Nov. 3, 1953 L. C. ROTTER ET AL 2,657,763

LUBRICATOR PUMP

Filed April 28, 1950

FIG. 2.

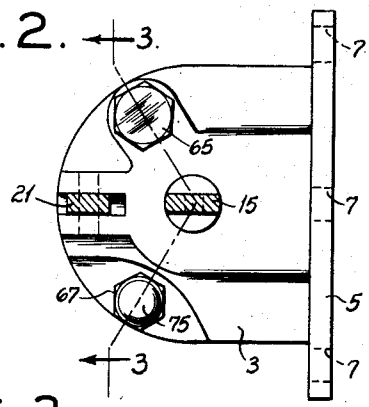


FIG. 3.

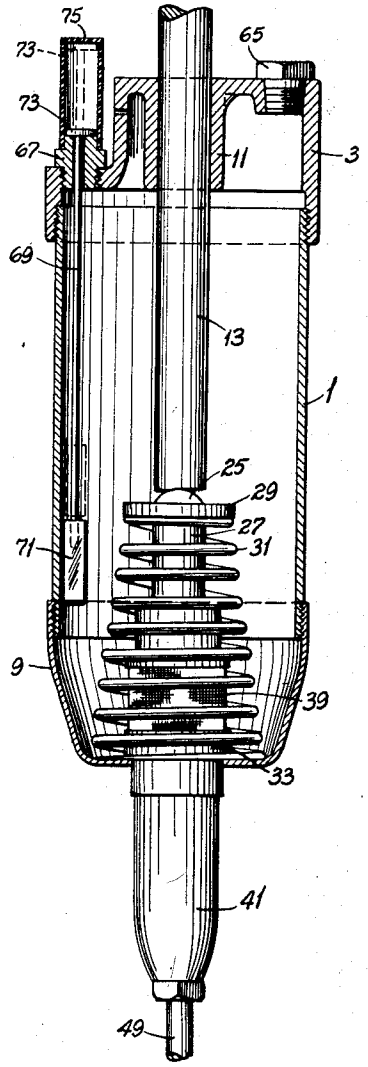
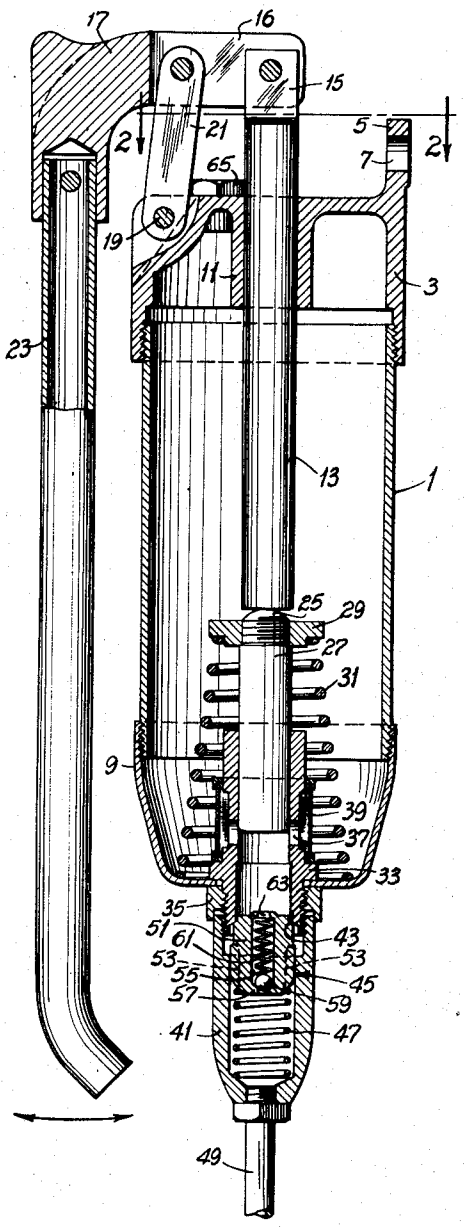


FIG. 1.



Ludwin C. Rotter,
Victor D. Klein,
Inventors.
Haynes and Koenig,
Attorneys.

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LUBRICATOR PUMP

Lutwin C. Rotter and Victor G. Klein, St. Louis, Mo., assignors to Lincoln Engineering Company, St. Louis, Mo., a corporation of Missouri

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1 Claim. (Cl. 184—28)

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This invention relates to lubricator pumps, and with regard to certain more specific features, to such pumps for supplying lubricator injector systems.

Among the several objects of the invention may be noted the provision of a lubricating pump embodying a simplified priming and pressure relief means for priming and by means of single-stroke operation rendering operative an attached injector system; and the provision of a pump of the class described adapted for convenient mounting and operation. Other objects will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the elements and combinations of elements, features of construction, and arrangements of parts which will be exemplified in the structures hereinafter described, and the scope of the application of which will be indicated in the following claim.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

Fig. 1 is a longitudinal cross section of apparatus embodying our invention;

Fig. 2 is a cross section taken on line 2—2 of Fig. 1; and,

Fig. 3 is a vertical section taken on line 3—3 of Fig. 2.

Similar reference characters indicate corresponding parts throughout the several views of the drawings.

The present invention provides a simple pump for use in connection with lubricator injector systems, of a nature designed to make such systems more practically applicable to ordinary shop equipment. To this end, the apparatus is made as simple and compact as possible, priming and pumping operations being coordinated for ease of operation, and complete injection operation being effected with a single stroke.

Referring now more particularly to the drawings, there is shown at numeral 1 a lubricant-containing barrel which is threaded into an upper head 3, the latter being formed with a supporting pad 5 having openings 7 for vertically locating the device on some vertical wall or panel. Threaded to the lower end of the barrel 1 is a lower head enclosure 9.

The upper head 3 forms a bushing 11 for a reciprocating push rod 13, the latter at its upper end being formed as a tongue 15 pinned to clevis 16 of a bell crank 17. The head 3 also supports a pivot 19 for a link 21 which is pinned into the bell crank clevis 16. The other arm of the bell crank

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17 is provided with an operating handle 23 which, if oscillated in a vertical plane such as shown by the arrow in Fig. 1, will reciprocate the push rod 13.

At its lower end the push rod 13 engages the ball end 25 of a plunger 27. A flange 29 is threaded to the upper end of the plunger 27, under which bears the upper end of a conical compression spring 31. The lower end of the spring 31 seats in the lower cap 9. A pump cylinder 33 by means of a threaded ring 35 is held in an opening in the cap 9. This cylinder 33 has inlet ports 37 adapted to be closed upon downward advance of the plunger 27. Surrounding the ports 37 is a strainer 39. Threaded to the lower outlet of the cylinder 33 is a nozzle 41. The outlet opening of the cylinder is formed as a valve seat 43 for seating a compound or double check valve assembly 45. The assembly 45 is biased to the seat 43 by means of a spring 47 positioned in the nozzle 41. The nozzle is provided with a supply line 49 which leads to the injector mechanisms to be served by the present pump. For example fifteen feet of line may serve fifteen or so injectors.

The compound check valve assembly 45 comprises an annular plug 51, axially grooved or flatted on its outside as shown at 53 to provide for passage thereby of lubricant when the plug is forced from the seat 43. The opening 55 through the plug 51 has an outer or downstream seat 57 for a ball check valve 59. A spring 61 biases the ball check valve 59 to the seat 57 in a downstream direction opposite to the upstream bias of spring 47 on member 51 against seat 43. The spring 61 reacts from an inturned shoulder 63 of the opening 55. A filling screw plug is provided at 65. At 67 is a guide bushing for a sliding rod 69, threaded at its lower end into a float 71. At its upper end, the rod 69 carries an indicator 73, which is movable under a transparent cap 75. The indicator 73 shows when the level in the cylinder 1 reaches a point at which refilling is required.

Operation is as follows:

Lubricant which in the present case is preferably of the liquid variety is introduced into the lubricant-containing barrel until it is full. The indicator 73 is a signal indicating the liquid in the lubricator-containing barrel should be replenished to avoid air entering the system. The line 49 is attached to the injectors served by the apparatus. The injectors require no detailed description, except to state that they are of the variety in which a certain pressure is required in

their supply line in order that they will force out a measured charge of lubricant to a bearing or bearings. After they have discharged, it is necessary, in order that they may reset themselves and refill from the same supply line, that the supply line be vented to a lower pressure. A typical injector system of the type referred to herein is shown in United States Patent 2,448,583. The volume of discharge upon a single stroke of plunger **21** is adapted to supply the simultaneous discharge of, say fifteen injectors through fifteen feet of line **49**, at a pressure of, say 600 to 1,000 p. s. i.

It is also necessary that the supply line be properly primed when operations are started. Supply line at greatest distance from gun should be open to allow air to escape when initially priming. It will be understood that priming of a line and of injectors can be accomplished at pressures lower than those required to operate the injectors. Thus the substantial volume required for initial priming of the system may be obtained by repeatedly oscillating the handle **23**. However, after the system has been primed, a single stroke of the handle is sufficient to increase the pressure to the upper value and to supply the amount of lubricant required for one operation of each of the injectors. The release pressure in line **49** required to cause the injectors to return to their initial (filled) positions is about 150 p. s. i. or so. The pressure at which valve **59** is set to release is about 50 p. s. i. and will open when this pressure or more exists as a differential pressure across it.

All that is required for injection is to oscillate the lever **23**. Obviously this will reciprocate the plunger **27**, which in its initial few strokes supplies sufficient lubricant to prime the line, if this has not already been primed. During this reciprocation the check valve member **51**, since it opens downstream, unseats to pass lubricant. The ball check valve **59** does not unseat, since it closes downstream, unless the pressure exceeds 50 p. s. i. when ports **37** are open. Finally, pressure is reached at which the injectors will operate. This is a pressure higher than the one which will unseat the check valve **59**, but this valve will not open when the lower end of the plunger **27** is below the ports **37**. This is because of the balanced pressure on opposite sides of this valve **59** under these conditions. Finally the injectors operate. When the injectors have operated, the handle **23** may be returned to return the plunger **27** to retracted position opening the ports **37**. Immediately the check valve **51** seats, but the check valve **59** will open, it being set to release at a pressure lower than the operating pressure for the injectors. Thus the line connected with outlet **49** is vented back to the cylinder **1** through the ports **37**. This allows the injectors to recharge in a manner which in view of said patent it is not necessary to detail herein.

After the first operation including priming the system is ready for the next use upon a single stroke. It will be understood that the line **49** will not vent below the predetermined pressure set by the check valve **59**, so that normally, if the line is not leaking, it will maintain its prime ready for subsequent single-stroke operations. Thus a single pull on the lever **23** is ordinarily sufficient to effect a discharge by the injectors. If prime has been lost several strokes may be necessary, as in initial starting. Without loss of prime a single stroke is sufficient because as stated the volumetric displacement of plunger **27** in the cylinder **33** is great enough to supply through the line an amount of lubricant equivalent to the total amount of lubricant supplied by all injectors.

Thus a typical release pressure for the valve **59** is 50 p. s. i. and typical pressure that may be obtained in the outlet **49** for a single stroke of the plunger **27** is 600–1,000 p. s. i., assuming fifteen or twenty small injectors and a 15-foot copper line to them. The injectors will recharge at about 200 p. s. i. or less release pressure, which assures opening of the valve **59**. Thus it will be seen that after the line and the injectors have been initially primed, a single stroke of the plunger **27** is sufficient to supply the injectors and to build a pressure up to 600–1,000 p. s. i.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained. The present construction provides for a compact, trouble-proof and convenient arrangement for obtaining initial prime and for venting the supply line after a one-stroke injection operation thereafter.

As many changes could be made in the above constructions without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

We claim:

Lubricating apparatus for single-stroke pumping of lubricant through an injector supply line to a plurality of injectors, comprising a lubricant container consisting of a barrel having end heads, one of said heads having means at one side for attachment of the container in vertical position on a support with said one head up, said one head having an opening for filling the container with lubricant, a pump cylinder fixed in an opening in the other and lower head extending axially of the barrel and having a radial inlet port in the portion thereof within the barrel, a plunger reciprocable in the cylinder, being movable downward through a pressure stroke from a retracted position upward of the port, and crossing the port in making the pressure stroke, a nozzle fixed on the outer end of the pump cylinder outside the barrel and adapted for connection of a lubricant line for supplying lubricant under injector-operating pressure to injectors, the cylinder, at its outer end, presenting an outwardly directed valve seat, an outlet check valve slidable in said nozzle, a spring in said nozzle biasing said check valve toward said seat, said check valve having a vent port extending axially therethrough, an inwardly directed valve seat at the outer end of the vent port, a vent valve in said vent port biased toward said inwardly directed valve seat by a spring in said vent port, a push rod axially slidable in an opening in the upper head of the barrel and engaging the upper end of the plunger for driving the plunger through a pressure stroke, a spring in the barrel biasing the plunger in return direction, and means for operating the push rod comprising an elongate handle pin-connected at one end to the upper end of the push rod and articulated by a link to the upper end head and having a retracted position extending down alongside the container, said handle, upon being swung upward and away from the container, driving the push rod downward to drive the plunger through a pressure stroke, said vent valve opening to vent the nozzle to the barrel via the radial inlet port when the plunger returns to re-

tracted position after a pressure stroke, the relation of the spring in the nozzle and the spring in the vent port being such that the vent valve opens at a lower pressure than the check valve.

LUTWIN C. ROTTER.
VICTOR G. KLEIN.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,686,309	Zabriskie	Oct. 2, 1928
1,795,034	Murphy	Mar. 3, 1931
1,877,124	Cutts	Sept. 13, 1932
1,915,443	Pelouch	June 29, 1933
1,967,707	Davis	July 24, 1934
2,082,521	Schneider	June 1, 1937

FOREIGN PATENTS

Number	Country	Date
106,247	Germany	Nov. 8, 1899