

Sept. 28, 1926.

1,601,490

F. S. BARKS

LUBRICATOR

Filed May 26, 1924

4 Sheets-Sheet 1

Fig. 1.

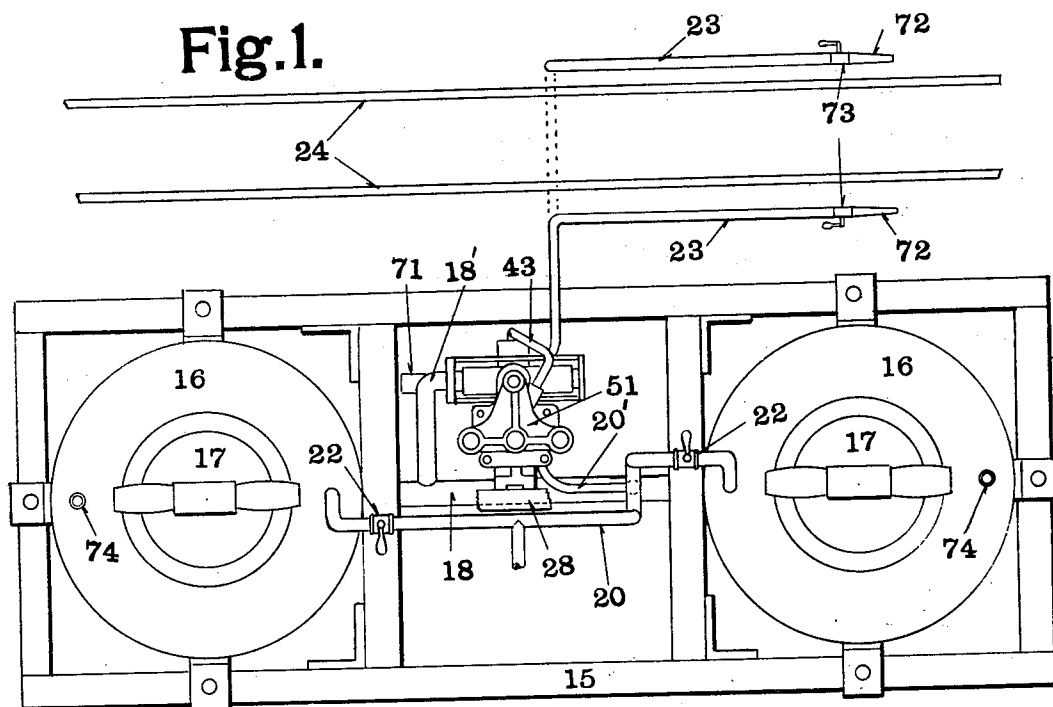
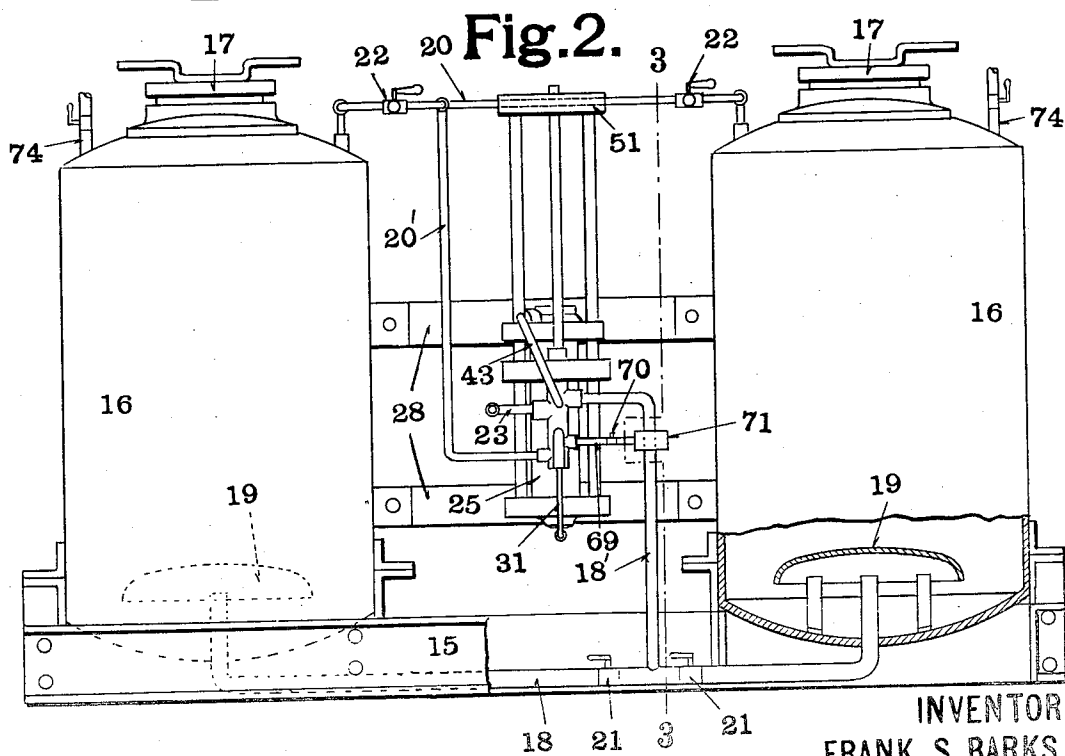


Fig. 2.



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Fig. 4.

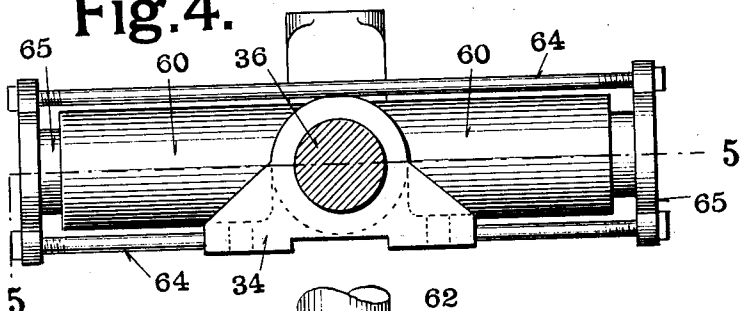


Fig. 5.

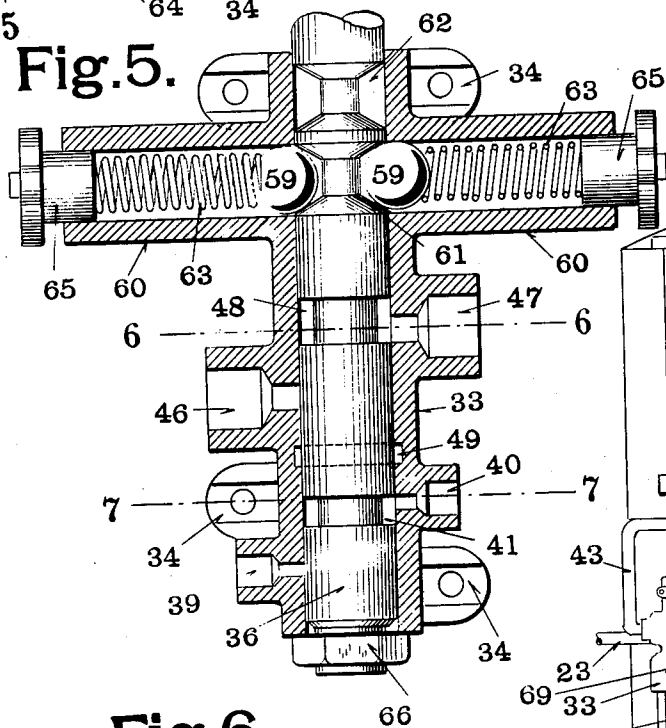


Fig. 3.

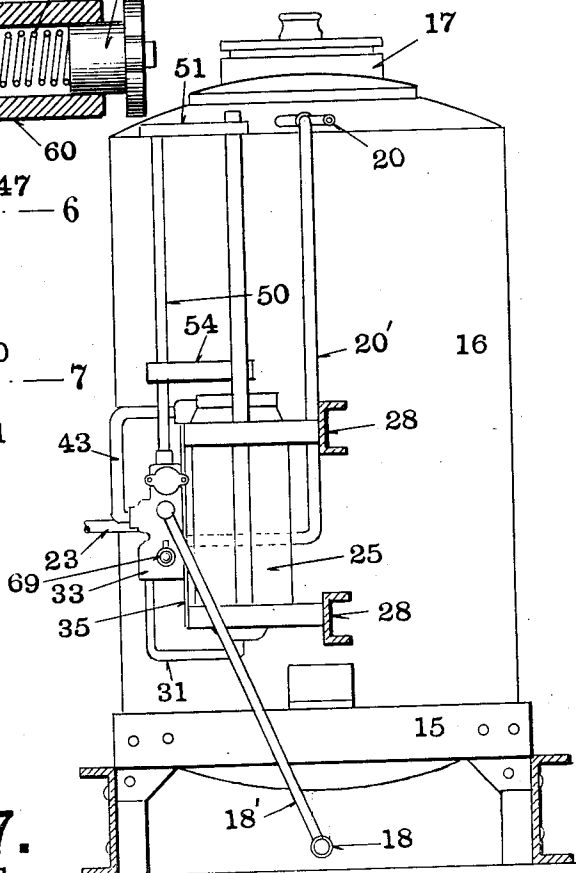


Fig. 6.

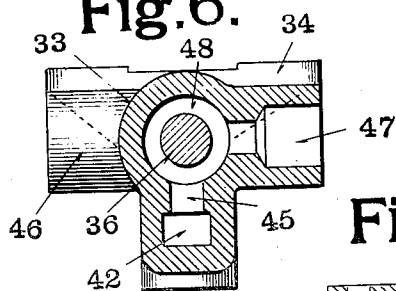
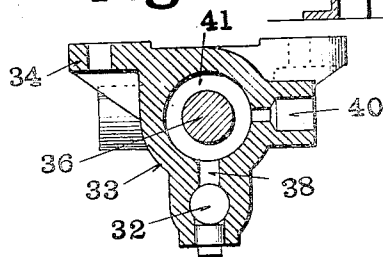


Fig. 7.



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Fig. 8.

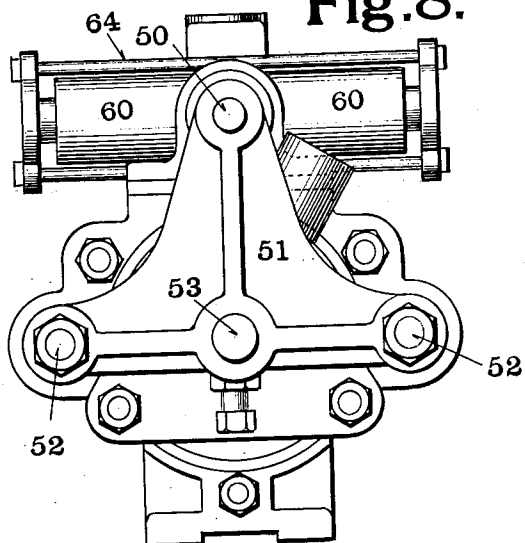


Fig. 9.

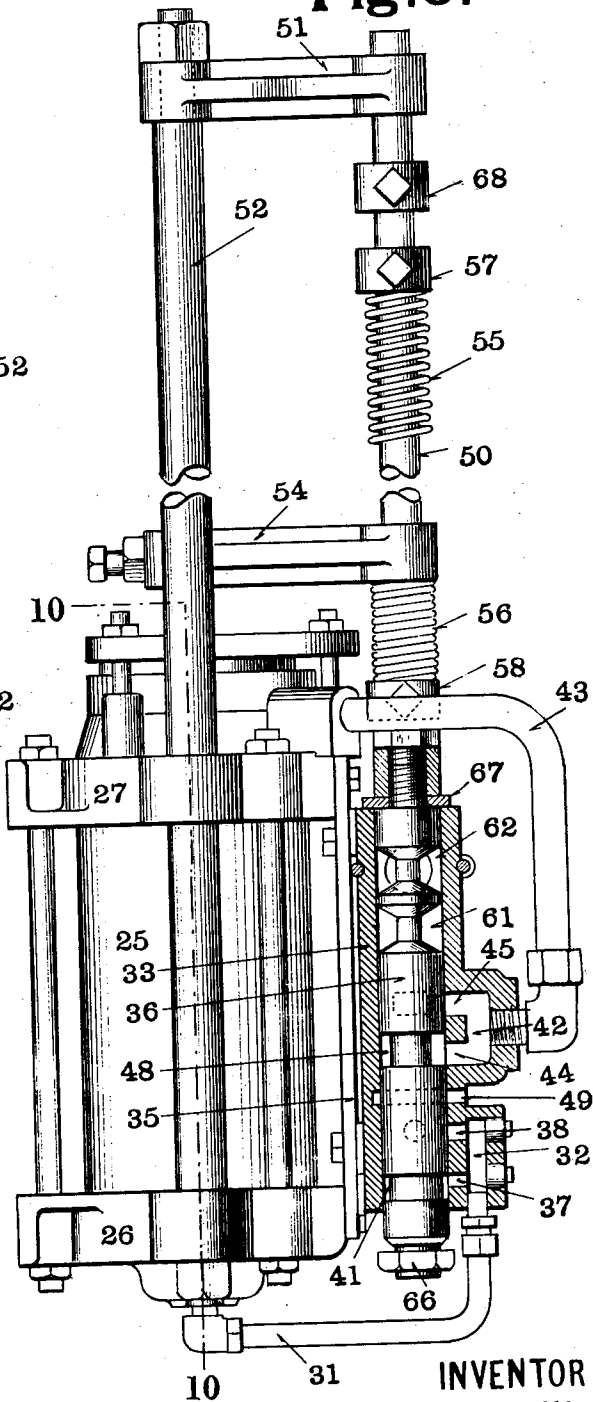
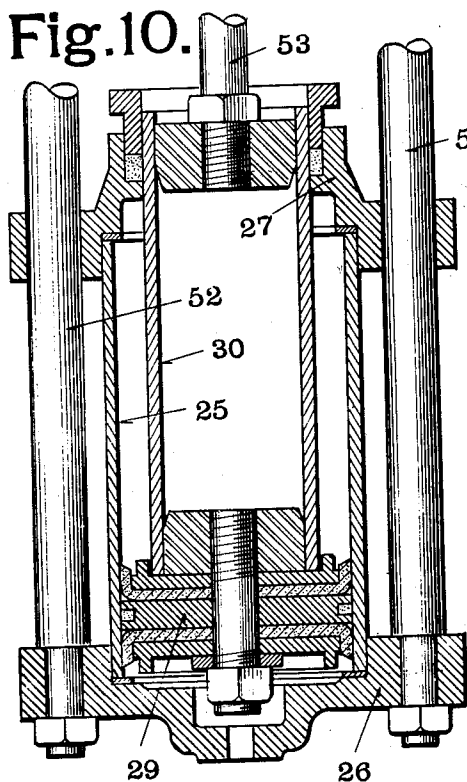


Fig. 10.



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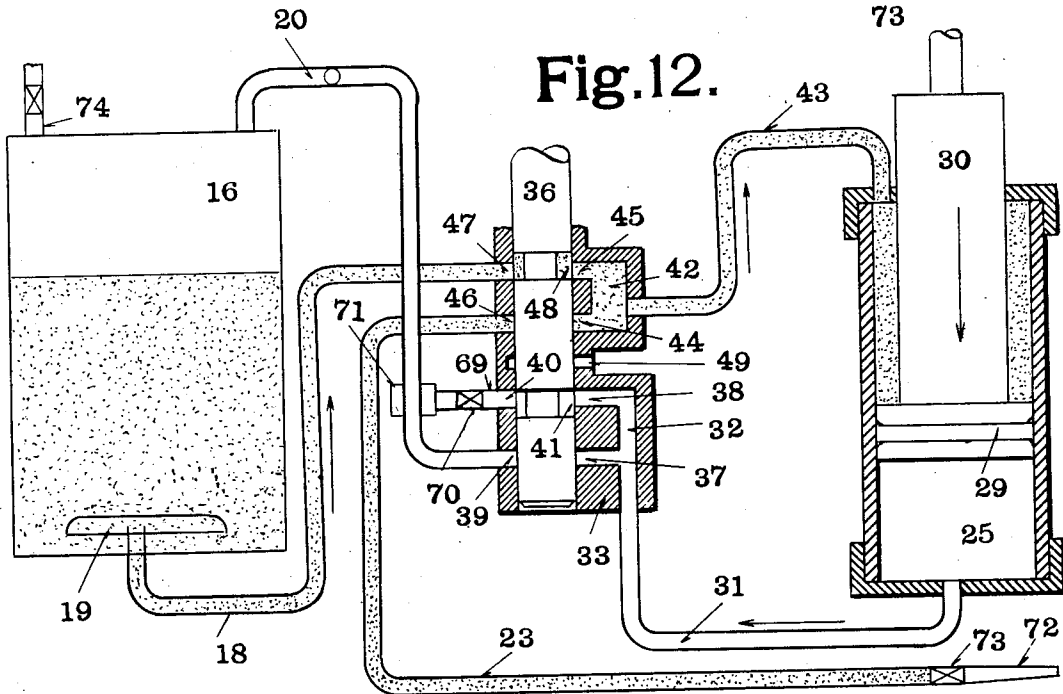
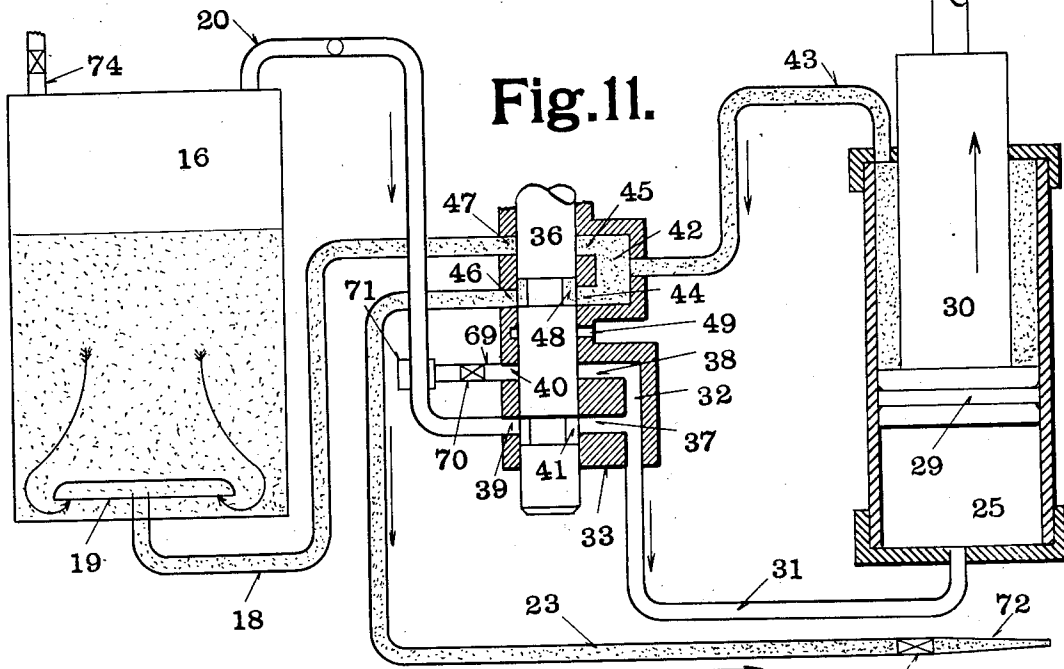
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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LUBRICATOR.

Application filed May 26, 1924. Serial No. 715,803.

My invention relates to a lubricator and is particularly adapted for the lubrication of mine cars where it is necessary, in order to secure the proper results, that a uniform quantity of stiff grease be delivered to each axle box. It may, however, be used for other purposes in which it is desirable to deliver measured quantities of lubricant, either liquid or semi-liquid, but is especially useful in connection with the latter as such semi-liquid lubricant cannot be successfully handled by the ordinary devices for dispensing liquids such as oils.

In the accompanying drawings, which illustrate one form of lubricator made in accordance with my invention, Figure 1 is a top plan view; Figure 2 is a side view, a part of the walls of one tank being broken away; Figure 3 is a section taken on the line 3—3 of Figure 2; Figure 4 is a top plan view of the automatic valve mechanism; Figure 5 is a section taken on the line 5—5 of Figure 4; Figure 6 is a section taken on the line 6—6 of Figure 5; Figure 7 is a section taken on the line 7—7 of Figure 5; Figure 8 is a top plan view of the pump mechanism; Figure 9 is a side view of the pump mechanism, the valve being shown in section; Figure 10 is a section taken on the line 10—10 of Figure 9; Figure 11 is a diagrammatic view; and Figure 12 is a view similar to Figure 11 but showing the valve in a different position.

Referring first to Figures 1, 2 and 3, 15 indicates a base upon which is mounted a pair of grease tanks 16 each provided with a removable cap 17 by means of which the tanks are filled. Projecting up through the bottom of each tank 16 is the vertical end of a discharge pipe 18. This end terminates some distance above the bottom of the tank and is covered by a baffle plate 19 preferably concave on its lower and convex on its upper face, as shown in Figure 2. Air or other fluid under pressure from a compressor or other source of supply not shown, is admitted to the tanks through supply pipe 20 and forces the grease out through the discharge pipe 18 under the control of the automatic pump mechanism hereinafter to be described. The object of the baffle 19 is to prevent the air from forcing a conical depression in the grease and thus gaining access to the discharge pipe before the tank is emptied. By the use of the baffle plate

access of air to the discharge pipe is prevented until the level of the grease has fallen to the lower edge of the baffle, after which a new charge of grease should be supplied to the tank. The pipe 18 is provided with a pair of valves 21 and the pipe 20 with a pair of valves 22 so that the tanks 16 may be alternately connected with the automatic pump mechanism situated between them, the purpose of using two tanks being to obviate the necessity of stopping the operation of the device while a tank is being filled. In Figure 1 I have shown two grease nozzles attached to the flexible discharge pipe 23, one arranged at each side of the track 24 upon which the mine cars are moved past the device to be lubricated. It will be understood, however, that when but a single pump mechanism is used, as shown in the drawings, only one nozzle should be used at a time otherwise the charge of grease might be divided and unequal quantities be delivered to the various axle boxes.

A cylinder 25, shown in detail in Figure 10, is carried between end castings 26 and 27 secured to cross bars 28 (Figure 3) forming part of the frame work. In the cylinder 25 is a piston 29 having a stem 30 of so large a diameter relative to the piston that the area of the lower face of the piston will be much greater than the effective area of the upper face. The lower end of the cylinder is connected by a pipe 31 with an air chamber 32 in a valve casing 33 secured by lugs 34 to a strap 35 carried by the castings 26 and 27. Casing 33 is provided with a longitudinal bore in which is a valve stem 36. Parts 37 and 38 extend from the air chamber 32 to the bore and, through these, the chamber is alternately placed in communication with a supply port 39 and an exhaust port 40 by means of an annular recess 41 in the valve stem. Formed in the valve casing above the air chamber is a grease chamber 42 communicating through a pipe 43 with the upper end of the cylinder 25. Ports 44 and 45 extend between the chamber 42 and the bore and thus enable the chamber to be put alternately into communication with discharge port 46 and supply port 47 through an annular groove 48 in the valve stem. Formed in the valve casing between the chambers 32 and 42 is a relief port 49 extending completely around the valve stem

to prevent any air which might leak around the valve stem from reaching the grease chamber or ports.

A rod 50 extends upwardly from the valve stem and is slidably mounted in a bracket 51 carried by uprights 52 supported by the castings 26 and 27. The bracket 51 also forms a bearing for an extension 53 of the piston stem 30. Adjustably mounted on the extension is an arm 54 (Figure 9) the rear end of which surrounds and slides upon the rod 50. Surrounding the rod 50 above and below the arm 54 are helical springs 55 and 56, respectively. Spring 55 is carried by an adjustable collar 57 and spring 56 by a similar collar 58. Movement is imparted to the valve stem by contact of the arm 54 with the springs 55 and 56. In order that the valve may be quick acting the stem is held against movement until the spring (54 or 55) is sufficiently compressed to throw the stem at once from one extreme of its movement to the other. This retardation of the stem is accomplished by two yielding members, preferably balls 59 (Figure 5), arranged at opposite sides of the stem in cylindrical extensions 60 and engaging with one or the other of two annular grooves 61 and 62 formed in the stem and having inclined walls. Helical springs 63 in the extensions 60 normally force the balls into one of the grooves and thus offer resistance to the longitudinal movement of the stem. The tension of the springs may be varied by threaded rods 64 extending between plugs 65 bearing on the outer ends of the springs. By this construction the pressure of the two balls is at all times equal so that no lateral strain is imparted to the stem. A nut 66 at the lower end of the stem and a washer 67 at the upper end serve as positive stops to prevent the valve from over-movement. If it is desired to vary the throw of the valve an adjustable collar 68 on the rod 50 may be used in place of the nut 66 to limit the upward movement.

The port 39 is connected with the pipe 20 by a branch 20' of the latter and the port 47 with the pipe 18 by a branch pipe 18'. Leading from the port 40 is a short air escape pipe 69 containing a valve 70 for regulating the escape of the air and thus the speed of operation of the device. This escaping air also controls or preferably directly actuates an audible signal such as the whistle 71 shown as attached to the end of the pipe. Terminating the flexible grease discharge pipe 23 is a nozzle 72 and a manually controlled valve 73 by means of which the automatic pump mechanism is controlled as will be hereinafter described. A valved relief pipe 74 in the top of each tank permits the pressure to be released from the tank before the lid is reopened for recharging.

The operation of my device is as follows: Assuming the parts to be in the position shown in the diagram Figure 11 with the valve 73 closed air pressure from the pipe 20 will be admitted through ports 39, 41 and 37 and pipe 31 to the lower end of the cylinder 25. This will tend to force the piston 29 upwardly, but as long as the valve 73 remains closed no movement of the piston can take place as there is no escape for the grease contained in the upper end of the cylinder. As soon, however, as the valve 73 is opened the grease will be forced out of the nozzle 72 passing through pipe 43, ports 44, 48 and 46, and pipe 23. As the piston travels upwardly the arm 54 (Figure 9) will engage the spring 55 and compress the same until the tension is sufficient to overcome the retarding effect of the balls 59 forced into the recess 62 by the springs 63. The relative tension of the springs should be so adjusted that this will not take place until the piston has substantially completed its stroke. When the retarding effect of the balls is overcome the valve stem 36 will be at once thrown to the position shown in Figure 12, cutting off the supply of grease from the pipe 23 and the pipe 18 placed in communication with the pipe 43 through ports 47, 48 and 45. At the same time the air supply will be cut off from the pipe 31 and this pipe placed in communication with the exhaust 69 through ports 38, 41 and 40 so that the air under pressure in the cylinder can escape to allow the piston to travel downwardly and thus supply the cylinder with a new charge of grease. The valve 70 regulates the escape of air and consequently the speed at which the piston travels downwardly and the escaping air blows the whistle 71 to inform the operator that the charge of grease has been delivered to the axle box and to warn him to close the valve 73 and thus prevent a second charge of grease from being delivered to the same axle box. The nozzle is now transferred to the next axle and the valve 73 again opened to start anew the cycle of operation above set forth.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a device of the class described, the combination of a tank containing lubricant, a pump cylinder and piston therein, a lubricant delivery conduit having a valve remote from the pump for controlling the discharge of lubricant from said pump, an exhaust passage, fluid pressure means for actuating the pump piston to discharge lubricant and for maintaining fluid pressure on the lubricant in the tank, and a valve mechanism adapted to connect one end of the pump cylinder alternately with the lubricant in the tank and with the delivery conduit and

the other end thereof alternately with the source of fluid pressure and with the exhaust passage, said mechanism being governed by the movement of the pump piston, whereby the operation of said pump is initiated by opening the lubricant delivery valve and automatically continues while said valve is open.

2. In a device of the class described, the combination with a tank containing lubricant, of means for supplying fluid under pressure to said tank, a pump cylinder, a

nozzle, an exhaust passage, and a valve mechanism adapted to connect one end of the pump cylinder alternately with the lubricant in the tank and with the nozzle and the other end thereof alternately with the operating fluid and with the exhaust passage, the effective piston area of the operating fluid end of the cylinder being substantially greater than that of the lubricant end.

In testimony whereof, I have hereunto set my hand this the 22 day of May, 1924.

FRANK S. BARKS.