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SAFETY OIL TANK.

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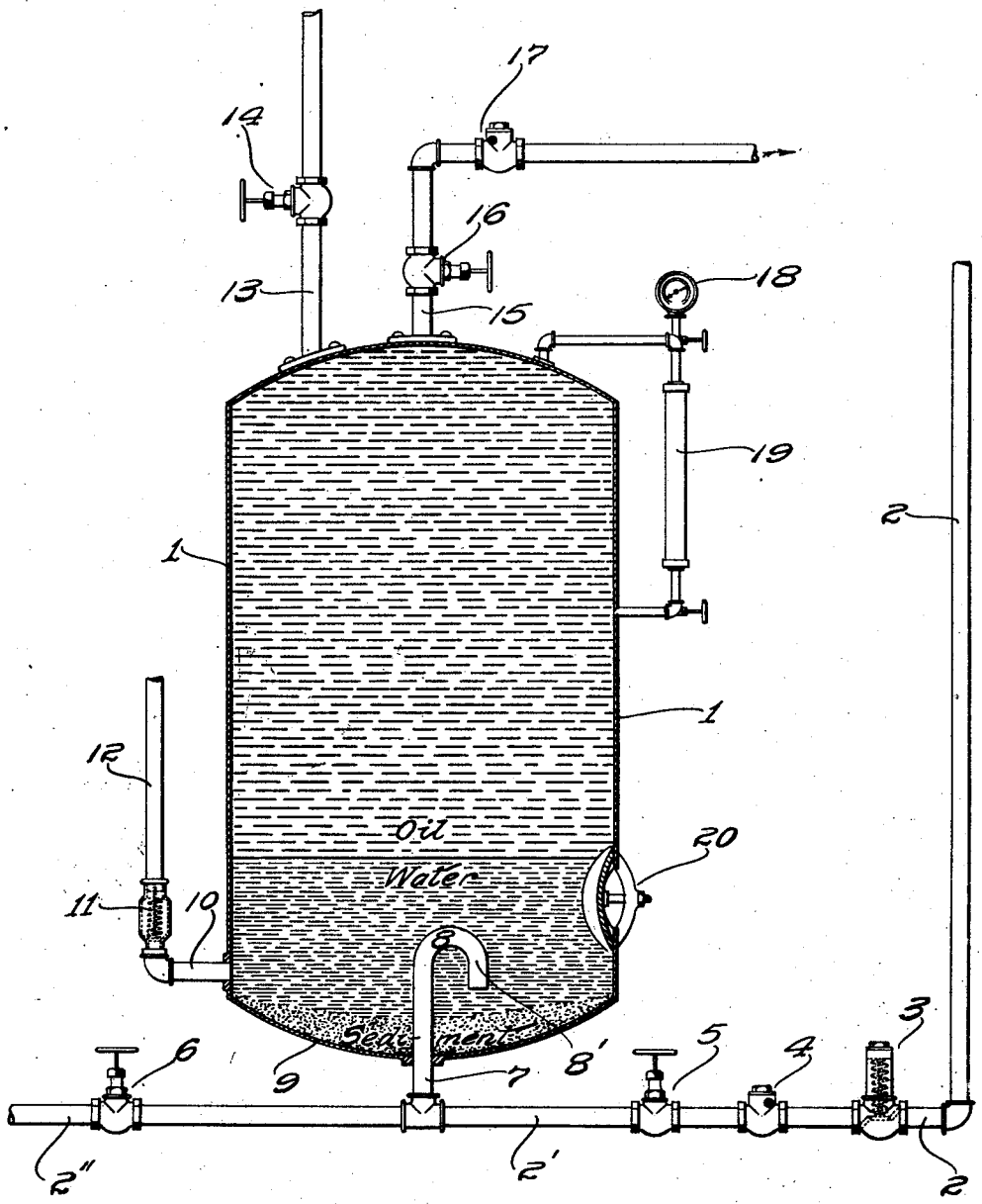
954,152. Patented Apr. 5, 1910.



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UNITED STATES PATENT OFFICE.

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SAFETY OIL-TANK.

954,152. Specification of Letters Patent. Patented Apr. 5, 1910.

Application filed May 12, 1908. Serial No. 432,555.

To all whom it may concern:

Be it known that we, WILLIAM WESTON and JOHN G. ORTH, both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Safety Oil-Tank, of which the following is a specification.

This tank is designed to be used for transporting, storing, purifying, and transferring oil, gasolene and hydrocarbon products for fuel and other purposes, and is adapted to supply fuel to oil-burners in furnaces and elsewhere.

An object is to make provision whereby the stored oil may be freed from impurities having greater specific gravity than the oil.

Another object is to take care of the expansion and contraction of the stored oil caused by variations of temperature.

Another object of this invention is to provide means for handling oil and transferring the same from one tank to another as in the case of loading or unloading cars, tank steamers, etc., without admission or inclusion of air to or in the oil-containers.

Other objects and advantages may appear from the subjoined detailed description.

The invention may be embodied in various forms.

The accompanying drawing illustrates the invention in the form at present deemed most desirable.

1 designates a shell which may be of any suitable material of sufficient strength to restrain the contents under the desired pressure.

2 designates a water supply pipe leading from a pressure source such as a pump, domestic or city water-supply, an elevated tank, or the like, not shown.

3 designates a pressure regulator to insure a constant and uniform pressure in pipe 2. 4 is a check-valve, and 5 a cut-off valve for said pipe 2 to control the flow of water therethrough.

6 is a draw-off valve.

2′ is a section of water pipe between valves 5 and 6.

7 is an inlet and outlet pipe between the cut-off valve 5 and the draw-off valve 6, and communicating between the intermediate portion 2′ of the pipe 2 and the lower portion of the shell 1, and terminating in a downwardly-turned portion or goose-neck 8, the mouth 8′ of which is arranged opening downwardly above the bottom 9 of the shell so as to allow space for undisturbed accumulations of sediment from the contents of the tank 1 without interfering with such mouth 8′, also to avoid driving water up into the oil in case of rapid outflow of oil under strong pressure of water, to direct sediment downward and to maintain a charge of water at the bottom of the tank.

10 is a valved relief-pipe opening from the shell 1 at a level somewhat above that of the mouth 8′ of the water-pipe 7 but below the normal water-level in the shell. Said relief-pipe is provided with a safety-valve 11, and the outer limb 12 thereof may lead to any point of discharge desired.

13 is a filling pipe controlled by a cut-off valve 14 for the purpose of charging the shell with oil.

15 is the discharge pipe provided with a cut-off valve 16 and a check-valve 17. Said discharge-pipe may lead to any place and to any burner, burners, or other device, or devices, not shown, where the oil is to be delivered.

18 designates a pressure gage, and 19 a sight-glass connected with the shell to enable the operator to determine the pressure and the level of the contents of the shell.

20 designates a man-hole to give access to the interior of the shell.

In practice, water may be admitted to the interior of the shell by closing the draw-off valve 6 and opening the cut-off valve 5 and the charging valve 14, and thereupon water will flow into the shell until the same is filled, and will then fill the pipe 13 and finally flow out at the open end thereof. Then the operator will close the cut-off valve 5 and will connect the pipe 13 with an oil-supply, not shown, for the purpose of filling the tank to the desired extent.

When the connection of pipe 13 with the oil-supply, not shown, has been made, the draw-off valve 6 may be opened and thereupon the water in the shell will begin to flow out through pipe 2″ and will cause suction through the pipe 13 to draw oil into the tank to supply the vacuum as the water flows out. When the charge of oil thus admitted is sufficient to fill the tank from the top downward to the man-hole 20, the attendant will close the draw-off valve 6 and

the charging valve 14. In this way the tank will be entirely filled with liquid, and the air excluded. The apparatus is now ready for holding the oil in storage for any required period, and in case the surrounding temperatures rise, thus causing expansion of the oil, the water at the bottom of the tank will, by such expansion be forced through the relief pipe 10, the check-valve 4 preventing any return of water toward the source of supply.

The provision of the check-valve is necessary in order to enable the relief-valve to operate. As it will be seen, the pressure to operate the relief-valve must exceed the pressure from the water-supply, and it would not be permissible to allow connection of the tank with the water-supply means if such action subjected the mains to liability of receiving charges of oil in case of fire. Otherwise, in case of large quantities of oil being stored and connected with the water-main the fire-engines might be found to add fuel to the flames.

By opening either or both the valves 14 and 16, the oil will be allowed to flow out responsive to the water pressure from pipe 2. The supply of oil may then be replenished by opening valves 6 and 14 while the other valves are closed and the pipe 13 is connected with an oil supply.

For supplying oil-burners or other means for consuming oil, the valve 14 may be kept closed and the valve 16 open, thus allowing the oil to flow out through pipe 15 and past the check-valve 17. Said check-valve prevents any back flow of oil or of air to the shell.

In case the oil contains water or impurities of any kind which have a specific gravity greater than the oil, such substances will settle to the lower portion of the tank and the accumulations may be removed from time to time through the man-hole 20 after the liquid contents of the shell have been drawn off. The water admitted in the manner above stated, will effectually expel all the oil and gas so that when the water is drawn off, access to the interior of the tank may be had with perfect safety, it being understood that atmospheric air is admitted to the tank through either of pipes 13 or 15, so that when the water is drawn off, the contents of the tank will consist simply of atmospheric air and the deposits which may remain at the bottom of the tank after the water and the liquid impurities have been drawn off through valve 6. By this means the delays heretofore necessary for safety, in order to allow the gases to escape from the tank, are avoided and all danger of explosions to which oil-tanks have heretofore been liable under normal conditions is done away with.

It is to be understood that the relief valve 11 will be constructed to resist any pressure that may pass the pressure regulator 3 and that in case the pressure in the shell becomes excessive the check valve 4 will close and the relief valve 11 will open thus allowing water to be discharged from the tank, thereby to relieve the pressure. When the pressure becomes again reduced to the normal the vacuum, if any, will be supplied through the regulator 3. It is thus seen that when the tank is subjected to heat as in the case of a fire around the same, thereby expanding the oil, that the fluid at first ejected from the relief-pipe will be water and no danger from burning oil can result at the outset of the fire, and that by extending the relief-pipe to a place free from danger of fire the expansion though continued until oil flows may be free from danger. In any event danger of bursting or straining the tank and all liability of oil escaping at spreading seams, is avoided.

We claim:—

1. A safety tank comprising a shell, means for supplying water to the same, means for supplying volatile oil to said shell, a relief pipe having a discharge separate from the water supply means and having an inlet in communication with the shell below the normal water level, an outwardly opening relief valve located in the relief pipe, and means for maintaining the valve in closed position against the normal water pressure, said valve automatically opening when the pressure rises to a predetermined degree above the normal water pressure.

2. The combination with a shell of valved means for supplying oil or the like to the upper portion of the shell, valved means for discharging the said oil or the like from the upper portion of the shell, a water-pipe connected between its ends with the lower portion of the shell, a draw-off valve connected to the pipe at one side of the connection, means for supplying water under pressure to the pipe on the other side of said connection, and a cut-off valve and a check-valve located in said latter portion.

3. The combination with a shell of valved means for supplying oil or the like to the upper portion of the shell, valved means for discharging the said oil or the like from the upper portion of the shell, a water pipe connected between its ends with the lower portion of the shell, a draw-off valve connected to the pipe at one side of the connection, means for supplying water under pressure to the pipe on the other side of said connection, a cut-off valve and a check-valve located in said latter portion, a relief pipe independent of the water pipe, and connected to the lower portion of the shell, and an outwardly opening pressure-operated relief valve in the relief pipe.

4. The combination with a closed tank, of

means for supplying oil to, and means for drawing off the same from the upper portion of the tank, means for supplying a liquid of greater specific gravity than the oil to the lower portion of the tank, a pressure controller located in the last named supply means for maintaining a constant pressure of the liquid in the tank, means for preventing back flow of liquid through the withdrawing means and means for preventing back flow of liquid through the last named supply means, automatic relief discharge means connected to the lower portion of the tank, said automatic means normally preventing the outflow of liquid through the relief discharge means and opposing a resistance thereto, greater than the supply pressure, said means being automatically operated to permit a relief discharge whenever the pressure within the tank overbalances the resistance.

5. The combination with a closed tank, of means for admitting oil to, and means for drawing off the same, from the upper portion of the tank, a water supply pipe connected to the lower portion of the tank, a check valve therein, a pressure controller also located in the water supply pipe, a relief discharge pipe separate from the water supply pipe, connected to the lower portion of the tank, and a relief valve located in the relief discharge pipe and normally closing the same, said valve opposing a resistance to the outflow, greater than the supply pressure and automatically opening when such resistance is overcome.

6. The combination with a closed tank, of means for supplying oil to and means for withdrawing it from the upper portion of the tank, a water supply and discharge pipe leading through the bottom of the tank, into the same, and terminating above said bottom in a downturned goose-neck, means for admitting and discharging water through said pipe, and means for permitting the removal of sediment deposited in the lower portion of the tank below the upper end of the pipe.

In testimony whereof, we have hereunto set our hands at Los Angeles, California, this 6th day of May, 1908.

WM. WESTON.
JOHN G. ORTH.

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