

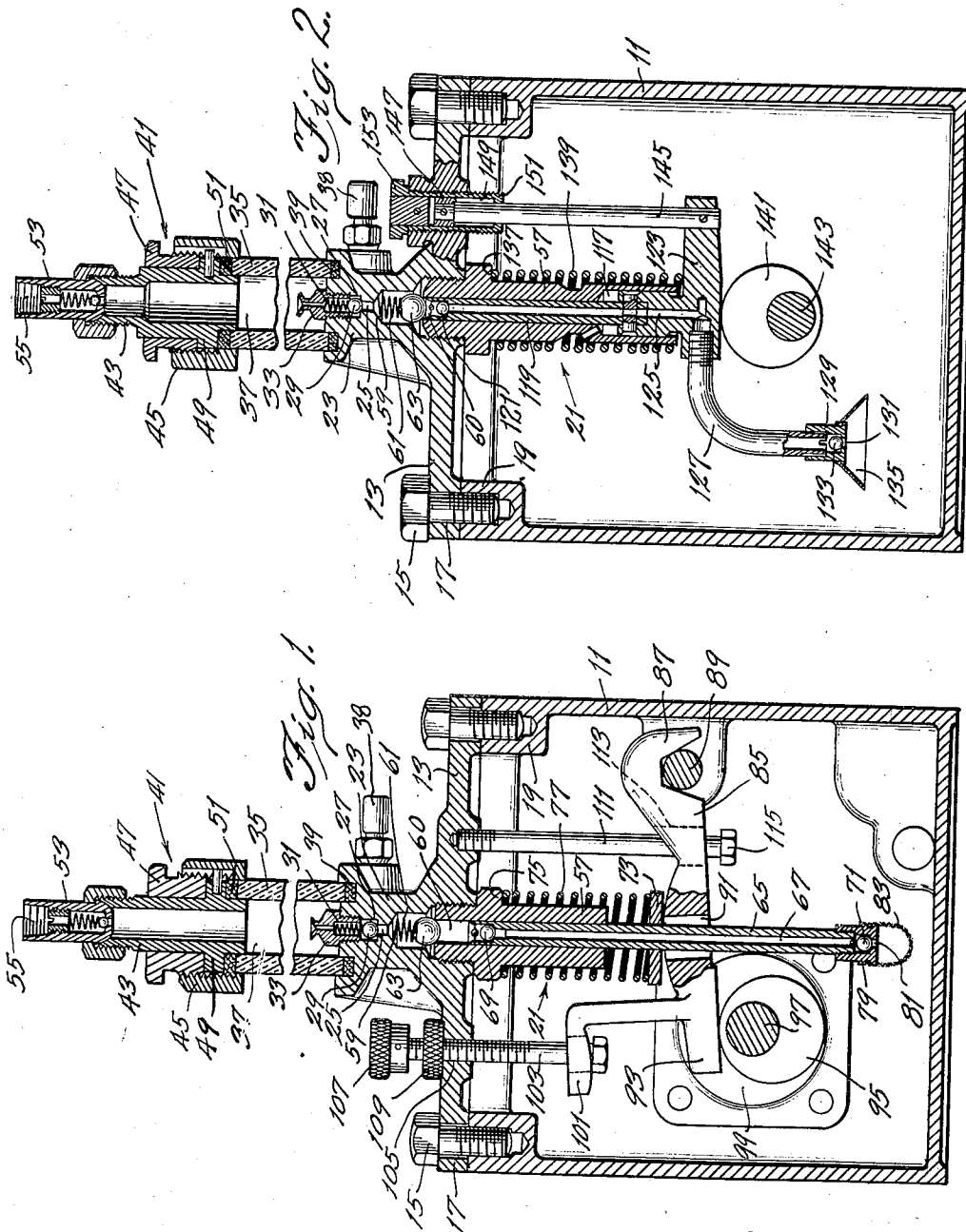
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LUBRICATOR

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LUBRICATOR

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Our invention relates in general to lubrication and has more particular reference to an automatic force feed lubricator.

An important object of the present invention is to provide an improved force feed lubricator, of the character described in the application of Edwin W. H. Rennick, Serial Number 479,685, filed September 4, 1930, for Lubricator, by effecting simplification of the parts and introducing improved structures whereby considerable increase in operating efficiency of the device is accomplished, and whereby the lubricator is rendered more rugged, more easily adjustable, and more easily serviced.

Among the important objects of the invention is to provide an improved mechanism for pumping lubricant to a supply line; to provide a simple, rugged construction including parts which are cheaply and easily manufactured and assembled, and which may be easily demounted for cleaning purposes; to produce a pumping element, which may be assembled as a unit for installation in the casing of the apparatus; to improve and simplify the means for actuating the pumping element, and to provide a simple, easily operating adjustment whereby the effective stroke of the pumping element may be regulated easily.

Another important object is to provide, in a device of the class described, a casing having a pump actuator mounted therein and a removable cover for the casing carrying a pump in position to cooperate with the actuating mechanism in a manner permitting separation of the pump and actuator by a simple separational movement accomplished by removing the cover from the casing.

Numerous other objects and advantages of the invention will be apparent from the following description, which, taken in connection with the accompanying drawing, discloses preferred embodiments of our present invention.

Referring to the drawing:

Figure 1 is a vertical section taken through one form of force feed lubricator device embodying our present invention; and

Figure 2 is a vertical section taken through a modified form embodying our present invention.

To illustrate our invention, we have shown on the drawing, lubricators each comprising a casing 11 adapted to contain a supply of lubricant to be forced into the lubricating system with which the device is associated.

The casing 11 is provided with a cover 13 secured across the open top of the casing in any

suitable manner, preferably detachably, as by means of bolts 15, which pass through openings 17 at the edge of the cover and take into tapped bosses 19 formed in the top of the case 11.

The cover 13 carries the pumping mechanism indicated generally at 21, which depends from the underside of the cover and extends down into the lubricant reservoir contained in the case 11. The cover 13 is formed with a boss 23 above the point at which the pumping mechanism is attached to the cover. This boss is formed with a channel 25, which extends through the cover and is provided with an upwardly facing seat 27, on which is mounted a ball check valve 29 normally urged against the seat 27 by means of a spring 31, the upper end of which is seated against a nozzle element 33, which is screw threaded into the upper end of the channel 25 and which opens into the sight glass 35, which is preferably filled with glycerine 37, so that when the pumping mechanism is operated, oil will be forced thereby up through the channel 25 past the check valve 29 and into the glycerine contained within the sight glass 35, so as to emerge slowly drop by drop through the nozzle 33 into the glycerine 37. Any suitable means, such as that shown in the aforesaid copending application of Edwin W. H. Rennick may be used for filling the sight glass with glycerine, such means being indicated generally at 38.

In order that the drops of lubricant may ascend through the nozzle 33 and, at the same time, be visible through the sight glass 35, the sight glass is filled with glycerine or some other suitable liquid of greater specific gravity than oil so that the drops of oil will ascend through the transparent liquid and be clearly visible through the sight glass. The sight glass 35 is preferably sealed to the upper end of the boss 23 in any suitable manner as by the gasket 39 and the upper end of the sight glass is provided with a suitable nozzle construction indicated generally at 41, and which consists of a channelled member 43, the upper end of which is threaded and the lower end of which is secured to the upper end of the sight glass with the channel of the member in communication with the interior of the sight glass. The lower end of the channelled member 43, in the illustrated embodiment, is secured to the sight glass by means of an internally threaded sleeve 45 secured in spaced relationship with respect to the boss 23 by suitable fastening means (not shown), which may be formed as integral webs formed on and extending between the parts 23 and 45, preferably on opposite sides of the sight glass. The

lower end of the sleeve 45 embraces the upper end of the sight glass and an externally threaded bushing 47 is provided, which bushing embraces the channelled member 43, threadingly interconnects with the threads of the cup-shaped member 45, and, upon being threaded into the latter, squeezes a flanged portion 49 of the channelled member 43 against the upper end of the sight glass, there being, preferably, a sealing gasket 51 mounted between the annular flange 49 and the upper end of the sight glass.

The upper end of the channelled member 43 carries an oil ejecting valve construction 53 communicating with the interior of the channelled member 43, so that oil may pass outwardly of the upper end into the lubricating system being served, which is connected to the device at the upper threaded end 55 of the valve 53.

The foregoing sight glass and ejector valve construction is clearly illustrated and described in the aforesaid co-pending application of Edwin W. H. Rennick, Serial Number 479,685, now Patent Number 1,942,450, and does not form a part of the present invention.

The pumping mechanism 21 comprises a cylinder 57, having a central channel 60 extending axially thereof, the upper end of the cylinder being threaded to engage in the lower end of the channel 25. The channel 25 is also provided with a shoulder 59 facing downwardly and formed in the channel below the ball valve 27, 29, to receive the upper end of a spring 61, which operates to resiliently urge an upwardly opening ball valve 63 against the upper end of the channel 60 when the cylinder 57 is secured in place in the cover.

The channel 60 of the cylinder 57 receives the upper end of a plunger 65, which is axially reciprocable within the cylinder. This plunger contains a channel 67, the upper end of which is provided with an upwardly opening ball valve 69, the lower end of which communicates with an inwardly opening ball valve 71, which communicates directly with the lubricant in the casing 11.

In Figure 1 of the drawing, the reciprocable member 65 comprises a single tubular member having a flange 73 at approximately its mid-point some distance below the lower end of the cylinder 57. The cylinder also has a shoulder 75 and a spring 77 extends between the collar 73 and the shoulder 75 to normally urge the reciprocable member 65 downwardly with respect to the cylinder 57.

The lower end of the tubular member 65 also is provided with a cap 79 having a perforation 81 for retaining the ball valve 71 in place and the cap 79 carries a strainer 83 covering the opening 81 whereby to filter the oil which enters said opening. The member 65 is reciprocated by means of an actuating member 85, one end of which is arranged in the form of a downwardly opening hook 87, which has pivotal engagement upon a journal bar 89 formed and arranged in the casing 11.

The actuating member 85 extends from the journal 89 beneath the collar 73 of the reciprocable member and has an opening 91 to permit said member to extend through and downwardly of the actuating lever 85. The actuating lever 85 also has a cam following portion 93, which extends to a position engaging an eccentric cam 95 carried by a shaft 97, which extends into the casing 11 and is suitably mounted for rotation in journals 99 formed in the side walls of the casing so that when the shaft 97 is rotated, the cam will alternately lift the cam follower 93 and

hence lift the member 65 forcing it upwardly in the cylinder 57 against the resistance of the spring 77 and alternately permit the cam follower 93 to descend under the influence of the urge of the spring 77.

The actuating member 85 is also provided with means for adjustably limiting its downward movement under the influence of the spring 77, said limiting means comprising a lug 101 formed on the member 85 and perforated to receive the shank of a threaded member 103, which extends upwardly and threadingly engages a threaded portion 105 on the cover. The upper end of the shank 103 extends through the cover and is provided with a knurled operating nut 107, by which the same may be rotated in order to adjust the lower limit of motion of the member 85. The member 103 may be secured in any desired adjusted position by means of the lock nut 109.

It will be noted that all of the operating mechanism, except the journal pin 89 and the actuating cam 95 are mounted on the cover and that, in order to remove the operating parts for inspection, it is simply necessary to remove the bolts 15 and lift the cover together with the pumping mechanism from the casing 11, it being noted that the cam follower 93 may be lifted from the cam 95 in an upward direction and that the downwardly opening hook 87 may also be removed from the member 89 by a simple upward movement of the part.

In order to prevent the spring 77 from pushing the member 85 downwardly on the member 65 when the parts are so removed from the casing for inspection, the cover carries a bolt 111 threaded at one end into the cover and extending downwardly through an opening 113 in the member 85 and having a head 115 adapted to engage the lower surface of the member 85 in order to limit its downward movement under the influence of the spring 77 when the parts are lifted up with the cover and the hook 87 disengages the journal rod 89.

In Figure 2 of the drawing, the cylinder 57 is enlarged at its lower end as at 117. The reciprocable pumping member, which operates within the cylinder comprises a tubular member 119, which extends in the upper portion of the bore of the cylinder and is provided with an upwardly opening ball valve 121, which corresponds to the ball valve 69 of the construction shown in Figure 1. The lower end of the tubular member 119 is secured to a member 123, with its bore in communication with a bore 125 formed in the member 123, the upper portions of the member 123 being slidably mounted in the enlarged portion 117 of the channel of the cylinder 57.

The lower end of the bore 125 communicates with a pipe 127, which is threaded into the member 123 and which extends downwardly thereof and terminates in an oil inlet construction corresponding to the parts 71, 79 and 81 of the structure shown in Figure 1 of the drawing, the pipe 127 being provided at its lower end with a cap 129 having a perforation 131 and enclosing a ball valve element 133.

The cap 129 also carries a conical oil baffle 135, the function of which is to facilitate the introduction of oil from the oil reservoir in the casing 11 through the opening 131 past the valve 133 and into the pipe 127, and thence into the bore of the reciprocable member.

The cylinder 57 has a shoulder 137 and a spring 139 extends between said shoulder and the portion 123 below the lower end of the cylinder.

der 57 to normally urge the reciprocable member, comprising the parts 119, 123 and 127 normally downwardly with respect to the cylinder 57.

The lower portion of the element 123 forms a cam follower corresponding in function to the cam follower 93 shown in Figure 1, and this cam following portion 123 cooperates with the eccentric cam 141 carried on and actuated by a shaft 143, which may be journaled in the walls of the casing in a manner similar to the journaling of the shaft 97 in the embodiment shown in Figure 1.

It should be understood that, upon the rotation of the shaft 143, the eccentric cam 141 will alternately raise the reciprocable portions of the device upwardly against the resistance of the spring 139 and alternately permit said reciprocable portions to be lowered with respect to the cylinder 57 under the urge of the spring 139.

The portion 123 also carries a connecting member 145, which extends upwardly and is provided with a head 147, which slides in a way 149 formed in a member 151, which is adjustably threaded into the cover 13.

The lower end of the member 151 is provided with a stop for limiting the downward movement of the head 147 and hence limiting the downwardly movement of the element 123. The upper end of the member 151 is formed with a manually operable nut 153, by which the elevation of the stop means, with respect to the cover, may be adjusted so that by manipulating the nut 153, the lower limit of the downward movement of the reciprocable member may be adjusted in order to control the stroke of the reciprocable member and hence the quantity of the fluid pumped during each operating cycle of the mechanism.

It will be noted also in connection with the construction shown in Figure 2, that all of the operating parts, with the exception of the cam 141, are mounted and supported on the cover and that the entire mechanism may be removed for inspection simply by removing the bolts 15 and lifting the cover.

The structures illustrated have the further common features that when the reciprocable pump element is moved downwardly, a quantity of oil will be ejected from the upper end of the channel into the bore of the cylinder 57 through the ball valves 69 and 121 at the same instance that a similar quantity of fluid will be introduced into the lower end of the channel 59 through the ball valves 133 and 71.

During the upper stroke of the reciprocable member against the spring 77, the ball valves 69, 121, 71 and 133 will remain closed and will force the oil, distributed in the channel 59 during the previous stroke, upwardly past the ball valve 63 and thence past the ball valve 29 into the sight glass. There is, therefore, provided a multiple pumping action at the bottom of the mechanism, although two relatively movable parts are employed. There is a pumping action at the lower end of the channel of the lubricating member to inject oil from the oil reservoir into the central bore of the reciprocating element and there is another pumping action at the upper end of the bore of the reciprocating member to eject the oil into the channel 59 and thence past the check valves 63 and 29 into the sight glass.

The construction and arrangement of the parts is simple and rugged and it will be apparent that the reciprocating member may be readily removed from the cylinder 57 for repair or replacement

since the same is formed as a unit part. When the reciprocating member gets out of order, or becomes damaged in service, it is simply necessary to lift the top, disconnect the screws 103 and 111, remove the part 85 and withdraw the element 65, immediately replacing it with a new part in order to recondition the damaged apparatus for service.

Replacement of the reciprocating member in the structure shown in Figure 2 is equally simple since it is merely necessary to disconnect the rod 145 from the part 123 in order to permit removal of the reciprocating member from the casing.

It is thought that the invention and numerous of its attendant advantages will be understood from the foregoing description and it is obvious that numerous changes may be made in the form, construction, and arrangement of the several parts without departing from the spirit or scope of our invention, or sacrificing any of its attendant advantages, the forms herein described being preferred embodiments for the purposes of illustrating our invention.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is as follows:

1. A force feed lubricator comprising a plurality of separable frame parts, a rockable pump actuating element carried on one of said parts, and a driving element for the actuating element carried on another of said parts, and means to connect the frame parts together in a predetermined relative position so as to support the driving and actuating elements in mutually cooperating position without direct positive connection therebetween, said frame part carrying the driving element having an abutment to rockingly receive and support the actuating element when the frame parts are operatively connected whereby the elements may be disassembled merely by uncoupling the frame members on which each is mounted.

2. In a force feed lubricator comprising a support comprising a casing having a removable cover, a pump comprising a relatively stationary part mounted on the cover, a part relatively movable with respect to the stationary part and normally biased in one direction and means including a member carried by said cover and removable therewith and adapted to tiltably seat upon the casing when the cover is in place, said member operatively engaging the movable part for shifting the same against its bias.

3. In a force feed lubricator comprising a support comprising a casing having a removable cover, a pump comprising a relatively stationary part mounted on the cover, a part relatively movable with respect to the stationary part and normally biased in one direction, means including a member carried by the cover and removable therewith and adapted to tiltingly seat on the casing when the cover is in place, said member cooperatively engaging the movable part in such a way that the latter holds the member on its seat, and means to move the member on its seat to shift the movable member against its bias.

4. In a force feed lubricator, a support, a pump-carrying member removable on the support, a pump on the pump-carrying member, including a relatively shiftable pump element, a pump actuating lever carried by the pump carrying member and adapted to fulcrum on said support, said pump element being normally biased toward the actuating lever, and means located in position on the support to shift the lever and

cause it to move the pump element periodically against its bias, said pump-carrying member being demountable from the support in a direction causing the direct separation of the pump actuating lever and the driving means.

- 5 5. A force feed lubricator of simplified construction, comprising means forming a lubricant container having a bearing abutment and a removable cover, means forming relatively reciprocable cooperating pump parts carried by and mounted solely on the cover in position to extend into the lubricant container, a tiltable lever carried by the cover to reciprocate the pump parts, said lever being carried in position to removably fulcrum upon said bearing abutment and to cooperatively associate with driving means mounted on the lubricant container in order to impart relative movement to the pump parts whereby when the cover is mounted on the container, the lever is supported in operative position with respect to the driving means, the operative parts of the pump being bodily removable from the driving means and the lubricant container by simply removing the cover and withdrawing the pump parts therewith.

- 25 6. In a force feed lubricator comprising a support comprising a casing having a removable cover, a pump comprising a relatively stationary part mounted on the cover, a part relatively movable with respect to the stationary part and normally biased in one direction, means including a member carried by said cover and removable therewith and adapted to tiltably seat

upon the casing when the cover is in place, said member operatively engaging the movable part for shifting the same against its bias, and adjustable means carried by said removable cover and co-operatively associated with said member to control the tilting movement thereof and thereby regulate the stroke of the relatively movable pump part.

7. A force feed lubricator of simplified construction comprising means forming a lubricant container having a bearing abutment and a removable cover, means forming relatively reciprocable cooperating pump parts carried by and mounted solely on the cover in position to extend into the lubricant container, a tiltable lever carried by the cover to reciprocate the pump parts, said lever being carried in position to removably fulcrum upon said bearing abutment and to co-operatively associate with driving means mounted on the lubricant container in order to impart relative movement to the pump parts whereby when the cover is mounted on the container, the lever is supported in operative position with respect to the driving means, the operative parts of the pump being bodily removable from the driving means and the lubricant container by simply removing the cover and withdrawing the pump parts therewith, and means carried by the removable cover and operable to adjust the tiltable lever to control the displacement of the reciprocable pump parts.

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