L. B. DE CAMP.

AIR COMPRESSING APPARATUS.

APPLICATION FILED JAN. 7, 1907.

971,175. Patented Sept. 27, 1910.

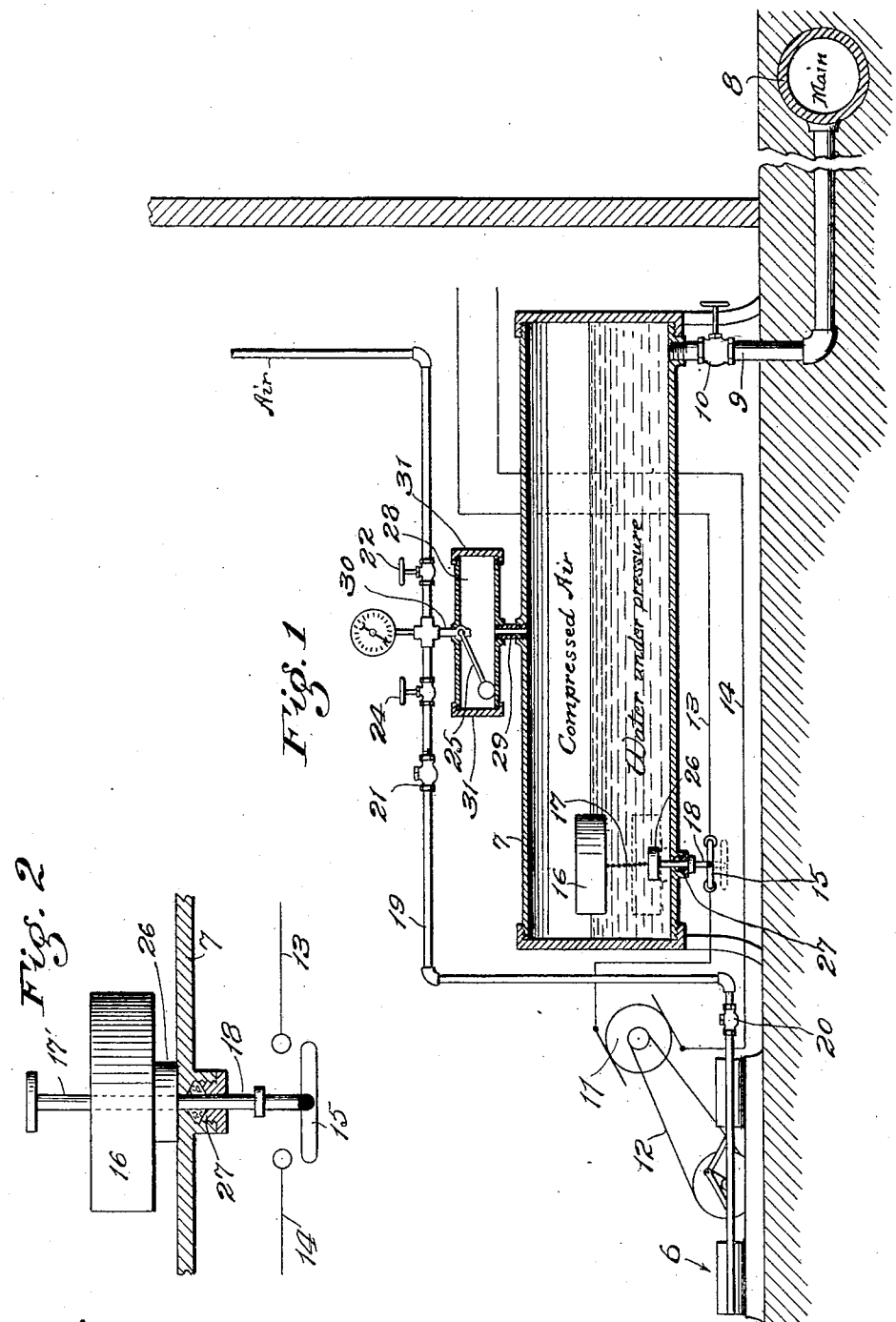

Fig. 1

Fig. 2

Witnesses
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UNITED STATES PATENT OFFICE.

LYMAN B. DE CAMP, OF BERKELEY, CALIFORNIA.

AIR-COMPRESSING APPARATUS.

971,175. Specification of Letters Patent. Patented Sept. 27, 1910.

Application filed January 7, 1907. Serial No. 351,264.

To all whom it may concern:

Be it known that I, LYMAN B. DE CAMP, a citizen of the United States, residing at Berkeley, in the county of Alameda and State of California, have invented new and useful Air-Compressing Apparatus, of which the following is a specification.

This invention relates to means for supplying air pressure in apparatus designed for burning for domestic and other uses, light distillates and other oils.

In the satisfactory burning of light distillate oils for domestic use it is necessary that some means be provided whereby the oil may be subjected to a uniform fluid pressure, and various means have been devised for applying fluid pressure for this purpose. Where a steam boiler is available such pressure has been supplied by connecting the burner with such boiler, the steam therefrom being used to vaporize the oil. Air under pressure has also been used for such purpose.

It is one of the objects of this invention to provide means for supplying to burners oils that require to be vaporized or atomized at the burner in order to effect complete combustion in an economical and satisfactory manner and to so construct said means that they, when installed, will make available to the cook or other attendant a reliable, constant, unvarying fluid pressure for acting upon the oil to effect complete combustion.

It is an object of this invention to provide such pressure by means in which the liability of getting out of order is reduced to a minimum, and this I accomplish by connecting a shallow compressed air tank with a source of high hydraulic pressure, and providing a motor of sufficient power to force the air into such tank against said high pressure, so that the operation of the motor may be at comparatively long intervals of time, and the variation of pressure in the compressed air tank will be negligible owing to the slight rise and fall of the water in such tank, which rise and fall is made to operate to turn on and off the power from the motor in any well-known way.

The accompanying drawings illustrate the invention.

Figure 1 is a fragmentary view partly in section, showing an air-compressing apparatus embodying my invention. Fig. 2 is an enlarged detail of the power-controlling means shown in Fig. 1. A different form of connection 17′ is shown.

6 is an air compressor.

7 is an air pressure tank connected with the main 8 of a high pressure water system by means of a pipe 9 controlled by valve 10.

11 is a motor connected by belt 12 to drive the air compressor 6 and connected with the source of power indicated by conductors 13, 14. Power-controlling means comprising a switch 15 is provided to turn the power on and off the motor.

16 is a float in the air pressure tank 7 connected loosely by connection 17 and rod 18 with switch 15 to operate the same, to turn on and off the power as the water rises and falls respectively in the air tank.

19 is an air pipe connecting the air compressor 6, the air pressure tank 7 and the apparatus for receiving and using the air.

20 and 21 designate two check valves between the air compressor 6 and the compressed air tank 7 to prevent back flow of air pressure and to insure satisfactory operation.

22 designates a primary air controlling valve between the compressed air tank 7 and the air receiver by which the flow of air to the burner may be limited and regulated for said operation with a determined pressure which will be afforded by the practically steady pressure of the water main.

24 is a cut-off valve between the compressed air tank 7 and the check-valve 21 to maintain the pressure of air in case of disconnections for repairs between said tank and the air compressor.

25 is a ball-cock between the air pipe 19 and the compressed-air tank 7 to avoid any liability of any water being carried over from the compressed-air tank into the air pipe.

The rod 18 has a head 26 on which the float 16 rests when there is little or no water in the tank. 27 is a stuffing-box through which the rod 18 passes from the inside of the tank to the switch 15. This stuffing-box serves the double purpose of preventing escape of water from the tank 7 and affording friction to prevent said rod 18 from moving by the force of gravity, so that when the rod has been drawn up into the switch-closing position it will remain in that position until force is applied to move it downward and the rod will thus be held normally

stationary by the stuffing-box, except when external force is applied to move it from or to switch-opening or switch-closing position.

In practice, after the apparatus has been installed, the valve 10 still being closed to prevent water from the main 8 from entering the tank 7, the float 16 will rest upon the head 26 of the rod 18 and the switch will thus be opened. The valve 22 may then be closed and the valve 24 opened. Then the attendant may close the switch 15, thus putting the motor 11 and air compressor 6 in operation, whereupon the air will be compressed in the tank 7 sufficiently to counterbalance the pressure in the water-main 8.

As the compressed air in the tank is sufficient to exclude the water from the main body thereof for the time being, the float 16 holds the switch open. As the air thus stored becomes diminished the water from the main will enter the tank, thus maintaining a constant pressure therein, and at the same time lifting the float 16 in the usual manner until the connection 17 is drawn taut and the rod 18 is brought into the raised position shown in Fig. 1, whereupon the switch will be closed and the power again turned on the motor to drive the air compressor. When this has occurred the motor will continue to operate until the compressed air in the tank has driven out the water sufficiently to allow the float 16 to force the rod 18 down into the switch-opening position, whereupon the power will be cut off from the motor and will remain cut off until the charge of air has been again sufficiently exhausted to allow the float to draw the rod 18 up to close the switch as before.

In my practice I have used an air tank having a depth as great as eighteen inches, in connection with a main in which the water pressure was approximately sixty pounds to the square inch, and with the invention thus applied the air pressures supplied were perfectly adapted to operate the burner in a thoroughly satisfactory manner without the fluctuations and inconvenience attendant upon the former oil-burning appliances.

It is apparent that the air pipe 19 may be connected with other burners, not shown, and that the number of burners in the system supplied from the air-tank 7 may be unlimited within the capacity of the air compressor. It is also apparent that means other than the electric motor shown may be used for operating the air compressor, and also that different forms of air compressors may be employed without departing from the spirit of this invention. It is also to be understood that where a water-main is not available, any hydraulic apparatus affording sufficient pressure as compared with the depth of the air tank, may be supplied to take the place of the water-main.

In case the air compressor at any time fails to operate, or the air in tank 7 becomes exhausted so as to allow water to enter the dome 28, the float-valve or ball-cock 25 operates to close the small air outlet from the dome and thus excludes water from the pipe 19 and prevents flooding of the house. By locating the float-valve or ball-cock 25 in a dome 28 above the air-tank 7, and connecting the dome with the tank and with pipe 19 by nipples 29, 30, the same does not interfere with filling the tank with water to completely drive out the air, and the dome may be readily detached and the caps 31 thereof may be unscrewed to adjust or repair the cock.

In Fig. 2 the connection between the float 16 and the rod 18 consists in a headed rod 17′ which extends loosely through the float 16, so that when the float is first moved upward it does not operate to lift the switch rod 18 until the space between the head of the rod and the top of the float 16 has been covered. Then the float operates to lift the rod 18 and switch 15 to complete the circuit.

What I claim is:—

1. The combination, of an air compressor, a pressure tank connected with the main of a water system, such main, a motor connected to drive the air compressor, a source of power to operate the motor, power-controlling means to turn power on and off the motor, a float in the tank connected to operate said power-controlling means and means to turn on and off the power as the water rises and falls in the pressure tank, an air pipe connecting the air compressor, and air tank, air check means between the compressor and air tank, and a valved outlet from the tank.

2. The combination, of an air pipe, a tank connected with the air pipe, means for supplying air under high pressure to said air tank, hydraulic means for counterbalancing said pressure, a switch, a rod for controlling said switch, a float carried by the hydraulic pressure for operating the rod, to close the switch when the float is elevated and to open the switch when the float is depressed, and means for holding the rod normally stationary.

3. An air-compressing apparatus comprising a pressure-tank adapted to be connected with a source of water-pressure, an air-compressor discharging into the pressure-tank, an electric-motor for operating the air-compressor, a switch-rod slidingly mounted through a bottom of the pressure-tank, electric connections so that the switch-rod opens and closes the circuit, and a float in the pressure-tank for operating the switch-rod.

4. An air-compressing apparatus comprising an air-pipe, a pressure-tank connected to the air-pipe, means for producing hydraulic pressure in the tank, an air-compressor discharging into the tank, an electric-motor for

operating the air-compressor, a switch-rod slidingly mounted in a bottom of the tank to open and close the electric circuit, and a float in the tank for operating the switch-rod.

5. In an air-compressor, a pressure-tank, means for producing hydraulic pressure in the tank, an air-compressor discharging into the tank, an electric-motor for controlling the air-compressor, a switch-rod slidingly mounted through the bottom of the tank to make and break the electric circuit, a float for elevating the switch-rod to close the electric circuit, an air-pipe leading from the pressure-tank, and a float-valve for controlling the air-pipe.

6. In an air-compressing apparatus, a pressure-tank, a switch-rod slidingly mounted vertically through the bottom of the pressure-tank; a float, collapsible means for connecting the float to the switch-rod in a manner to permit lost motion between the float and the switch-rod so that the float may rise and fall to the extent of the lost motion without moving the switch-rod, and so that the buoyancy of the float upon the water will raise the switch-rod and close the switch; and the weight of the float upon the switch-rod when the water recedes will lower the switch-rod and open the switch.

7. In an air-compressor, a pressure-tank, means for producing hydraulic pressure in the tank, an air-compressor discharging into the tank, an electric-motor for operating the air-compressor, a switch-rod slidingly mounted through the bottom of the tank to make and break the electric circuit, a float for elevating the switch-rod to close the electric circuit, a dome for the tank, an air-pipe leading from the dome, and a float-valve controlling the air-pipe and located in the dome.

In testimony whereof, I have hereunto set my hand at Los Angeles California this 21st day of December, 1906.

LYMAN B. DE CAMP.

In presence of—
JAMES R. TOWNSEND,
BEULAH TOWNSEND.