitting while at the same time holding the displacer 12 and the cup leather 11 stationary. In this manner, the displacer is caused to eject or displace the lubricant from the cylinder 8 through the displacer, the cup leather and the gasket 10, into the fitting. The operator then rotates the barrel 5 in the opposite direction, thereby causing the cylinder 8 to move outwardly upon the fitting 23. During this movement of the cylinder 8, the displacer 12 and the cup leather are held stationary with respect to the fitting 23, so that ultimately the atmospheric pressure exerted upon the lubricant in the barrel 5 is sufficient to force the lubricant into the cylinder, and thereby prime it for the next ejecting operation, but with comparatively light greases, there is a tendency for the lubricant at the center of the barrel to be gradually removed, thus forming an opening in the grease extending through the length of the barrel and preventing the further operation of the compressor. Furthermore, if the greases employed are too heavy, atmospheric pressure becomes more or less ineffectual for priming the cylinder.

To overcome the above difficulty, we have provided the piston rod 24 which extends throughout the entire length of the barrel 5 and passes loosely through an opening

formed in the removable cap 25. At the point where the piston rod 24 passes through the cap 25, it is reduced in diameter, as shown at 24^a, and a screw 26 is threaded into its outer end to act as a stop for limiting the inward movement of the piston rod relatively to the cover. A leaf spring 27 is confined between the shoulder 24^b formed on the piston rod and the end of the cap 25, in such manner that this spring tends to move the piston rod 24 inwardly. There is; however, a small space 28 between the spring 27 and the end of the cap 25 that permits the piston rod 24 to be moved bodily with respect to the cap. The inner end of the piston rod 24 is reduced in diameter, as shown at 24^c, and extends through the opening in the flexible valve 19, which is preferably made of leather, or other similar suitable material. This extension 24^c extends into the path of the displacer 12 so that when the latter occupies its innermost position relatively to the cylinder 8, the piston rod 24 will be pushed outwardly until the spring 27 contacts with the inwardly displaced portion 29 of the cap.

A piston comprising the follower plate 30, the cup leather 31 and face plate 32 is reciprocably mounted in the barrel. The follower plate 30 comprises a sleeve 33 that extends through the central openings in the cup leather 31 and face plate 32, and freely slides upon the piston rod 24.

A plurality of spring clutch members 34, bent as shown in Figs. 1 and 3, and slotted at 35 to receive the rivets 36, are slidably mounted upon the piston in such manner as to engage the piston rod 24 and the inner wall of the barrel 5. These clutch members are shaped so that when the piston rod 24 moves in an outward direction, they do not seize it, but when the piston rod 24 moves in the opposite direction, they immediately engage it and cause the piston to move inwardly with it, that is, with the piston rod.

In the operation of the construction described above, when the barrel 5 is turned to cause the cylinder 8 to move downwardly over the fitting, the extension 24^c of the piston rod will be brought into contact with the inner end of the displacer 12, and thus held stationary while the cylinder 8 and the barrel 5 continue to advance in the direction of the fitting. This will cause the spring 27 to be placed under tension. Then when the direction of rotation of the barrel 5 and cylinder 8 is reversed, the cylinder will begin to move away from the fitting, and thus tend to create a void in the cylinder, but immediately the spring 27 begins to expand, thus causing the piston rod 24 to move inwardly with respect to the barrel 5. The clutch elements 35 immediately engage the piston rod and carry the piston along with the rod. As the piston moves with respect to the barrel, it will eject lubricant from the latter past the flexible valve 19 and into the cylinder 8, thereby priming the latter.

The throw of the spring 27 can be made so that at each discharge stroke of the compressor, just sufficient lubricant will be displaced by the piston to fill the cylinder, but we prefer to make the throw of the spring 27 considerably greater so as to insure a complete filling of the cylinder at each stroke of the compressor.

It should be noted that a disc 37 is secured to the inner end of the piston rod 24 to act as an abutment for the flexible valve 19 during the pressure stroke.

The piston rod is provided with an annular flange or rib 38 for engaging the end of the sleeve 33 when the cap is unscrewed, so as to enable the piston to be withdrawn with the piston rod. An annular groove 39 is formed in the piston rod 24 for receiving the inner ends of the clutch elements 34 when the piston has reached the inner limit of its movement, thereby expediting the withdrawal of the piston from the barrel.

While we have described the details of construction of the preferred embodiment of our invention, it is to be understood that our invention is not limited to these details, but is capable of other adaptations and modifications within the scope of the appended claims.

Having thus described our invention, what we claim is:

1. A lubricant compressor comprising a barrel, a cylinder communicating with said barrel, reciprocable means in said cylinder for displacing lubricant therefrom, an apertured valve between said barrel and said cylinder, a piston rod reciprocably mounted in said barrel and having a portion projecting through the aperture in said valve into the path of said reciprocable means, a spring for urging said piston rod toward said cylinder, a piston slidable on said piston rod, and clutch mechanism carried by said piston for engaging said piston rod and moving said piston toward said cylinder.

2. A lubricant compressor comprising a barrel, a cylinder communicating with said barrel, reciprocable means in said cylinder for displacing lubricant therefrom, an apertured valve between said barrel and said cylinder, a piston rod reciprocably mounted in said barrel and operable by said reciprocable means, means for urging said piston rod toward said cylinder, a piston slidable on said piston rod, and clutch mechanism carried by said piston for engaging said piston rod and moving said piston toward said cylinder.

3. A lubricant compressor comprising a low pressure barrel, a central axial rod extending through said barrel, a piston slidable on said rod, high pressure compressing

means receiving lubricant from said low pressure barrel and adapted to axially reciprocate said rod, and slip clutch means having a wedging action and connecting said rod and piston for advancing said piston toward said high pressure compressing means upon reciprocation of said rod.

4. A lubricant compressor comprising a low pressure barrel, a central axial rod extending through said barrel, a piston slidable on said rod, high pressure compressing means receiving lubricant from said low pressure barrel and adapted to cause an axial reciprocation of said rod in operation, and slip clutch means connecting said rod and piston for advancing said piston toward said high pressure compressing means upon reciprocation of said rod.

5. A lubricant compressor comprising a low pressure barrel, a central axial rod extending through said barrel, spring means biasing said rod to a predetermined position, a piston slidable on said rod, high pressure compressing means receiving lubricant from said low pressure barrel and adapted to cause an axial reciproaction of said rod against the force of said spring in operation, and slip clutch means connecting said rod and piston for advancing said piston toward said high pressure compressing means upon reciprocation of said rod.

6. A lubricant compressor comprising a low pressure barrel, a central axial rod extending through said barrel, spring means biasing said rod to a predetermined position, a piston slidable on said rod, high pressure compressing means receiving lubricant from said low pressure barrel and adapted to cause an axial reciprocation of said rod against the force of said spring in operation, and slip clutch means connecting said rod and piston for advancing said piston toward said high pressure compressing means upon reciprocation of said rod, said spring returning said rod in the direction for advancing said piston.

7. A lubricant compressor comprising a body, low pressure and high pressure compressing means in said body, a manually operated transmission means for actuating said high pressure means, said transmission means having a forward and return stroke and automatically cooperating ratchet means between said high and low pressure compressing means for actuating said low pressure means during the return stroke of said transmission means.

8. A lubricant compressor comprising a body, low pressure and high pressure compressing means in said body, a manually operated transmission means for actuating one of said compressing means upon its forward stroke, and automatically cooperating ratchet means between said compressing means for actuating the other compressing means during the return stroke of said manually operated transmission means.

In witness whereof, we hereunto subscribe our names this 12 day of June, 1924.

EARL F. PIERCE.
JOE B. NIMS.