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M. N. MACRATE & J. A. TOOMEY.

OIL BURNING SYSTEM.

APPLICATION FILED SEPT. 25, 1906.

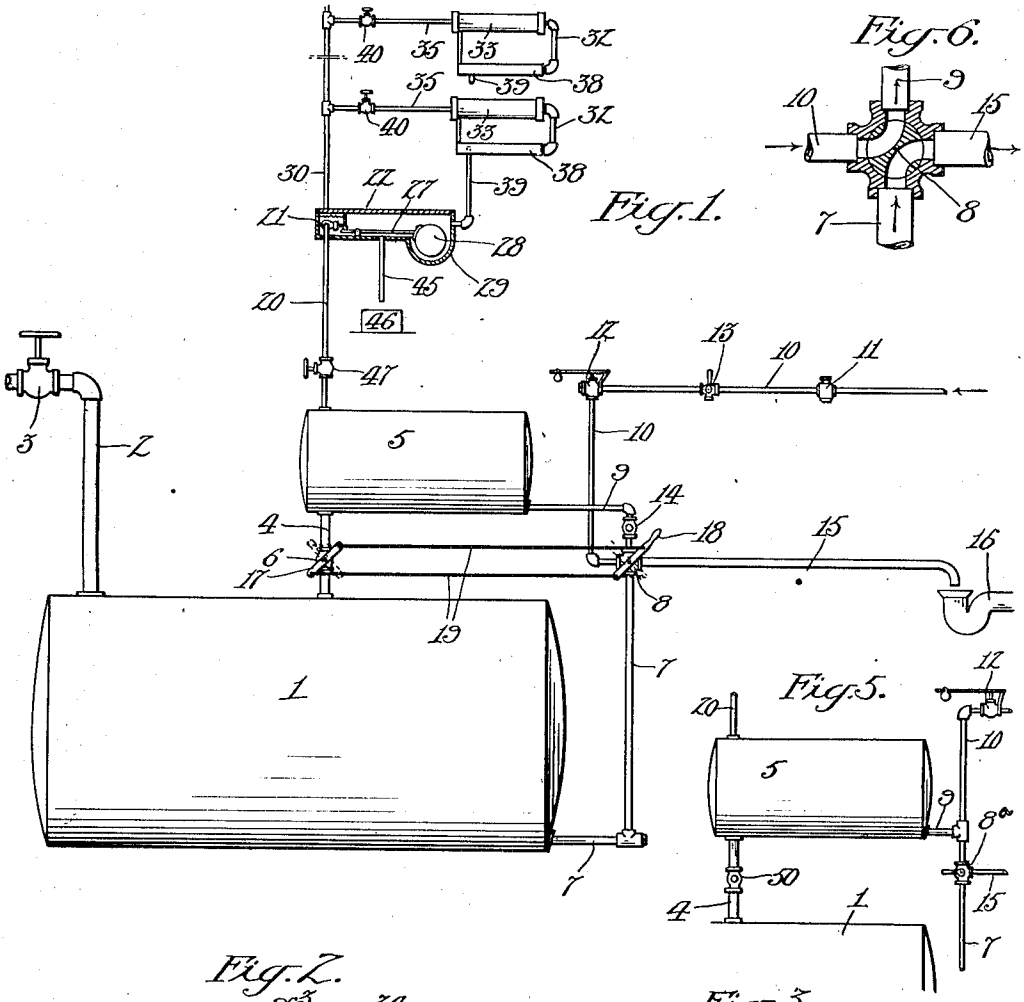


Fig. 1.

Fig. 6.

Fig. 5.

Fig. 2.

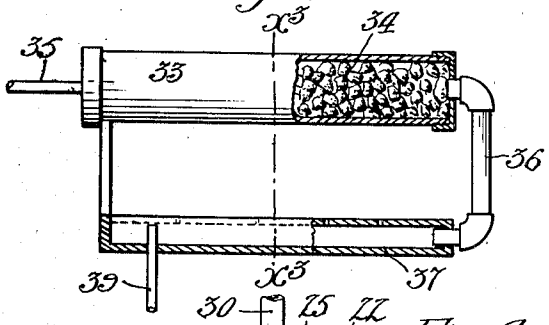


Fig. 3.

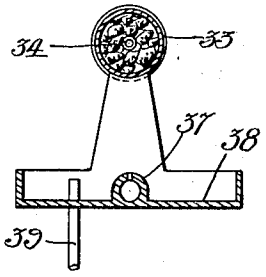
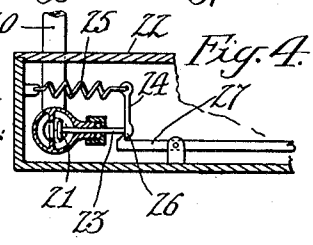


Fig. 4.



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UNITED STATES PATENT OFFICE.

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OIL-BURNING SYSTEM.

No. 851,953. Specification of Letters Patent. Patented April 30, 1907

Application filed September 25, 1906. Serial No. 336,192.

To all whom it may concern:

Be it known that we, MICHAEL N. MACRATE and JOHN A. TOOMEY, both citizens of the United States, and both residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Oil-Burning System, of which the following is a specification.

This invention relates to oil burning systems and particularly to a system in which the oil is forced under pressure to the burner and one of the main objects of the invention is to cause the supply of oil to be automatically cut off in the event of the burner becoming accidentally extinguished or if the burner valve is carelessly left open and the burner has not been lighted.

Another object is to provide means for filling the main storage tank without the necessity of putting out the fires at the burners.

A further object is to provide a safety drain and receptacle for any oil which may escape from the burner.

Further objects of the invention will be brought out in the following description.

The accompanying drawings illustrate the invention, and referring thereto:—Figure 1 shows the preferred arrangement of the system, the automatic safety oil shut-off device being shown in section. Fig. 2 is a side elevation partly in section of one form of burner. Fig. 3 is a section on line x^3—x^3 of Fig. 2. Fig. 4 is a vertical sectional view, enlarged, of the automatic safety shut off valve and adjacent mechanism. Fig. 5 is a view of a portion of the system showing a modified form. Fig. 6 is a detail section through the four way valve.

1 designates the main tank to which oil is delivered by a pipe 2 which may extend to the street or other place convenient for filling from car or tank wagon, the valve 3, when closed, prevents the outward passage of oil when the main tank is under water pressure. A pipe 4 leads from the main tank 1 to an auxiliary tank 5, the pipe 4 having a valve 6. The pipe 7 extends from the lower part of the tank 1 to a four way valve 8, while a pipe 9 leads from valve 8 to the auxiliary tank 5. A water pipe 10, which is connected with the city water system, leads to valve 8, the pipe 10 being provided with an automatic pressure regulating valve 11, for maintaining the pressure at any desired degree, and with a safety valve 12 which prevents any excessive pressure in the event of failure of the pressure regulating valve 11 to act properly, and located between the safety valve 12 and pressure regulating valve 11 is a manually operated valve 13. The pipe 9 is provided with a check valve 14 which prevents the backward flow of oil through pipe 9. A drain pipe 15 extends from the valve 8 to a sewer or drain 16 which may be located either above or below the main tank 1. Mounted on the respective stems of valves 6 and 8 are levers 17 and 18, the latter being provided with a handle, and the two levers are connected by links 19 so that when the hand lever 18 is operated to shift the valve 8, the lever 17 is also simultaneously operated to automatically open or close the valve 6.

A pipe 20 extends from the auxiliary tank 5 to an automatically controlled valve 21, shown in detail in Fig. 4, which is located within a casing 22. The stem 23 of the valve carries a laterally projecting arm 24, which arm is connected to a spring 25, the other end of the spring being attached to the casing 22. The lower end of the arm 24 is extended slightly beyond the stem 23 to form a detent 26, which detent is normally engaged by a pivoted latch lever 27, the outer end of the lever 27 being connected to a float 28, the casing 22 having a semi-spherical pocket 29 formed in its lower wall to receive the float. The latch lever 27 normally engages the detent 26 and holds valve 21 open, but when any oil escapes into the pocket 29 the float 28 is lifted which disengages the latch lever 27 from the detent 26 and the spring 25 contracts and automatically closes the valve 21 which remains closed until the valve is manually retracted and re-engaged with the latch lever 27. A pipe 30 leads from the valve 21 and oil burners 32 may be connected therewith.

One form of oil burner which may be used is shown in detail in Fig. 2 and comprises a cylindrical retort 33, the interior of which may be filled with fire brick 34 broken into small chunks. A pipe 35 conducts oil from the pipe 30 to one end of the retort 33, while a pipe 36 leads from the other end of the retort down to a burner tube 37 which is formed on a pan 38 located under the retort 33, the upper wall of the tube provided with orifices for the escape of gas to be burned. From each pan 38, a pipe 39 leads to the casing 22 above described. Each pipe 35 is provided with a valve 40 for regulating the burner. The drain pipe 45 is arranged to conduct any

excess of oil from the casing 22 to a receptacle 46. A valve 47 is located in the pipe 20 for regulating the flow of oil from the auxiliary tank 5 to valve 21.

In operation the tanks 1 and 5 are first filled as follows: Valve 3 is opened, which permits oil to flow into the tank 1. Valve 13 is shut and lever 18 is operated to shut off communication of pipe 7 with pipe 15 and valve 6 is simultaneously opened so that after tank 1 is filled oil will flow into the auxiliary tank 5. As soon as both tanks are filled, the valve 3 is closed and as pipes 10 and 7 are in communication and valve 6 is open, by opening valve 13 water under pressure passes through pipe 10 to pipe 7 and into the lower part of tank 1, thus placing the oil in both tanks 1 and 5 under the pressure of the water which forces oil up through pipe 20 and through valve 21 to pipe 30, from which the oil is delivered through pipes 35 to the respective burners. The oil, as it enters the retort 33 of a burner is formed into gas or vapor by the heat from the flames which are burning under the retort and the gas generated in the retort is conveyed through pipe 36 to the tube 38 to supply the flames. When the system is to be replenished with oil it is not necessary to extinguish the burners for the reason that the auxiliary tank 5 may continue to supply oil under the water pressure while the main tank 1 is being filled and to accomplish this the lever 18 is operated to close valve 6 and place pipe 10 in communication with pipe 9, and to place pipe 7 in communication with pipe 15, whereupon the pressure from the water in pipe 10 is transferred directly to the auxiliary tank 5 through the pipe 9, the check valve 14 permitting the movement of water in this direction and thus the burners are kept supplied with oil under the same pressure while the tank 1 is being refilled. In refilling the tank 1, the valve 3 is opened and the pressure of the oil in entering forces the water which has accumulated in the tank 1, out through pipe 7 and pipe 15 to sewer 16. As soon as tank 1 has been refilled with oil, valve 3 is shut and lever 18 is opened to open valve 6 and again place pipe 10 in communication with pipe 7, whereupon the oil in both tanks is again under the water pressure. Water which gets into tank 5 during the refilling operation, sinks down through pipe 4 into tank 1 as soon as valve 6 is opened after the completion of the refilling operation.

If through carelessness or ignorance or accident, a burner is out and its valve 40 is open the oil which escapes from the burner will flow through pipe 39 into the casing 22, and but a slight amount of oil thus escaping is necessary to lift the float 28, whereupon the latch lever 27 releases detent 26 and allows the valve 28 to quickly shut tight, which positively prevents further flow of oil to the burner and thus prevents accident. What little excess of oil may be present in the burner and casing 22, after the valve 21 closes, finds its way out through pipe 45 and is caught by receptacle 46.

Fig. 5 shows another form of connection in which automatic co-operation of valves 6 and 8 is dispensed with, and a valve 8^a is substituted for valve 8, and a plain check valve 50 substituted for the valve 6. When the valve 8^a is in one position the pressure is through pipe 7 into the tank 1, forcing the oil from tank 1 up past valve 50 into tank 5 and thence to the burners, while when the valve 8^a is in the other position, communication is shut off between pipe 10 and 7 and pressure goes from pipe 10 through pipe 9 to auxiliary tank 5. At the same time pipe 7 is in communication with pipe 15 so that water from the tank 1 may pass through those pipes to the sewer.

What we claim is:—

1. In an oil burning system, a main tank, an auxiliary tank, an oil burner, a circulatory system which includes the tanks and burner, pressure means for maintaining a flow of oil through the circulatory system, a drain connection normally cut off from the main tank, and means controlled by a single device for cutting out the main tank, but not the auxiliary tank, from the circulatory system, and connecting the main tank with the drain connection to enable the evacuation of the main tank of the pressure medium and its replenishment with oil without interrupting the service of oil under pressure to the burner.

2. In an oil burning system, a main tank, an auxiliary tank, a pipe connecting said tanks, a valve in said pipe, a four way valve, a pipe from the four way valve to the main tank, a pipe from the four way valve to the auxiliary tank, a check valve in the latter pipe, a drain pipe leading from the four way valve, a pipe from the four way valve connected with a water pressure system, a burner, and a pipe from the auxiliary tank to the burner.

3. In an oil burning system, a main tank, an auxiliary tank, a pipe connecting said tanks, a valve in said pipe, a four way valve, a pipe from the four way valve to the main tank, a pipe from the four way valve to the auxiliary tank, a check valve in the latter pipe, a drain pipe leading from the four-way valve, a pipe from the four way valve connected with a water pressure system, a burner, and a pipe from the auxiliary tank to the burner, and means for automatically operating the first named valve when the four way valve is operated.

4. In an oil burning system, a main tank, an auxiliary tank, a pipe connecting said tanks, a valve in said pipe, a four way valve, a pipe from the four way valve to the main

tank, a pipe from the four way valve to the auxiliary tank, a check valve in the latter pipe, a drain pipe leading from the four way valve, a pipe from the four way valve connected with a water pressure system, a burner, and a pipe from the auxiliary tank to the burner, and means for automatically opening said first valve when the four way valve is operated to place the water pressure pipe in communication with the main tank, and to automatically close said first valve when the four way valve is operated to place the main tank in communication with the drain pipe and the water pressure pipe in communication with the auxiliary tank.

5. In an oil burning system, a main tank, an auxiliary tank, a pipe connecting said tanks, a valve in said pipe, a four way valve, a pipe from the four way valve to the main tank, a pipe from the four way valve to the auxiliary tank, a check valve in the latter pipe, a drain pipe leading from the four way valve, a pipe from the four way valve connected with a water pressure system, a burner and a pipe from the auxiliary tank to the burner, a lever on the first valve, a lever on the four way valve, and links connecting the two levers.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 19th day of September, 1906.

MICHAEL N. MACRATE.
JOHN A. TOOMEY.

In presence of—
GEORGE T. HACKLEY,
FRANK L. A. GRAHAM.