Dec. 20, 1938. W. J. HALL 2,140,956

PUMP

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FIG. 2

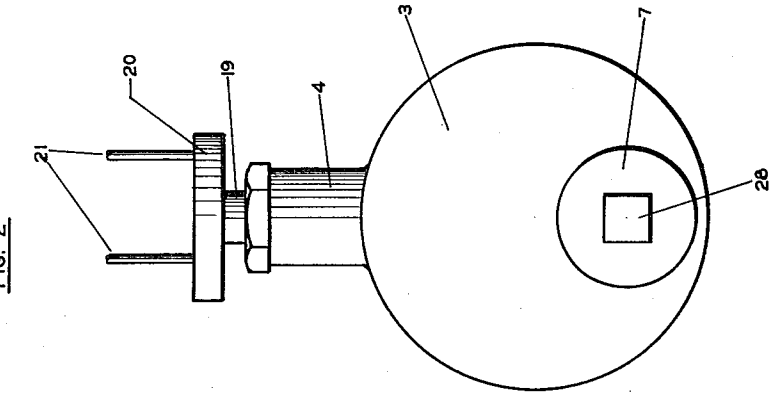
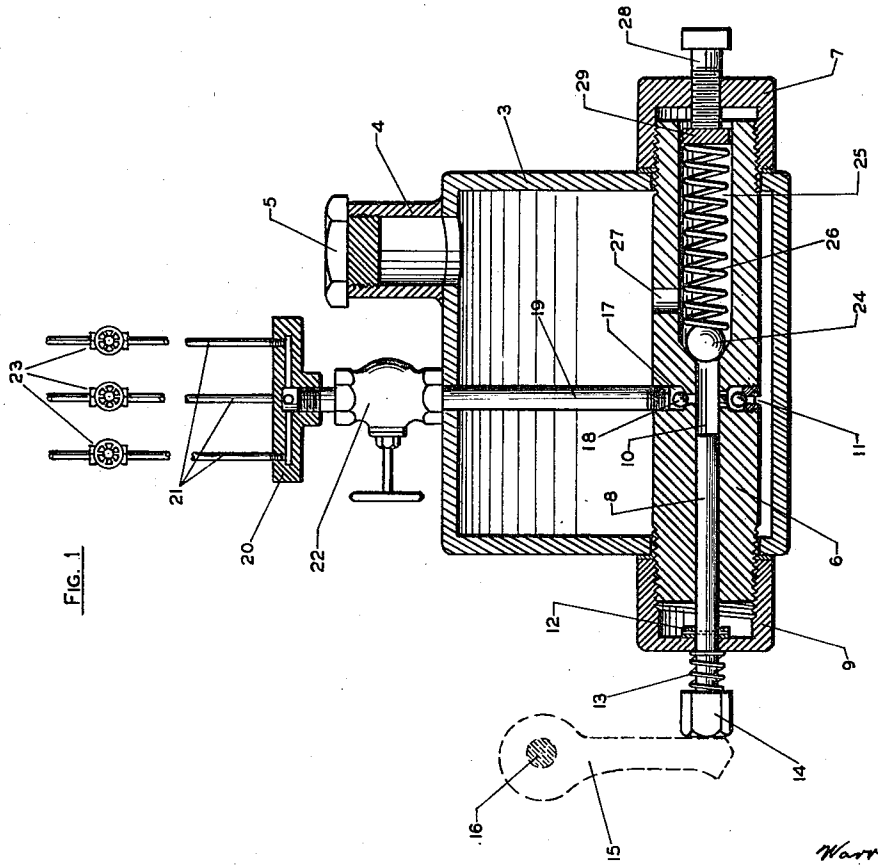


FIG. 1



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4 Claims. (Cl. 184—27)

This invention relates to apparatus for injecting liquids or fluid substances into engines, pipes or containers where other liquids, gases or substances are found under high pressure, preferred uses being the lubrication of steam engines by injecting oil into the steam line thereof at desired places, as well as the injection of treating chemicals or fluid into flowing or pumping oil wells, so that water and other waste will be separated from the oil. These are but two uses of the many for which this apparatus may be used, and while the description hereinafter, insofar as its objects, construction and operation are concerned, will be directed to uses as a lubricator pump for steam engines, it is to be understood that the apparatus is not necessarily limited to this specific use.

An object of the invention is the provision of an oil pump for steam or pressure engines capable of force feeding oil into the same and against any pressure of steam. It is a further object to provide a single action pump to supplant the double pumps heretofore used in the accomplishment of the same purposes, the advantage of which is at once apparent.

A further object is to provide a lubricator pump of such character and construction as to obviate damage or impairment should the pump be started with the outlet valve closed. A further object is to provide a lubricator which is constructed and functions in such manner as to obviate draining heretofore found necessary with other devices for similar purposes.

A still further object is to provide a lubricator pump of extremely simple construction, composed of but few simple, easily made and readily assembled parts, which parts are so constructed and function in such manner as to minimize the opportunity for wear or derangement, which may be readily adjusted when required without the exercise of special skill or knowledge, which may be located at any place upon or about the engine so as to be operated from a movable part thereof, and which will prove thoroughly practical and efficient in carrying out its functions.

With these objects in view, together with others which will appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of parts, all as will be described more fully hereinafter illustrated in the drawing, and particularly pointed out in the claims.

In the drawing:

Figure 1 is a sectional view taken longitudinally through a force feed pump embodying the invention, and

Figure 2 is an end view of the pump.

Referring now more particularly to the drawing, 3 indicates the body of a tank, reservoir or container for the lubricating fluid; the said reservoir having a filling neck 4 closed by a suitable cap 5.

The pump mechanism for delivering the lubricant from the reservoir to the prescribed points for lubrication includes a cylinder 6 preferably located within and at the lower part of the reservoir 3. This cylinder is made of suitable metal and is of a length slightly greater than the breadth of the reservoir, so that its ends project beyond the sides of the latter. The protruding ends of the cylinder are exteriorly threaded as shown, and are closed by caps 7 and 9, respectively. These caps thread upon the cylinder and bear against the walls of the reservoir, packing gaskets being interposed between the caps and the walls to obviate leakage.

The cylinder is provided with a central bore 10 extending inwardly from one end thereof and within which a piston 8 is slidably arranged. Clearance is provided between the head end of the piston and one end of the bore to provide a clearance space or chamber to which lubricant is admitted through the checked valve represented at 11. This valve may take any desired form, but in the present instance is shown as a ball valve to open when the piston moves outwardly but to seat and seal the inlet when the piston moves inwardly of the cylinder. The outer end of the piston projects through the cap 9 with a suitable packing gland or washer 12 to prevent leakage, and is normally maintained in projected position by an expansion spring 13 bearing at one end against the cap and at its opposite end against the adjustable head or tappet member 14. The piston may be moved inwardly against the tension of the said spring by a movable arm, cam or like part 15 operated by a movable part of the engine; the shaft 16 representing such part in the present instance.

The pressure chamber portion of the bore 10 also has communicating with it a discharge port 17 within which a check valve 18 is located. This port communicates with a distributor pipe 19 leading to the exterior of the reservoir. This pipe connects with a distributor head 20 arranged in any desirable location, and delivery pipes 21 lead from the head to the points of the engine for lubrication. If desired a main control valve 22 is arranged in the pipe 19, or each

of the delivery pipes 21 may be equipped with individual control valves 23.

The head of the pressure chamber portion of the bore 10 is normally closed by a valve 24. This valve, in the present instance, includes the ball as shown arranged within the bore 25 extending inwardly from the opposite end of the cylinder, and a spring 26 in said bore normally holds the ball 24 seated in the end of the pressure chamber. The bore 25 has a port 27 communicating with the interior of the reservoir. The tension of spring 26 may be accurately controlled by an adjusting screw 28 threaded through the adjacent cap 7; a plate 29 being interposed between the end of the screw and the spring. It will be noted that the spring 26 is relatively heavy, in order that high pressure against the ball 24 may be exerted if required.

In operation, the tank or reservoir containing lubricant, with the parts assembled in the above manner, is located upon or near the engine in any desired or convenient place and adjacent to the operating arm, cam or lever 15. Upon starting the motor the arm 15 forces the piston inwardly, while retraction of the arm allows the piston to move outwardly under impulse of spring 13. Adjustments for the throw of this piston may be accurately governed by rotating the tappet member 14. As the piston reciprocates, pressure will be built up in chamber portion of the bore 10. Outward movement of the piston causes valve 11 to open drawing lubricant into the chamber, while movement of the piston in the opposite direction causes valve 11 to close and outlet valve 18 to open whereupon lubricant is forced into the delivery pipe 19. As this pressure builds up the lubricant passes to the head 20, from whence it is distributed through the various pipes 21 and to its ultimate destination. Regulation of the flow through these pipes is accurately controlled by manipulation of valves 23. As the operation of the pump is continuous it is obvious that pressure in the delivery line would become excessive were it not for the pressure relief valve 24. The adjustment of this valve is such that upon a prescribed pressure being reached the valve 24 opens against the pressure of spring 26, whereupon the lubricant under pressure may pass back into the reservoir through the bore 25 and port 27.

The construction of this single acting pump is such as to be economical in manufacture, installation and maintenance, with an assurance at all times of proper operation. It is obvious that after once being properly installed it will require little attention or adjustment, and any required adjustments may be easily and quickly made without the necessity of special skill or implements.

I claim:

1. In a pump, a reservoir, a cylinder in the reservoir, said cylinder having a bore therein, a piston slidable in said bore and extending through one end of said cylinder exteriorly of said reservoir, a channel in the opposite end of said cylinder communicating with said bore, a spring-biassed valve means in said channel to close said bore, means at the adjacent end of said cylinder to regulate the tension of said spring from a point externally of said reservoir, intake and relief valves in said cylinder connecting with said bore, said valves opening and closing alternately by impulse of said piston and upon prescribed movements of the latter, a distributor pipe communicating with said discharge valve, a yieldable means for moving said piston in one direction, and means for moving the piston against the pressure of said yieldable means.

2. In a pump, a reservoir, a cylinder in said reservoir with its ends projecting beyond the latter, caps closing the ends of said cylinder and maintaining the same in said reservoir, said cylinder having a bore, a piston slidable in said bore and extending through one of said caps, a channel in the opposite end of said cylinder communicating with said bore, a ball in said channel to close said bore, a spring in said channel bearing against said ball, a screw member in the adjacent cap to regulate the tension of said spring, intake and relief valves in said cylinder connecting with said bore, said valves opening and closing alternately by impulse of said piston and upon prescribed movements of the latter, a distributor pipe communicating with said discharge valve, a spring for moving said piston in one direction, and means for moving the piston against the pressure of said spring.

3. In a pump of the character described, and as set forth in claim 1 wherein the means for moving said piston comprises a tappet operatively connected with one end of the piston to be engaged by an operating member to move the piston in one direction, means normally urging the piston in the opposite direction, and said tappet being adjustable whereby the movement of the piston in one direction may be regulated.

4. In a pump of the character described, and as set forth in claim 1 wherein the means for sliding the piston includes adjustable means for varying the throw of the piston in one direction of its movement.

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