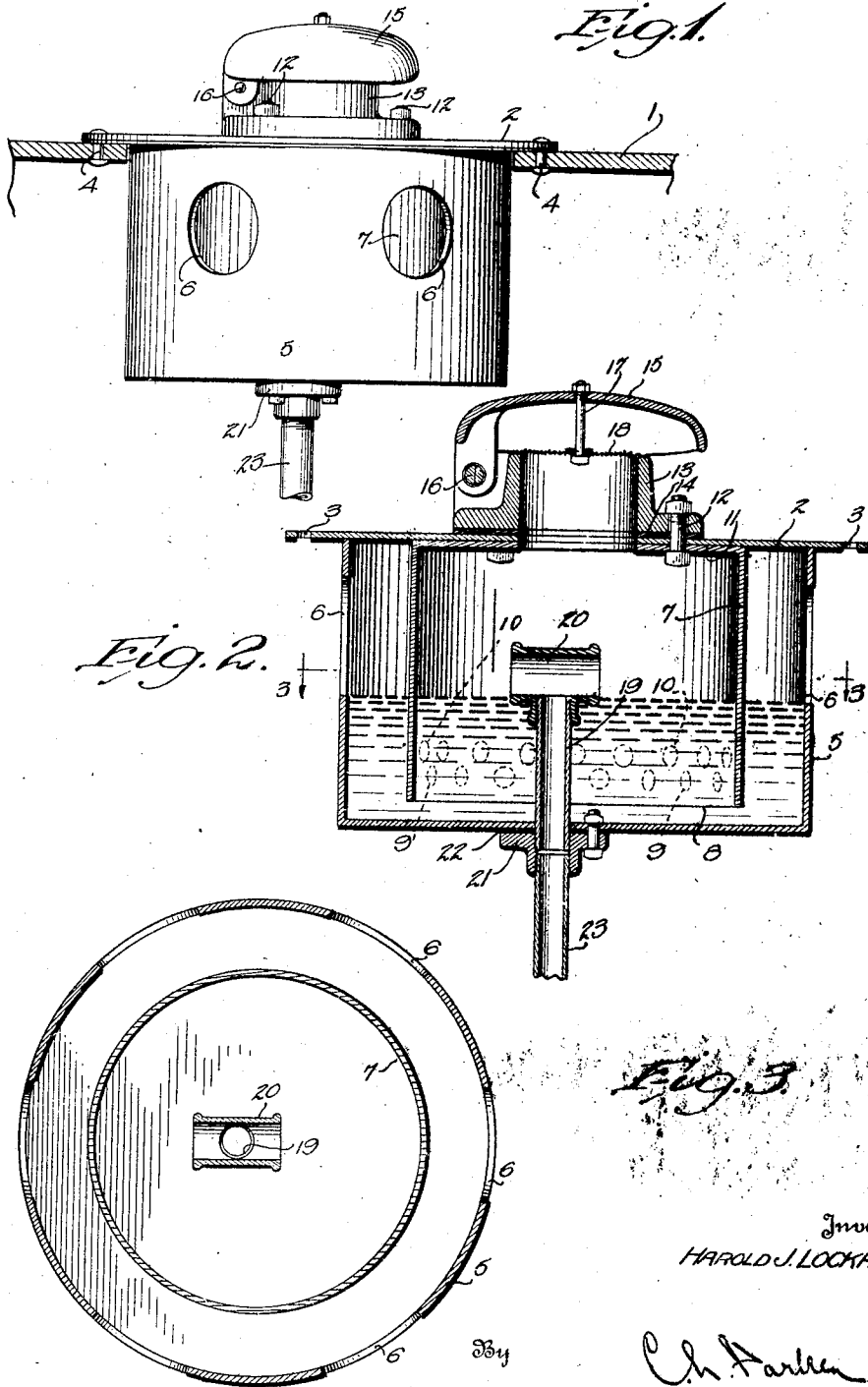


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H. J. LOCKHART
FLUID PRESSURE REGULATOR

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UNITED STATES PATENT OFFICE.

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FLUID-PRESSURE REGULATOR.

Application filed February 2, 1923. Serial No. 616,631.

To all whom it may concern:

Be it known that I, HAROLD J. LOCKHART, a citizen of the United States, residing at Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Fluid-Pressure Regulators, of which the following is a specification.

This invention relates to fluid pressure regulators, and more particularly to attachments for tanks used in storing volatile liquids, such as crude petroleum oils, gasoline, and the like.

An object of the invention is to provide an attachment for gas-tight storage tanks by means of which escape of vapors and gases will be prevented until a predetermined pressure is reached and which will then permit escape of said gases and vapors.

A further object is to provide a pressure regulator of simple construction and relatively few parts.

A further object is to provide a regulator employing a liquid seal in which the same liquid as that stored in the tank may be used.

In the accompanying drawings, I have shown one embodiment of the invention. In this showing:

Figure 1 is a side elevation of the pressure regulator arranged within a tank,

Figure 2 is a vertical sectional view thereof, and

Figure 3 is a horizontal sectional view on line 3—3 of Figure 2.

Referring to the drawings, the reference numeral 1 designates a portion of the deck of an oil tank. This tank may be of any desired construction, but the invention is best applied to a metal tank which is gas-tight or substantially gas-tight. As shown, the regulator consists of a plate 2, having a plurality of openings 3 adjacent its edge. As shown, this plate is adapted to be arranged over an opening in the deck of the tank and is secured thereto by means of bolts or rivets 4, passing through the openings 3. A receptacle or container 5 is arranged beneath the plate 2, and is secured thereto in any suitable manner. The vertical wall of this receptacle is provided with a plurality of openings 6, spaced from the bottom as shown. A skirt 7 is arranged within the receptacle and spaced from its outer wall. The bottom 8 of the skirt terminates above

the bottom of the receptacle, forming a pair of compartments or chambers communicating with each other at the bottom. The skirt is provided with two horizontal rows of perforations or openings 9 and 10, arranged beneath the openings 6. The skirt or inner shell is provided with a top 11 which is secured to the plate 2 by bolts 12. These two members are provided with aligned openings adapted to be disposed beneath an outlet member 13. The outlet member is secured in position by means of the bolts 12, and a gasket 14, or other suitable packing, may be disposed between the top of the regulator and the outlet member, as shown. The outlet member or dome is provided with a lid or cover 15, mounted on a suitable hinge 16. A bolt 17 extends downwardly from the lid and is adapted to support a fire screen 18, arranged over the outlet opening.

The regulator is provided with an overflow pipe 19, having a T 20 at its upper end. The top of the overflow pipe is in alignment with the bottom of the openings 6 in the outer shell. A flange 21 is bolted to the bottom of the outer shell and a liquid-proof connection is obtained by means of a gasket 22. This flange is threaded to receive the lower end of the over-flow pipe which passes through an opening in the shell. A liquid seal pipe 23 extends downwardly from the flange beneath the level of oil in the tank.

The operation of the device will be apparent from the foregoing description. The working pressure of gas and vapor in the tank is transmitted to the top of the body of liquid between the shells 5 and 7, the gases entering the regulator through the openings 6. As the pressure increases, the liquid is forced downwardly until the gases are permitted to escape through the openings 10 and then through the outlet 13. Further increase in pressure causes the liquid between the shells to be forced further down, permitting the gases to escape through the openings 9 and finally permitting the gases to pass under the bottom 8 of the inner shell. The liquid flows through the overflow pipe into the tank.

By regulating the depth of the outer shell beneath the openings 6 and the position of the perforations 9 and 10, the gage may be constructed to permit any desired pressure to exist in the tank and permit escape of

gases when the pressure exceeds the desired limit. It is necessary to provide means for escape of gases and vapors in oil tanks to minimize the chances of explosions. I have
5 found, however, that a tank which is substantially gas-tight and provided with some means such as the present regulator to permit escape of gases when an undesirable pressure is reached, reduces losses through
10 evaporation of the lighter constituents to a minimum.

It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size, and arrangement of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

20 Having thus described my invention, I claim:

1. A pressure regulator comprising an outer shell adapted to be arranged in a tank, said shell being provided with openings
25 spaced from the bottom, an inner shell extending from the top of the outer shell to a point near the bottom, said regulator being provided with an outlet opening within said inner shell, and an overflow pipe communicating with the interior of said regulator at
30 a point spaced from the bottom thereof.

2. In a pressure regulator, a substantially cylindrical member having a closed top, said member being provided with openings
35 spaced from the bottom, an inner shell arranged in said member and spaced from the bottom thereof, said inner shell being provided with a plurality of rows of openings

arranged on a level below the openings in said first member, the top of said member
40 being provided with an outlet opening, and an overflow pipe communicating with the interior of said member.

3. In a device of the character described, a substantially cylindrical member having
45 an outlet opening in its top, an overflow pipe extending through the bottom of said member, said member being provided with a plurality of openings spaced from the bottom, and an inner shell arranged in said
50 member and spaced from the bottom to form a liquid seal, said inner shell being provided with openings arranged beneath the openings in said cylindrical member.

4. In a device of the character described, a substantially cylindrical member adapted
55 to be arranged within a tank and communicate with the interior of the tank, said member being provided with an outlet opening in its top, an overflow pipe extending
60 through the bottom of said member to a point substantially level with the point of communication with the tank, said member being adapted to receive a body of liquid,
65 normally arranged below said overflow pipe, and an inner member arranged therein, said inner member being spaced from the bottom and being provided with openings disposed
beneath the top of the overflow pipe.

In testimony whereof, I affix my signature
70 in presence of two witnesses.

HAROLD J. LOCKHART.

Witnesses:

H. B. SATTERFIELD,
M. O. MITCHEL.