E. HURLBRINK.

CONTAINER FOR INFLAMMABLE LIQUIDS.

APPLICATION FILED JAN. 13, 1915.

1,151,184.

Patented Aug. 24, 1915.

2 SHEETS—SHEET 1.

FIG. 1.

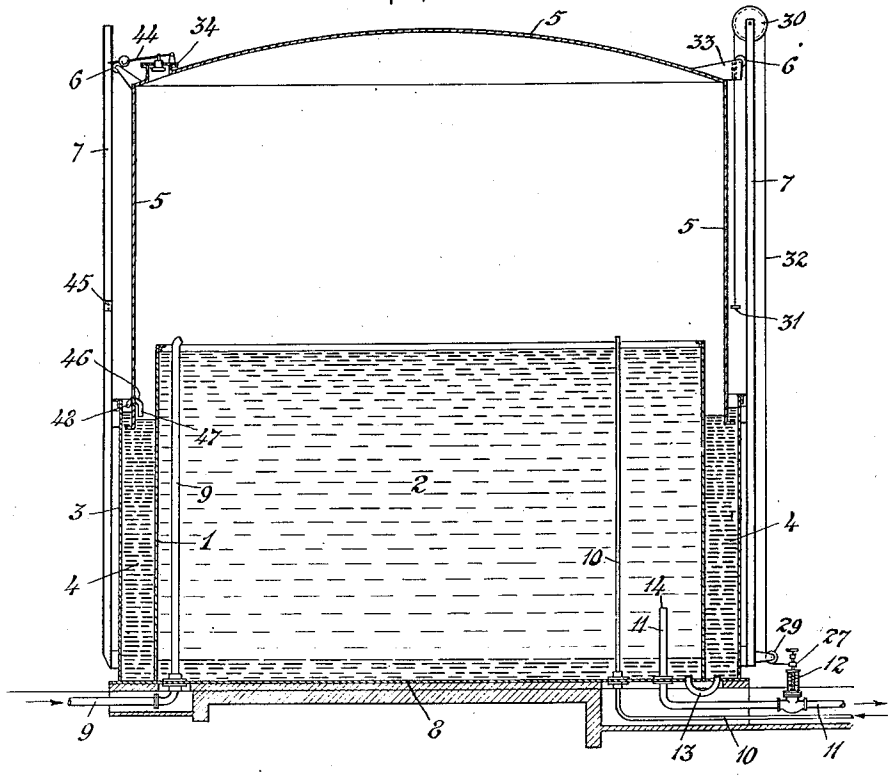


FIG. 3.

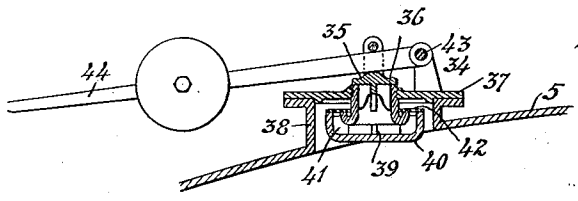
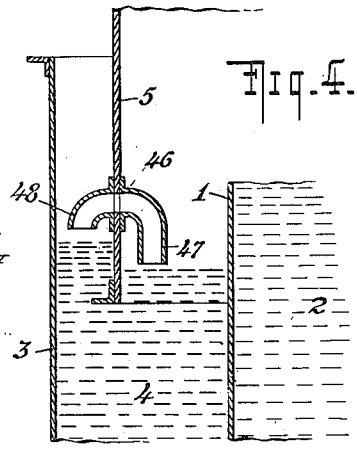


FIG. 4.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

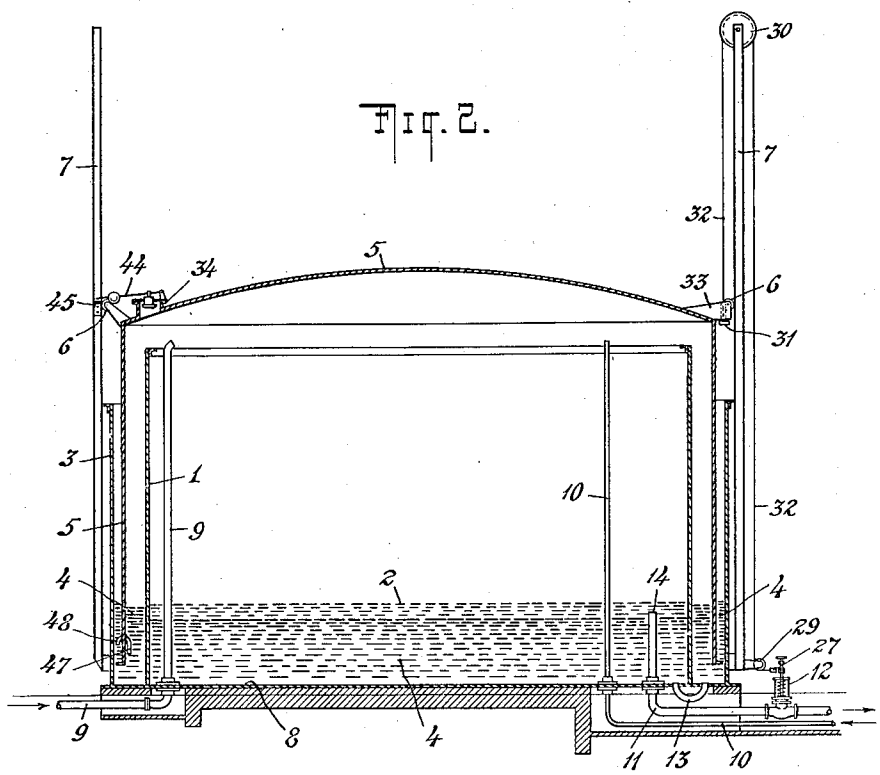


Fig. 5.

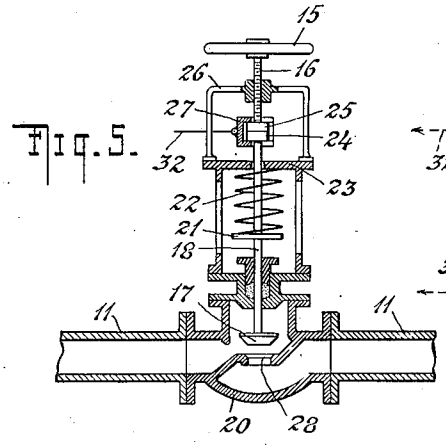


Fig. 6.

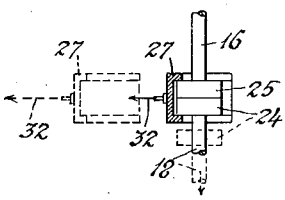
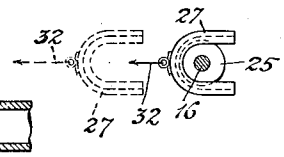


Fig. 7.



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CONTAINER FOR INFLAMMABLE LIQUIDS.

1,151,184. Specification of Letters Patent. Patented Aug. 24, 1915.

Application filed January 13, 1915. Serial No. 2,092.

To all whom it may concern:

Be it known that I, ERNST HURLBRINK, a subject of the German Emperor, and a resident of Berlin-Friedenau, Germany, have invented certain new and useful Improvements in Containers for Inflammable Liquids, of which the following is a specification.

This invention relates to containers for inflammable liquids and particularly to large sized containers connected with gasometers having a vertically movable floating bell and containing a supply of a protective gas to fill the upper space of the container, above the liquid.

One of the objects of the present invention is to provide shut-off means for automatically preventing the drawing off of inflammable liquid whenever the gasometer bell reaches its lowermost position. In the absence of such means, there is danger of the top of the gasometer bell being driven in by the preponderance of atmospheric pressure over the partial vacuum produced in the gasometer in case large amounts of liquid should be withdrawn from the container at the time the gasometer bell, having reached its lowermost position, is unable to go down farther.

Another object of this invention is to prevent the occurrence of a dangerous vacuum within the gasometer, independently of the shut-off means referred to above, by providing the bell with a venting device arranged to admit the ambient air to the interior of the gasometer shortly before the bell reaches its lowermost position.

As an example, one form of the invention has been illustrated in the accompanying drawings, in which—

Figure 1 is a vertical section of a gasometer provided with the present improvements, the bell being shown in its uppermost position; Fig. 2 is a similar view showing the bell in its lowermost position; Fig. 3 shows in vertical section, upon an enlarged scale, the air admitting or venting device; Fig. 4 is a detail vertical section of a blow-off device; Fig. 5 is a vertical section upon an enlarged scale, of the automatic shut-off valve located in the draw-off pipe; and Figs. 6 and 7 are respectively a vertical and a horizontal section of the controlling mechanism associated with said shut-off valve.

The container 1, adapted to be filled with the inflammable liquid 2 (say, gasolene) is surrounded by an annular tank 3 which holds a sealing liquid 4 (say water) into which dips the lower edge of the inverted member or bell 5 fitted over and around the container 1. The bell 5 is suitably guided in its vertical movement, as by means of rollers 6 carried by the bell and traveling upon stationary vertical posts 7 of the customary framework. The usual counterbalancing device (not shown) may be employed in connection with the bell. The container 1, which is open at the top, is filled by means of a pipe 9 passing through the bottom 8 of the container and extending to its upper edge. If desired, a float may be provided in the container, with connections to control a valve in the pipe 9, so that the supply of liquid to the container will be shut off automatically when the liquid attains a predetermined level in the container. The protective gas (a non-oxidizable gas, generally a mixture containing a large proportion of carbon dioxid) is supplied through a pipe 10 likewise passing through the bottom 8 and extending to the interior of the floating bell 5. The draw-off pipe or conduit 11 through which the inflammable liquid is conveyed from the container 1 to the draw faucet or other discharge device (not shown), also extends through the bottom 8 and is provided, at its exposed outer portion, with an automatically closing shut-off valve 12, the operation of which is fully described below. In the construction shown, the interior of the container 1 and that of the tank 3 are connected at their lower portions, as by an elbow pipe 13, so that the inflammable liquid 2 will rest on top of a layer of the sealing liquid 4 which enters the container at the bottom. With this arrangement, the container 1 is subjected to but a slight outward strain (chiefly at the upper portion) by the liquid in the annular surrounding tank 3. Whenever inflammable liquid is withdrawn through the conveying pipe 11, a certain amount of the sealing liquid 4 will pass from the tank 3 through the elbow pipe 13 into the container 1, the equilibrium being preserved automatically. Thus there can be no pressure exerted inwardly on the container wall by the contents of the annular tank 3, but on the contrary, the wall in-

terposed between the two receptacles will be subjected only to a slight outward pressure corresponding to the difference in the height of the two liquid columns, due to their unlike specific gravities. The intake end 14 of the draw-off pipe 11 should be at a level above the highest possible level of the sealing liquid 4 within the container 1 (Fig. 2) so that in no case will there be any danger of drawing off some of the sealing liquid through the pipe 11.

Of course, the interior of the container 1 and of the tank 3 can be placed in communication as described above only when the respective liquids (as gasolene and water) are not miscible.

As shown in the detail views Figs. 5, 6 and 7, the stem or spindle of the automatic shut-off valve 12 controlling the draw-off pipe 11, consists of an upper part 16 carrying a hand wheel 15 and of a lower part 18 carrying the valve proper 17. These parts 16, 18 are in alinement, and the lower part 18 passes through a stuffing box 19 on the valve casing 20, and is pressed downward by a coiled spring 22, one end of which bears against a collar 21 on the stem part 18 and the other against a stationary plate 23 rigidly connected with the valve casing 20. At its upper end the stem part 18 carries a collar 24, and a similar collar 25 is provided at the lower end of the upper stem part 16. These two collars are normally held together as in Fig. 5 by means of a connecting member or fork 27, the upper part 16 being screw-threaded and fitted into a correspondingly threaded part of the stationary frame member 26. Thus, when the connecting member 27 is in the position shown in Fig. 5, the valve 17 will be moved toward or from its seat 28, by turning the hand wheel 15.

When the floating bell reaches its lowermost position, then, according to this invention, the valve 12 controlling the draw-off pipe 11 is to be closed automatically, so as to prevent the withdrawal of any further amount of inflammable liquid 2 from the container 1. For this purpose the following arrangement has been provided: A rope, wire, or other flexible connection 32 attached to the horizontally movable fork 27, passes in engagement with the roller 29 at the lower end of one of the guide posts 7, then to a roller 30 located at the upper end of said post, and finally to a weight or disk 31 located in the path of an operating projection or member 33 secured to the bell 5. Normally the connection 32 exerts no appreciable pull to remove the connecting or coupling member 27 from the position shown in Fig. 5, it being understood that the spring 22 pulls the collar 24 downward so as to press it against the connecting member 27 and to prevent any accidental movement thereof. The valve 12 is thus normally held open. When, however, the bell 5 reaches its lowermost position (Fig. 2), the operating member 33, coming in contact with the projection 31, pulls it down, and the connection 32 thus pulls the coupling member 27 away from the collars 24, 25 as indicated by dotted lines in Figs. 6 and 7. The lower stem part 18 being thus released, the spring 22 will at once throw the valve proper 17 against its seat 28. Therefore, as soon as the bell 5 falls to a predetermined level, the valve 12 will be closed automatically, so that it will then be impossible to withdraw any large amount of inflammable liquid through the pipe 11. Thus there cannot arise, within the apparatus, a partial vacuum such as might cause injury to the bell.

Under extraordinary circumstance (breaking of the connection 32, or freezing fast of the coupling member 27, etc.) the device might fail to operate as described above. As an additional safeguard, there is provided therefore, another, independent device to prevent the formation of a partial vacuum in the apparatus if inflammable liquid is withdrawn after the bell 5 has reached its lowermost position. This additional device consists of an air-admitting or venting valve 34 shown in detail in Fig. 3, and arranged to be opened as the bell sinks, shortly before it reaches its lowermost position. This venting valve 34 comprises a valve proper 35 coöperating with the tubular or bell-shaped seat 36 screwed into the cover 37 of the nipple or housing 38 extending from the top or roof of the bell 5. To the lower part of the valve seat 36 there is secured by ribs 39 a cup-shaped member 40, an annular space 41 being formed between this member and the valve seat 36. This space 41 is closed at the top by a ring 42 resting on the edges of the seat 36 and member 40 and acting as a check valve opening toward the interior of the bell 5. The valve proper 35 is pressed down on its seat by a weighted lever 44 fulcrumed at 43 upon a bracket secured to the bell.

As the bell 5 approaches its lowermost position, the free end of the lever 44 will engage an actuating projection 45 on vertical post 7 so as to cause said lever to swing on its fulcrum 43 and to unseat the valve 35 (Fig. 2). Air may then pass from without past the automatically opening check valve 42 into the bell 5, so that atmospheric pressure will prevail within the bell, preventing the formation of any partial vacuum such as might cause the outside pressure to crush or at least deform the bell. The danger of forming an explosive mixture by the admission of such air is very slight, it being well known that air if admixed to the protective gas in slight proportions, will not materially reduce the protective action of

such gas. At any rate, under the very exceptional circumstances mentioned, it is more important to guard against the crushing of the bell by external pressure than against the very slight danger of explosion.

In case an excess of protective gas should be supplied to the bell 5 through the pipe 10, such excess will be allowed to escape by means of the automatic blow-off device shown best in Fig. 4. This device consists of a siphon-like elbow pipe 46 extending through the vertical wall of the bell 5 and secured thereto, the inner member 47 of the said pipe having its end at a lower level than its outer member 48, which latter is within the outer space of the tank 3. Should the bell rise beyond its normal uppermost position, first the member 48 and then the member 47 will rise from the sealing liquid 4 in the tank 3. The excess gas may then pass out into the air through the pipe 46, and if any particles of liquid are carried along by the escaping gas, these will be discharged into the main body of sealing liquid by the downwardly facing member 48.

While the example illustrated comprises a container arranged within the gasometer which holds the protective gas and is provided with a vertically movable bell, it will be understood that the container and the gasometer might be arranged side by side. This modification and others may be made without departing from the nature of the invention as set forth in the appended claims.

I claim as my invention:

1. A container for inflammable liquids, a gas holder adapted to contain an inert gas communicating with said container and provided with a vertically movable floating bell, a draw-off pipe connected with said container, a shut-off means in said pipe and means operative when said bell arrives at a certain point in its downward movement near its lowermost position for causing the shut-off means to close the draw-off pipe.

2. A container for inflammable liquids, a gas holder adapted to contain an inert gas communicating with said container and provided with a vertically movable floating bell, a draw-off pipe connected with said container, a shut-off means in said pipe adapted automatically to close the same, a detent to hold said shut-off means in the open position and means operative when said bell arrives at a certain point in its downward movement near its lowermost position for releasing the said detent to cause the shut-off means to close the draw-off pipe.

3. A container for inflammable liquids, a gasometer communicating with said container and provided with a vertically movable bell, a draw-off pipe connected with said container, a shut-off valve controlling said pipe and provided with a two-part stem, a coupling member for normally connecting the parts of said stem and holding the valve open means for closing the valve when the coupling member is removed from its normal position, and means, controlled by the movement of the gasometer bell, for shifting said coupling member from its normal position as the bell approaches its lowermost position.

4. A container for inflammable liquids, a gas holder adapted to contain an inert gas communicating with said container and provided with a vertically movable floating bell, a draw-off pipe connected with said container, a shut-off means in said pipe, means operative when said bell arrives at a certain point in its downward movement near its lowermost position adapted to cause the shut-off means to close the draw-off pipe and means also controlled by the movement of said bell for establishing open communication between the interior of said bell and the outside air upon the further descent of said bell to a position lower than that at which the shut-off means in the draw-off pipe is arranged to close the same.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ERNST HURLBRINK.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.