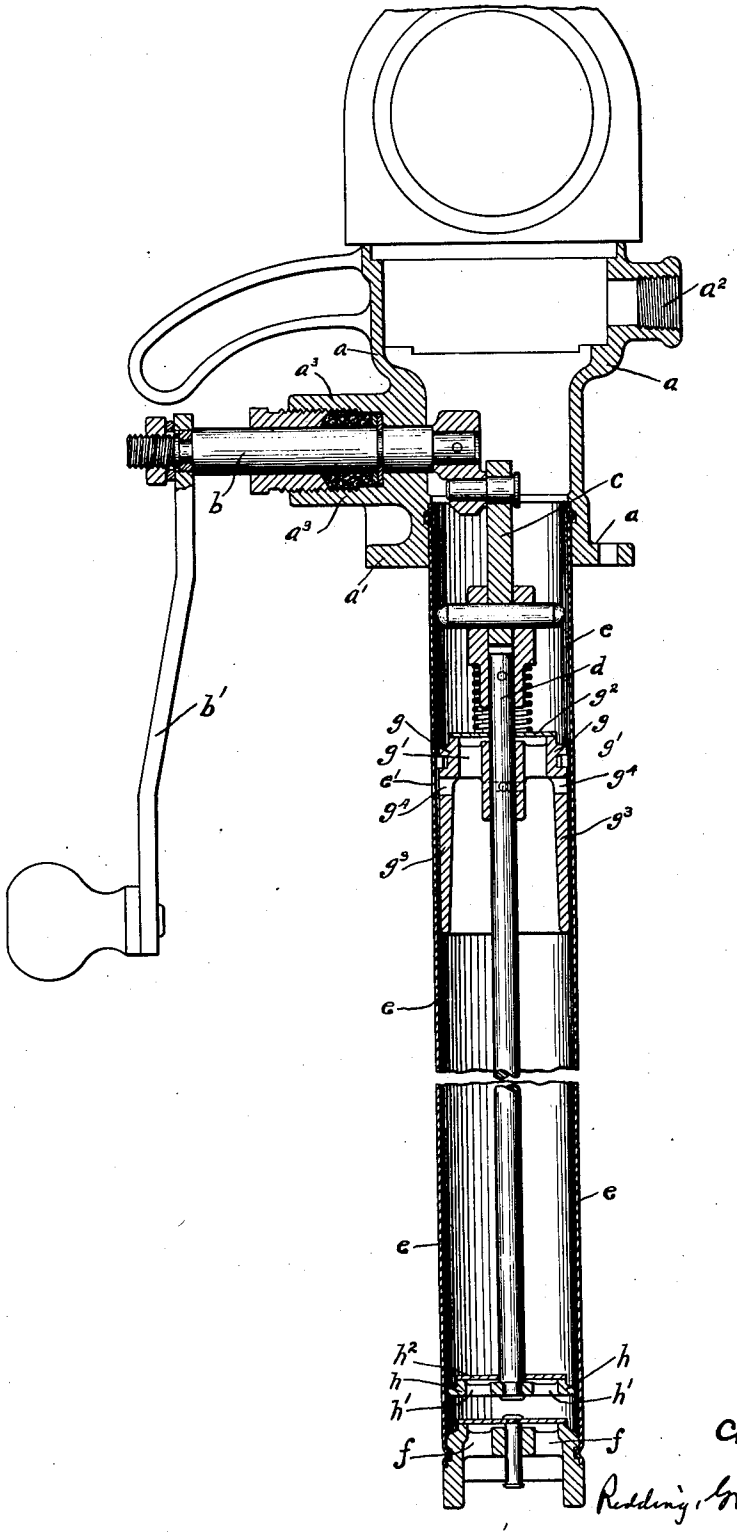
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LIQUID PUMP

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LIQUID PUMP

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This invention relates to the construction of pumps adapted for the delivery under pressure of relatively heavy grease such as that used for the transmissions and differentials of automobiles and it has for its particular purpose to provide a pump which will become inoperative when air is present in the liquid being measured. In this connection the present invention is applicable to pumps for use with any liquid regardless of its viscosity.

The invention will be more fully explained hereinafter with reference to the accompanying drawing, the single figure of which is a view in vertical sectional elevation of a pump which is constructed in accordance with the invention.

The construction illustrated in the drawing comprises a pump head a which may be formed with a flange, as at a^1, by which the pump may be secured upon the top of the grease container from which the supply is to be drawn. It may also be provided with an outlet a^2 and with a bearing a^3 for a crank shaft b equipped with an operating handle b^1, the crank being connected by a pitman c with the pump plunger or piston rod d. The cylinder e, secured in any convenient manner to the pump head a is extended into the grease container (not shown) to the desired depth and is provided at its lower end with an intake valve f. Secured to the plunger or piston rod d, near its upper end, is a piston g provided with apertures g^1 and a spring-pressed lift valve g^2. For a reason to be explained the piston g is formed with an extended skirt g^3 which has, just below the piston head, one or more ports g^4, one of which, in the lowest position of the piston, as represented in the drawing, registers with a port e^1 in the wall of the cylinder e, the port e^1 being closed by the skirt g^3 of the piston immediately after the upward movement of the piston begins. The plunger or piston rod d may also have at its lower end a piston h provided with apertures h^1 and a lift valve h^2.

The upward motion of the piston g draws in liquid or air or both through the ports f. On the downward stroke of the piston g the liquid or the air or the mixture is put under compression by the spring loaded valve g^2. Since liquids are incompressible, the valve g^2 will be forced open provided that the cylinder e, beneath the piston g, is completely full of liquid. If, however, the cylinder e is full of air below the piston f or if there is a mixture of air and liquid, the air content will be compressed and the valve g^2 will not open. At the bottom of the stroke, the port e^1 will be opened. If the cylinder e is full of air or if there is any air mixed with the liquid, this air, which has been compressed by the downward motion of the piston, will expand, blowing air and liquid out of the port e^1. Thus, only liquid will flow through the valve g^2 and the presence of a small quantity of air under the piston will render the pump inoperative. This action will take place even though the liquid is viscous and the air so intimately mixed therewith that it will not rise in the cylinder to the underside of the piston g.

At the top of the pump is a liquid meter and in the application shown, the air eliminating device is used to insure the delivery of air-free-liquid only to the meter. The device ceases to pump liquid or air through the meter as soon as any appreciable quantity of air is present in the cylinder e. This insures correct measurement of the delivered liquid. The meter is not an essential part of the device, however, as this pump may also be used where it is desired to deliver an air-free-stream of liquid.

In view of the fact that air cannot be separated from viscous or semi-viscous liquid by settling out but rather remains therein almost indefinitely, it will be seen that the foregoing mechanism is particularly well suited for use in connection with the pumping and metering of viscous and semiviscous liquids.

It will be understood that various changes in details of construction and arrangement may be made to suit different conditions of use or the convenience of the manufacturer and, except as pointed out in the accompanying claims, the invention is not restricted to

the particular construction shown and described herein.

I claim as my invention:

1. In a liquid pump, a cylinder provided with a port in its wall, an intake valve, a piston provided with an aperture and a lift valve and having an extended skirt with a port for registration with the port of the cylinder wall, and means to reciprocate the piston.

2. In a liquid pump, a pump head, a cylinder secured to the pump head and provided with a port in its wall, an intake valve, a piston valve provided with an aperture and a lift valve and having an extended skirt with a port for registration with the port of the cylinder wall, a piston rod to which the piston is connected, a crank shaft mounted on the pump head, and a pitman connecting the crank and the piston rod.

3. In a liquid pump, a cylinder provided with a port in its wall, an intake valve, a piston rod, a piston at the lower end of the piston rod and provided with an aperture and a lift valve, a second piston secured to the piston rod near its upper end and provided with an aperture and a lift valve and having an extended skirt with a port for registration with the port of the cylinder wall, and means to reciprocate the piston rod.

This specification signed this 20 day of July, A. D. 1932.

CHARLES S. HAZARD.