March 30, 1926. 1,578,766

W. SCHWEMLEIN

VALVE

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Fig. 1.

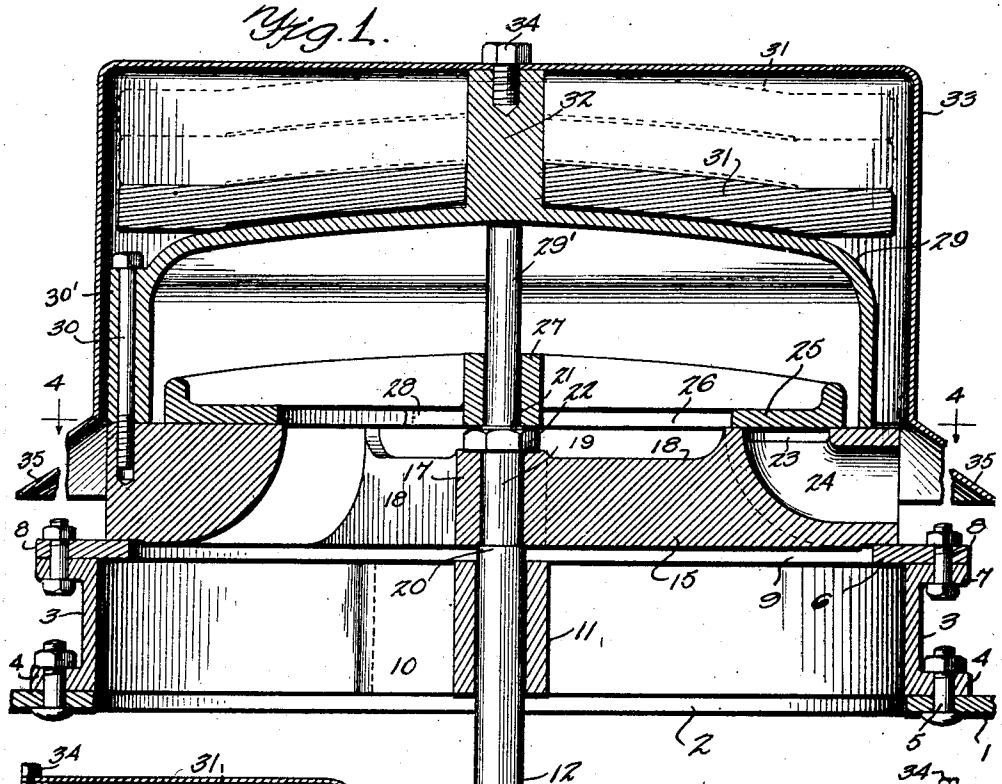


Fig. 2.

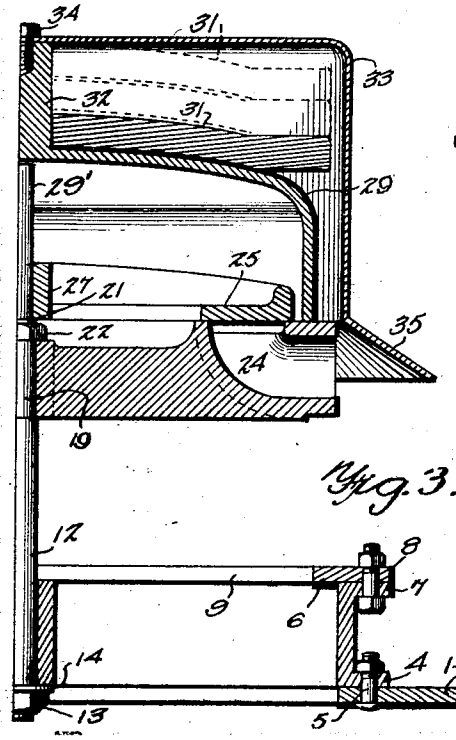
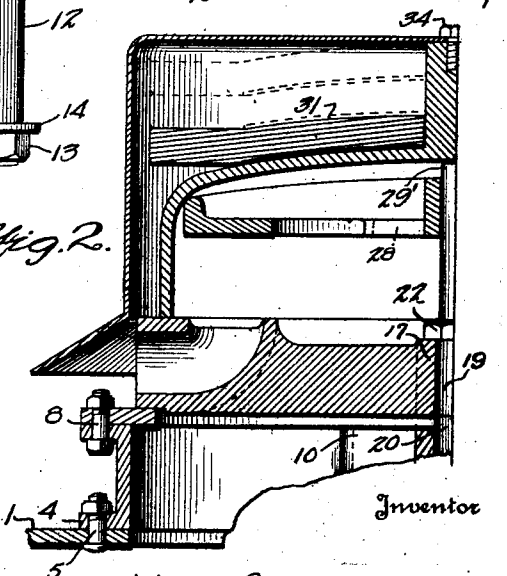


Fig. 3.



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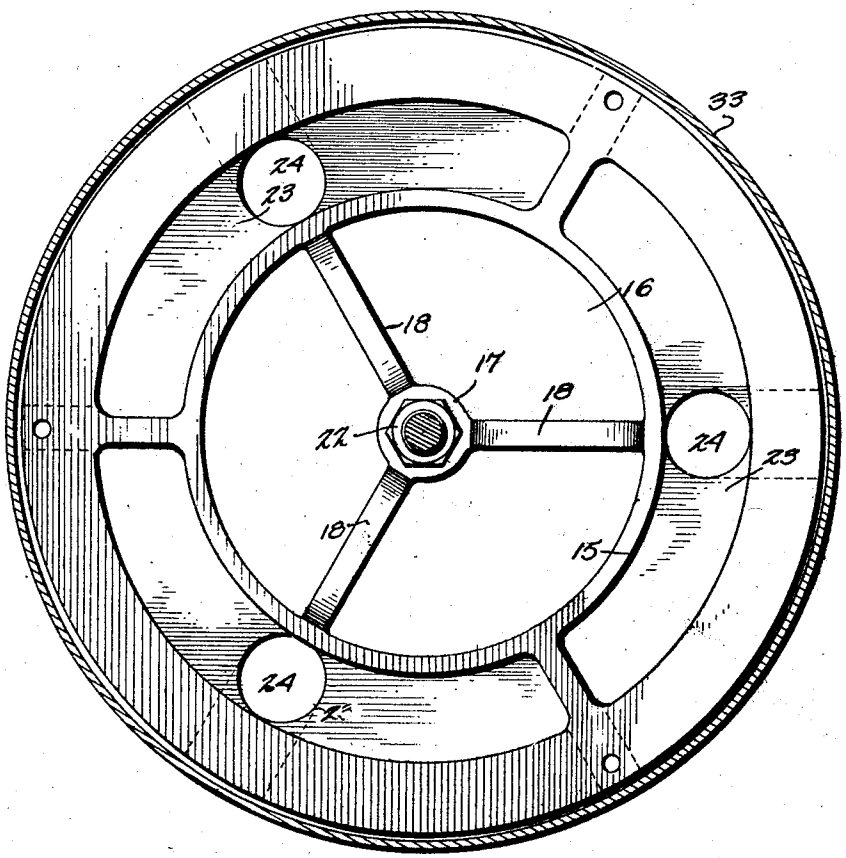
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Fig. 4.



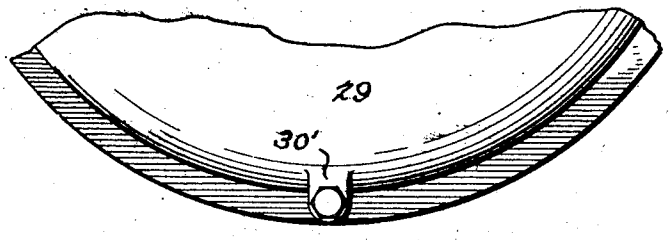


Fig. 5.

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Patented Mar. 30, 1926. 1,578,766

UNITED STATES PATENT OFFICE.

WILLIAM SCHWEMLEIN, OF PARKERSBURG, WEST VIRGINIA, ASSIGNOR TO THE PARKERSBURG RIG & REEL COMPANY, OF PARKERSBURG, WEST VIRGINIA, A CORPORATION OF WEST VIRGINIA.

VALVE.

Application filed January 19, 1925. Serial No. 3,475.

To all whom it may concern:

Be it known that I, WILLIAM SCHWEMLEIN, 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 Valves, of which the following is a specification.

This invention relates to valves, and more particularly to combined pressure and vacuum relief valves.

The valve forming the subject matter of the present invention is adapted to be employed in place of the oil seal gage on the man hole dome cover of an oil tank or may be used on any other type of container wherein either a pressure or a vacuum is apt to exist and must be relieved.

In the present type of pressure and vacuum relief valves, the vacuum valve is mounted beneath the pressure valve. In the present invention, I provide a valve of this character in which the vacuum valve is mounted above the pressure valve.

One of the advantages obtained by the present construction is the increase in area of the passages. In the former constructions, the area of the pressure valve is reduced by the amount of space necessary to use for the vacuum valve, whereas in the valve forming the subject matter of the present invention, the area of the pressure valve is practically equal to the area of the opening over which the valve is placed.

A further advantage of this construction is that the weight of the vacuum valve parts is added to the weight that must be elevated to unseat the pressure valve. In prior constructions, the pressure valve is maintained on its seat by weights placed on top of it and the weight so employed may be reduced in the present construction an amount equal to the weight of the vacuum valve parts.

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

Figure 1 is a vertical sectional view showing both of the valves in closed position,

Figure 2 is a similar view showing the vacuum valve in open position,

Figure 3 is a similar view showing the pressure valve in open position,

Figure 4 is a horizontal sectional view on line 4—4 of Figure 1, and,

Figure 5 is a detail sectional view substantially on line 5—5 of Figure 1.

Referring to the drawings, the reference numeral 1 designates a tank or container having an opening 2 formed therein. A cylindrical member 3 is secured to the tank in any suitable manner. As shown, this member is provided with a flange 4 at the bottom and suitable fastening elements 5 are passed through this flange and the wall of the tank. An annular plate 6 is bolted to a flange 7 formed at the top of the cylindrical member by means of bolts 8 and this plate is provided with a central opening 9. The cylindrical member is provided with a plurality of radial arms 10 connected to a central hub 11 forming a spider. This spider is provided with a central opening for the reception of a guide rod or support 12. As shown, the lower end of the rod is threaded, and is adapted to receive a nut 13 by means of which a washer 14 is retained in position. This washer is adapted to engage the bottom of the hub when the rod is moved upwardly to limit its movement.

The pressure valve is mounted on the guide rod 12 and consists of an annular plate 15 having a central opening 16. This plate is adapted to rest upon the annular plate 6 when in closed position. As shown, the valve is provided with a central hub 17 connected to the plate by radial arms 18. The hub 17 surrounds a reduced portion 19 of the guide rod and the bottom of the hub engages a shoulder 20. The guide rod is provided with a threaded portion 21, adapted to receive a nut 22 by means of which the pressure valve member is secured fast to the guide rod. As shown, the plate is provided with spaced openings 23, communicating with passages 24 extending to the periphery of the valve member.

The vacuum valve consists of an annular plate 25 adapted to rest on the pressure valve and having a central opening 26 substantially the same size as the central opening in the pressure valve. This plate carries a hub 27 connected thereto by means of radial arms 28 and the hub is provided with a central opening to slidably receive a reduced upper portion 29′ of the guide rod.

A cover 29 is arranged over the valves and adapted to move with the pressure valve.

As shown, this cover is provided with peripheral extensions 30′ adapted to receive bolts 30 which are secured in the pressure valve. Weights 31 may be arranged on top of the cover to regulate the pressure necessary to open the pressure valve. As shown, the cover is provided with a central projection 32 and a hood 33 is adapted to be secured thereto by means of a bolt 34. The lower end of the hood is provided with a skirt 35 which extends outwardly at an angle in proximity to the passages 24.

The operation of the device is as follows:

The lower face of the pressure valve and the upper face of the vacuum valve are subjected to the pressure in the tank. The guide rod is secured to the pressure valve to move therewith and the vacuum valve is slidably mounted on this rod. When a pressure above the predetermined pressure exists in the tank, it acts on the lower face of the pressure valve to raise it from its seat as indicated in Figure 3 of the drawings, and permit escape of gases. The gases entering the cover 28 force the vacuum valve to its seat. As stated, the desired pressure at which the valve will automatically open may be controlled by regulating the number of weights 31. It will be noted that the parts of the vacuum valve rest on the pressure valve to assist in holding it on its seat and the number of weights employed may thus be reduced an amount equal to the weight of the parts of the vacuum valve.

When the pressure in the tank decreases, the pressure valve is drawn to its seat. When the pressure decreases to such a point that a partial vacuum exists in the tank, the vacuum valve 25 is lifted from its seat, moving upwardly on the reduced portion 29 of the guide rod and air enters through the passages 24 and the openings 23 to relieve the vacuum.

It is to be understood that the form of my 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.

I claim:

1. A combined pressure and relief valve comprising a valve seat, a substantially flat, annular plate of substantially uniform thickness mounted on said seat and forming a pressure valve member, a cover carried by said member, and a second plate arranged over said pressure valve member within said cover and forming a vacuum valve, said pressure valve member being provided with a central opening, said vacuum valve member being provided with a central opening, and said pressure valve member being further provided with openings extending from the top to its outer periphery and normally closed by said vacuum valve member.

2. In a device of the character described, a ring adapted to be secured over an opening in a container and form a valve seat, a hub arranged centrally of said ring, a rod slidably mounted on said hub, a pressure valve member arranged on said seat and connected to said rod, said pressure valve member being provided with an opening, a cover carried by said pressure valve member, a vacuum valve member arranged within said cover and normally engaging the upper face of said pressure valve member, said pressure valve member being provided with additional openings normally covered by said vacuum valve member, weights arranged on said cover, and a hood arranged over said cover and secured thereto.

3. In a device of the character described, a ring adapted to be secured over an opening in a container and form a valve seat, a hub arranged centrally of said ring, a rod slidably mounted in said hub, a pressure valve member arranged on said seat and connected to said rod, said pressure valve member being provided with an opening, a cover carried by said pressure valve member, and a vacuum valve member arranged within said cover and normally engaging the upper face of said pressure valve member, said pressure valve member being provided with additional openings normally closed by said vacuum valve member.

4. In a device of the character described, a ring adapted to be secured over an opening in a container and form a valve seat, a hub arranged centrally of said ring, a rod slidably mounted in said hub, means for limiting the upward movement of said rod, a pressure valve member arranged on said seat and secured to said rod, said pressure valve member being provided with an opening, a cover carried by said pressure valve member, and a vacuum valve member arranged within said cover and normally engaging the upper face of said valve member, said vacuum valve being slidably mounted on said rod, said pressure valve member being provided with openings extending from its upper face to its periphery.

In testimony whereof, I affix my signature.

WILLIAM SCHWEMLEIN.