April 22, 1930. L. M. PERSONS 1,755,611

PUMP

Filed March 3, 1926

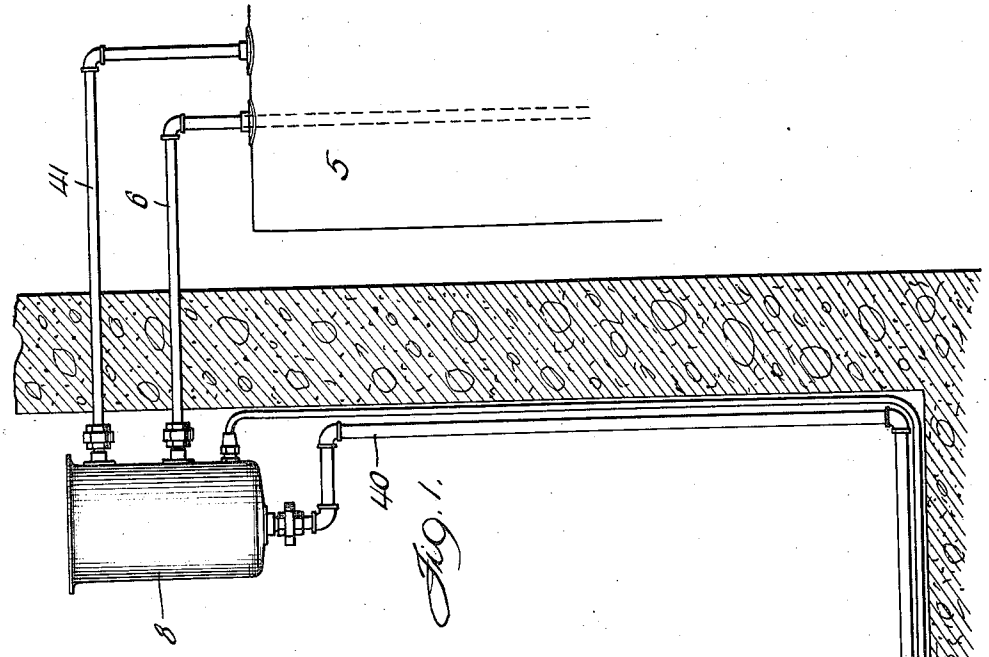

Fig. 1.

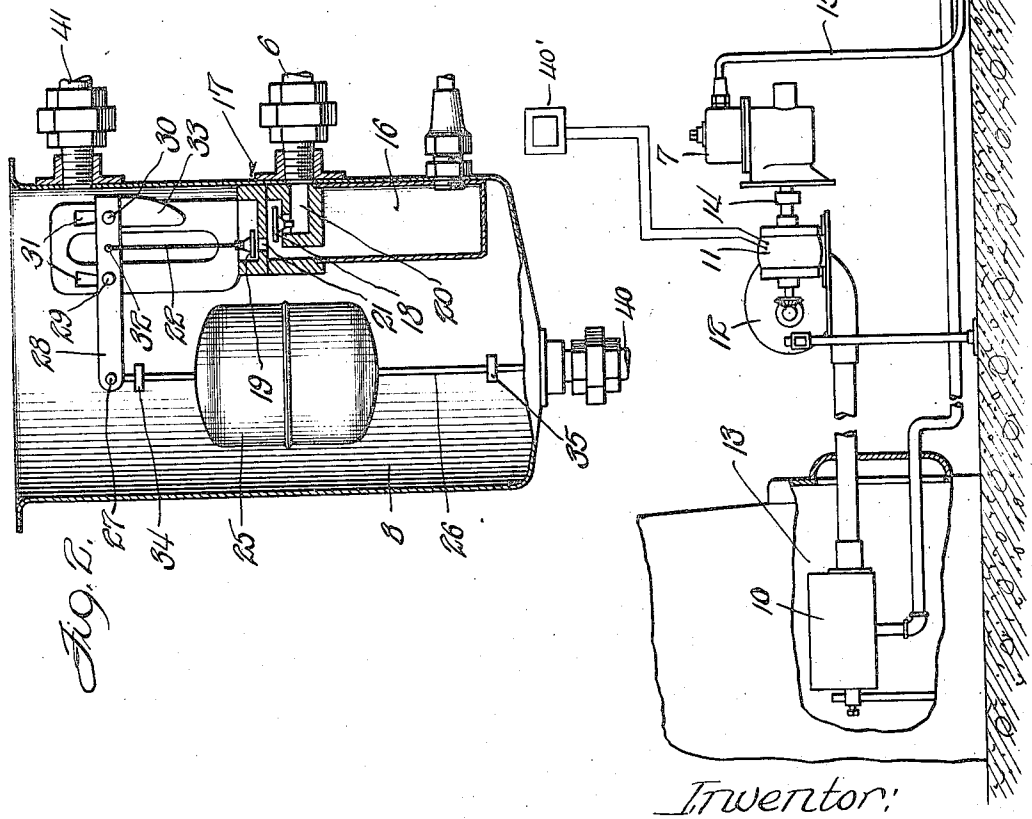

Fig. 2.

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UNITED STATES PATENT OFFICE

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PUMP

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My invention relates to pumping apparatus for fluid supply systems.

An object of my invention is to provide a pumping apparatus having an improved type of control capable of use with practically any type of pulsating pump for automatically controlling the pumping of any liquid into a supply tank or receptacle.

In fluid supply systems, particularly those employed to feed liquid fuel, say, to oil burners used for the purpose of heating homes or the like, the oil is pumped from a storage tank, such as may be installed on the outside of the building, to a supply tank located in the building or adjacent the burner, and from which the oil flows to the burner. It is obvious that some means of automatic operation is desirable for the pumping apparatus, so that a constant supply will be available for feeding to the burner from the supply tank. Considerable attention has been given to such an automatic control because there is a possibility that it will function to pump the entire contents from the storage tank into the building in the event a leak occurred, or in the event a siphoning action took place after the system has stopped. On the other hand, oil burning apparatus is expensive and there is a tendency to overlook the installation of automatic pumping apparatus, particularly if it is also expensive.

One of the objects of my invention is to provide an improved form of control, which may be associated with any type of pump in a fluid supply system, and which embodies all the elements of safety, as well as protects against a siphonic action of the fluid when the pump is stopped. Besides affording greater safety and protection, the control eliminates in an oil burning system the need for a separate motor for driving the pump. The pump may be located at the burner and driven by the motor thereof, while the control may be located anywhere in the system and connected through a liquid piston with the pump.

A more specific object of the invention is to associate with the outlet valve of the suction line, between the storage tank and supply tank, a float adapted to open the valve when in its upper and lower positions and to close the valve when in its intermediate position.

In order to apprise those skilled in the art how to construct and practice my invention, I shall now describe a preferred embodiment thereof in connection with the accompanying drawings forming a part hereof.

In the drawings:

Figure 1 is a diagrammatic view of a fluid supply system employing an improved automatic control embodying my invention; and

Fig. 2 is an enlarged detail vertical sectional view through the supply tank in which the control is located.

The drawings illustrate my invention embodied in an oil burning system in which the pumping apparatus pumps oil from a storage tank into a supply tank for the purpose of feeding the oil to the burner.

It will be obvious to those skilled in the art that my invention is capable of embodiment in practically any type of fluid supply system where safe, economical and automatic operation is desirable.

In the apparatus shown in the drawings, oil or liquid in the storage tank 5, or other suitable source of supply, is drawn through a suction pipe 6, constituting a suction line, by means of a pump 7 and is discharged into a supply tank or receptacle 8 from which receptacle the oil is fed to burner 10. Burner 10 is preferably of the type employing a motor 11 for driving a blower 12, which blower serves to feed the liquid fuel in an atomized condition to a fire pot 13.

Pump 7 may be of any desirable type and may be connected by coupling 14 to motor 11. I prefer, however, to employ a pump of the pulsating type.

Pump 7 and receptacle 8 are connected by means of a small tube 15 which transmits power from the pump in the form of an extended liquid piston to a closed chamber 16 preferably located in receptacle 8. Chamber 16 is closed at its upper end by means of a valve head 17 which is provided with inlet and outlet valves 18 and 19.

Suction pipe 6 enters tank 8 so as to communicate with the inlet passage 20 of valve

head 17, over which inlet passage 20, the inlet valve 18 is adapted to be held, so as to alternately open and close this passage with chamber 16 on the pulsating strokes of the liquid piston. Outlet valve 19 operates to open and close the outlet port 21 during the pulsating action of the liquid piston so as to discharge the liquid drawn through pipe 6 on the suction stroke of the pump 7. Outlet valve 19 is freely suspended from a link 22, which allows the outlet valve to normally respond to the alternate pulsations of the liquid piston.

A triple acting float 25 may be located in receptacle 8 to control the position of outlet valve 19, whereby the flow of fluid from suction pipe 6 may be controlled so as to maintain a predetermined level in tank 8. Float 25 is adapted to rise and fall on a stem 26 pivotally suspended at 27 to the free end of a lever 28. Lever 28 is loosely pivoted at the points 29 and 30 in slots 31, and also pivoted at 32 to the upper end of link 22. A weight 33 is furnished at the inner end of lever 28. End stops 34 and 35 are furnished on the opposite ends of float stem 26.

In the normal operation of the pumping apparatus the automatic control serves to permit oil to be pumped from storage tank 5 into receptacle 8 until a predetermined high level is obtained, whereupon float 25 rises and engages stop 34. Engagement of stop 34 by float 25 raises lever 28 about its pivotal mounting 30, thereby lifting outlet valve 19 from its seat and destroying the suction pressure created within chamber 16 by the alternate pulsations of the liquid piston extending through pipe 15 from pump 7. As oil is supplied through pipe 40 to burner 10, the float rides downwardly on stem 26. If the burner is still operating, the pump 7 idles until float 25 drops to its intermediate position. The valve is then seated and suction pressure is re-established in chamber 16. Pump 7, then, functions again to draw oil from storage tank 5 and supply it to receptacle 8. At this point, it will be obvious that the house thermostat 40′ automatically controls the circuit to motor 11. Hence, motor 11 will continue to operate to drive both the blower and pump 7 while the float is in its upper position to unseat outlet valve 19 so as to break the suction pressure and temporarily discontinue the flow from storage tank 5 into the receptacle 8 but although the pump is driven at this time, it becomes effective to pump liquid only when the outlet valve 19 is again seated by the falling of the float to intermediate position.

As long as float 25 remains in its intermediate position, oil will flow from storage tank 5 into receptacle 8. Obviously if pipe 40 is ruptured or springs a leak while the burner is operating and the pump 7 is being driven by motor 11, oil will be emptied from tank 8 at a greater rate than the normal flow and thereby cause float 25 to drop to its lower position. The weight of float 25 against stop 35 moves stem 26 downwardly. This action pivots lever 28 about its other pivot point 29 and raises valve 19 from its seat. Suction pressure created by pump 7 in chamber 16 through the liquid piston in pipe 15 is immediately destroyed. Flow of oil through pipe 6 also ceases and no more oil is delivered to tank 8 until the pipe 40 is repaired, although the burner may be operating and the pump 7 may be driven by motor 11.

By locating tank 8 at a point above storage tank 5, it is impossible for a siphonic action to occur when the system is shut down. In the event that valve 19 tends to stick to its seat and allow a continued pumping action of the fluid from storage tank 5 into receptacle 8, an overflow pipe 41 is furnished to drain back the excess oil into storage pipe 5.

From the foregoing description, it will be observed that a novel form of automatic control, embodying the essential features of safety required in oil burning apparatus, is disclosed which is simple and inexpensive, and which may be so disconnected from the pump as to permit the pump to be driven by the burner motor and the control to be placed anywhere between the burner and the storage tank. The mechanism disclosed, while automatic in its operation, prevents pumping of the contents of storage tank 5 into the building should a leak occur in the pipe 40.

Other modifications, arrangements and embodiments of the present invention may be obtained without departing from the spirit and scope of the invention.

I claim:

1. In a fluid supply system, the combination of a source of supply, a receptacle, a pump for pumping fluid from said source of supply into said receptacle, and a control associated therewith comprising a closed chamber communicating with said source of supply and said pump, and an outlet valve for said chamber adapted to be held in open position when the liquid in said receptacle reaches predetermined high and low levels.

2. In a fluid supply system, the combination of a source of supply, a receptacle, a pump for pumping fluid from said source of supply into said receptacle, a fluid piston extending between said pump and said receptacle whereby the pulsations of said pump function to pump fluid from said source of supply, a valve governing the admission of the fluid into said receptacle, and means for actuating said valve to stop the pumping of fluid to said receptacle when the rate of discharge is greater than the rate at which the fluid is supplied to said receptacle.

3. In a fluid supply system, the combination of a source of supply, a receptacle, a pump for pumping fluid from said source

of supply into said receptacle, a fluid piston extending between said pump and said receptacle whereby the pulsations of said pump function to pump fluid from said source of supply, a valve governing the admission of the fluid into said receptacle, and a float disposed in said receptacle adapted to hold said valve in open position when the rate of discharge is greater than the rate at which the fluid is supplied to the receptacle.

4. In a fluid supply system, the combination of a source of supply, a receptacle located at a point substantially above the source of supply; a pump, a liquid piston extending from said pump to said receptacle, and mechanism for controlling said liquid piston whereby to discontinue the pumping of fluid into said receptacle when the fluid reaches predetermined high or low levels.

5. In a fluid supply system, the combination of a source of supply, a receptacle, a pump, a liquid piston extending from said pump to said receptacle, and float actuated means adapted to release the suction pressure of said liquid piston when the liquid in said receptacle reaches an upper level, to establish the suction pressure when the liquid reaches an intermediate level, and to release the suction pressure when the liquid reaches a lower level.

6. The combination of a float, a valve adapted to be operated by said float, and a pivotal connection between said float and said valve causing said float to unseat said valve when the float is in upper and lower positions.

7. The combination of a float, a valve adapted to be operated by said float, and a connection between said float and said valve so arranged that said float will unseat said valve when the float is in upper and lower positions.

8. The combination of a float, a valve adapted to be operated by said float, and a connection between said float and said valve so arranged that said float will operate said valve when the float is in its upper and lower positions.

In witness whereof, I have hereunto subscribed my name.

LAWRENCE M. PERSONS.