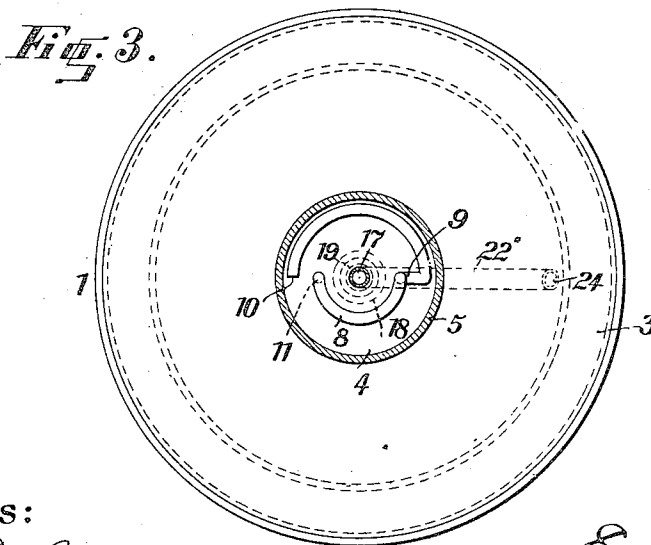
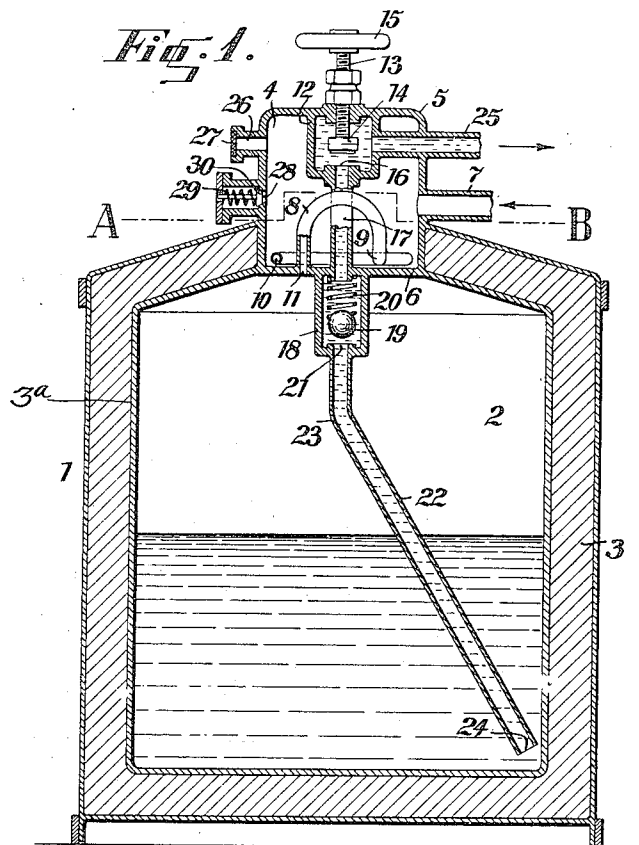


E. HURLBRINK.
CONTAINER FOR INFLAMMABLE LIQUIDS.
APPLICATION FILED MAY 27, 1914.

1,295,321.

Patented Feb. 25, 1919.
4 SHEETS—SHEET 1.



Witnesses:

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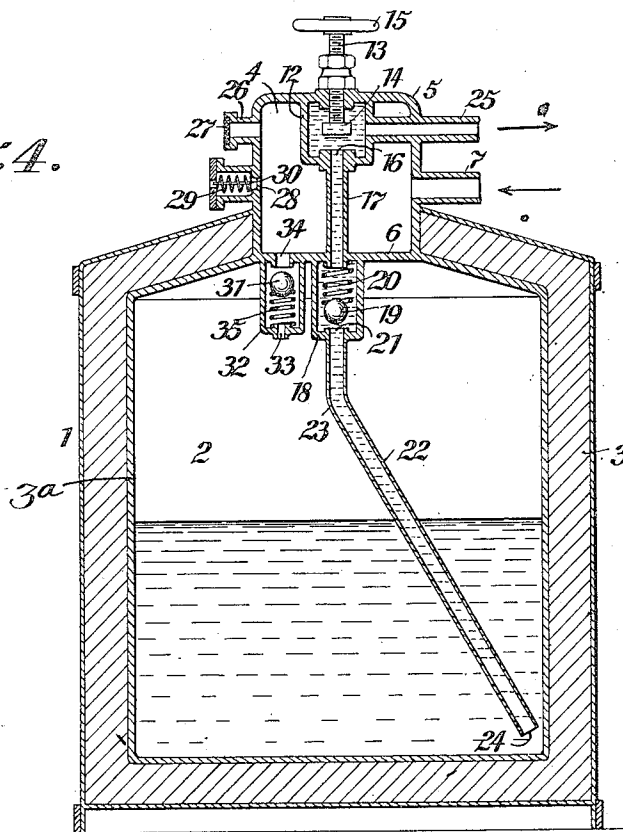
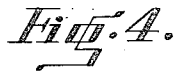
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Fig. 5.

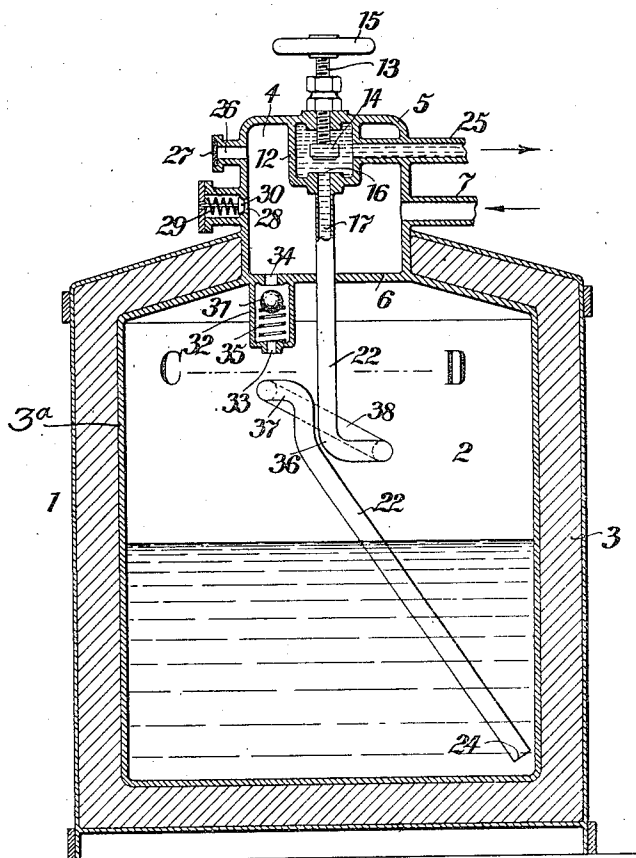
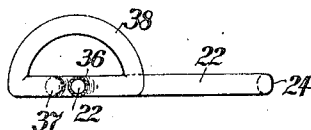


Fig. 6.



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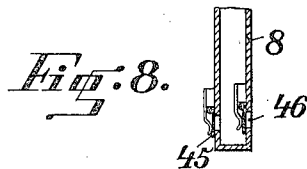
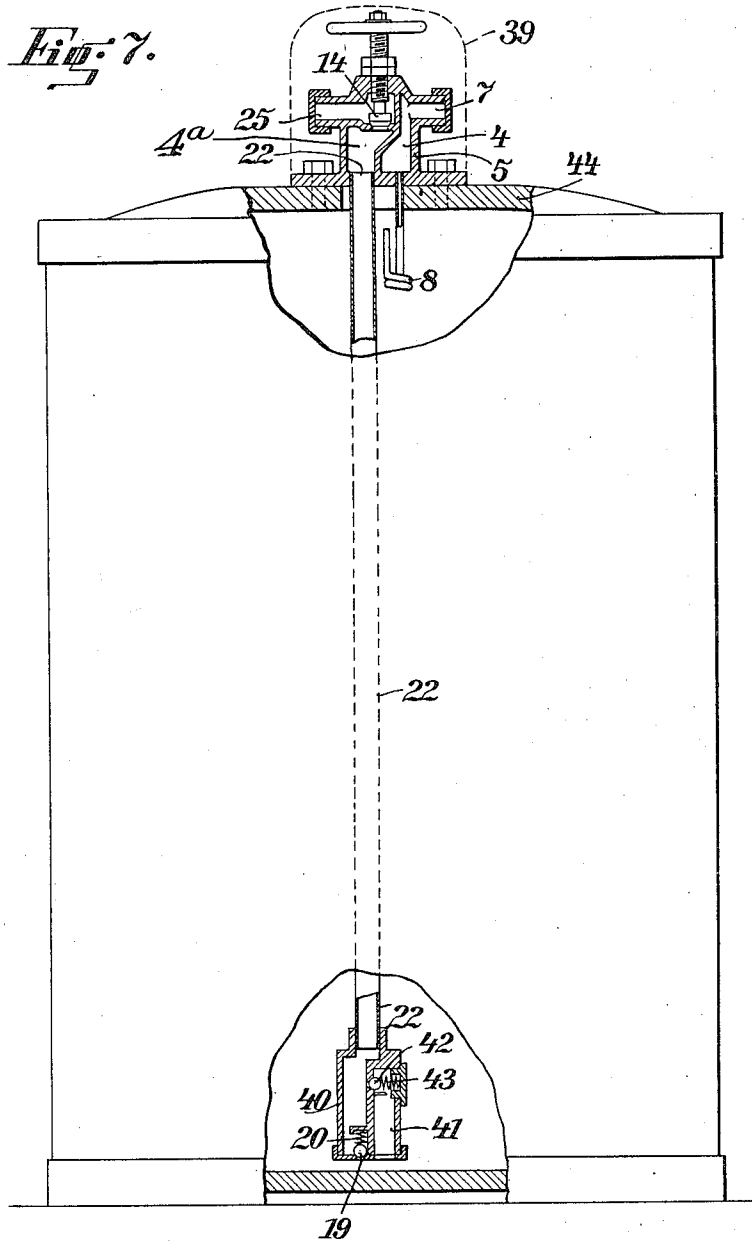
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UNITED STATES PATENT OFFICE.

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CONTAINER FOR INFLAMMABLE LIQUIDS.

1,295,321.

Specification of Letters Patent.

Patented Feb. 25, 1919.

Application filed May 27, 1914. Serial No. 841,192.

To all whom it may concern:

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

My invention relates to containers for inflammable liquids and has for its object to construct such containers in a manner to prevent unintentional outflow of the contents and to prevent any air from reaching the interior of the container. A further object of my improvement is to provide a means for automatically arresting the outflow of the liquid in case a fire should occur in the vicinity of the said container. My invention will be fully described hereinafter and the features of novelty will be pointed out in the appended claims.

Reference is to be had to the accompanying drawings in which Figure 1 is a central longitudinal section of my improved container with the parts in the position assumed during outflow of the contents; Fig. 2 is a similar view showing the container in position for filling; Fig. 3 is a horizontal section on the line A—B of Fig. 1; Figs. 4 and 5 are sectional views similar to Fig. 1 of two different forms of my improvement; Fig. 6 is a detail section on the line C—D of Fig. 5; Fig. 7 is an elevation with parts in section of still another form of my invention; and Fig. 8 is a detail view of a different valve arrangement.

Referring more particularly to Figs. 1, 2 and 3 the container comprises a shell 1 of any suitable material preferably lined on the inside with an insulating material 3, the latter in turn being also preferably covered with a suitable covering 3^a to protect the said material 3 from the liquid contained in the chamber 2. A chamber 4 is located at one end of the container and is formed by means of a cap 5 which is preferably an integral part of the wall 6 of said container; the said cap 5 being provided with a pipe or tube 7 communicating with the chamber 4 and adapted for connection either with a source of gas under pressure or with a supply of the particular liquid as will be more fully explained hereinafter. The chamber 4 also contains a tube 8 carried by the wall 6 and bent into a plurality of U-bows and at right angles as indicated at 9 to form what

might be termed a coil, the said tube 8 having its one end 10 located in close proximity to the wall 6 in communication with the chamber 4 and its other end 11 connected with the chamber 2. A valve casing 12 is located within the chamber 4 but has no communication therewith and is provided with a valve seat 16, controlled by a valve 14, the latter being carried by a screw-threaded stem 13 adapted to be rotated by means of a hand wheel 15. The valve seat 16 is located adjacent to one end of a tube 17 extending from said casing 12 through the wall 6 into a valve chamber 18 located interiorly of the container 1 in the chamber 2 thereof. This valve chamber 18 contains a ball-valve 19 normally pressed, by means of a coil spring 20, upon a valve-seat 21 located adjacent to the end of a pipe 23 communicating with the valve-chamber 18 and having its end 24 located in close proximity to the bottom of the container and being bent at 23 to bring said end 24 closely adjacent to the side wall thereof as clearly shown in Fig. 1. The valve casing 12 is further provided with an outlet tube 25 which extends through the cap 5 and may be suitably connected with the place or device where the liquid is to be used. In addition to this the said casing 12 is formed with an opening 26 which normally is sealed by means of a closure 27 constructed of a material which is easily fused or melted or otherwise destroyed by heat or flame. A safety valve 30 controlling an aperture 28 in the chamber 4 and itself controlled by a coil spring 29 may also be provided if desired.

When it is desired to utilize all or a portion of the liquid contained in the container 1 the same is placed in an upright position as shown in Fig. 1 and the pipe 7 is connected with a source of gas which is non-inflammable or which may be brought into contact with the said liquid without any harmful results. This gas will fill the chamber 4 and if the valve 14 is opened by actuating the hand wheel 15, the said gas will be forced into the end 10 and through the coil 8 and out of the end 11 thereof into the chamber 2. The pressure of said gas being thus brought to bear upon the liquid in said chamber 2, said liquid will be forced into the end 24 and up through the pipe 22 and after raising the valve 19 from the seat 21, against the tension of the spring 20, passes into the valve-chamber 18, and through the

tube 17 and into the valve casing 12 and from thence out through the pipe 25 to the point or place of use.

If during such outflowing of the liquid a fire should occur in the vicinity of the receptacle, the heat or flames therefrom will melt or otherwise destroy the closure 27 and thus open the chamber 2 to the atmosphere by way of the opening 26. As soon as this has occurred the gas entering through the pipe 7 into the chamber 4 instead of passing through the tube 8 into the chamber 2 will pass out of said chamber 4 through the opening 26 and the flow of inflammable liquid through the pipe 25 will immediately and automatically cease. The insulating material 3 will protect the liquid remaining in the receptacle 1 from the effects of the fire or the heat therefrom so that all danger of explosion and additional fire is entirely obviated. If during operation of the receptacle the pressure of the gas entering through the tube 7 exceeds a predetermined point the safety valve 30 will be opened to relieve the same, it being understood that the tension of the spring 29 is computed accordingly.

When it is desired to fill or replenish the receptacle 1 it is placed in a horizontal position as indicated in Fig. 2 with the valve 14 being open as shown, and the tube 7 connected with a source of liquid preferably under pressure. The end 10 of the tube 8 as illustrated is in its lowest possible position while the end 24 of the pipe 22 is raised to its highest position. In this condition the liquid is forced into the chamber 4 and through the tube 8 into the receptacle 1, the gas in the chamber 2, as the liquid level rises, being forced through the tube 22, valve chamber 18, tube 17, valve casing 12 and tube 25, the valve 19 being raised from the seat 21 by the said gas to make this possible. If any liquid remains in the chamber 4 after the filling operation has been discontinued the same will be forced through the tube 8 into the receptacle by the pressure of the gas entering through the tube 7, the first time a quantity of liquid is again withdrawn in the manner described above.

As will be apparent from the foregoing the flow of the gas and of liquid during withdrawal of liquid from the receptacle and during the filling operation respectively is always in the same direction through the tubes or pipes 7, 8, 22, 17 and 25.

It will further be seen that the valve 19 constitutes an automatic safety device for preventing the liquid from unintentionally flowing from the receptacle when in a horizontal or any approximately similar position, this being due to the fact that the moment the valve 14 is opened atmospheric pressure will be added to that exerted by the spring 20 to maintain said valve 19 firmly

on its seat, thus preventing any air from reaching the chamber 2. At the same time said valve prevents any liquid from flowing through the pipe 22 from the said chamber 2.

The tube 8 in addition to its other functions constitutes an additional safety device for preventing the liquid from unintentionally leaving the chamber 2 or from gaining access to the open. For instance any air which might enter through the opening 26 after the closure 27 has been destroyed and finds its way into the tube 8 would be arrested by the pressure of the gas contained in the chamber 2 exerted as said gas sought to escape through said tube 8 so that the incoming air and the outgoing gas would be balanced and the progress of both arrested. That is the horizontal portion of the tube 8 acts as a fluid seal and arrests the progress of any air through said tube into the container. This is due to the pressure of the gas therein, the specific weight of which is greater than that of the air and thus prevents diffusion and withdrawal of the liquid. In other words, the air is under normal pressure while the gas pressure is always in excess of said normal pressure so that a counterbalancing of pressures takes place between the two in the tube 8 which brings about a neutral effect and arrests the progress of both the gas and the air thus guarding against the formation of a combustible mixture in the container by the inflow of air.

In the form of my invention shown in Fig. 4 the tube 8 is replaced by a ball-valve 31 contained in a casing 32 and controlling a passage 34 extending between the chamber 4 and said casing 32, the latter communicating with the chamber 2 by means of an aperture 33. The said ball valve 31 is normally maintained against its seat to close the passage 34 by means of a coil spring 35 and operates similar to the valve 19 although in a reverse direction. In other respects the construction of this form of my invention may be the same as the one first described.

In withdrawing liquid from this form the gas under pressure enters the chamber 4 through the tube 7 as in the first form and after depressing the valve 31 so as to free the passage 34 passes into the valve casing 32 and through the aperture 33 into the chamber 2 and thus raises the liquid through the pipe 22 and finally out of the tube 25 in the same manner as hereinbefore brought out. This receptacle may be filled in the same way as in the first form by reversing the operation as described above.

In Fig. 5 the valve 19 and its coöperating parts are omitted and the pipes 17 and 22 are united and the latter is thus directly connected with the valve casing 12. The pipe 22 at some point within the chamber 2 is looped or bowed so as to extend at substan-

tionally right angles to the axis of the receptacle as indicated at 36 and 37 and so as to be inclined as illustrated at 38. This arrangement operates in the same manner as the tube 8 and prevents air from rushing into the chamber 2 through the pipe 22 when the valve 14 is opened. The construction and operation of this last form may otherwise be the same as the two forms first described both as to emptying and as to filling.

The valve 31 of Figs. 4 and 5, in case the closure 27 has been destroyed, also prevents air which may enter the chamber 4 from entering the chamber 2 and being substituted for the gas which may be contained in the upper part of the receptacle or rather the said chamber 2.

The form shown in Fig. 7 comprises for instance a wrought iron receptacle or tank 1 having a cover 44 on which the valve casing 5 is located, the latter being divided into two chambers 4 and 4^a, one of which 4^a is connected with the tube 25 and the other 4 with the tube 7 and which have no communication with each other. A valve 14 similar to and operated the same as the corresponding valve in Fig. 1 controls the connection between the chamber 4^a and the tube 25, the chamber 4^a in turn being connected with the interior of the receptacle 1 by means of a pipe 22 which at its lower end carries and communicates with a valve casing 40 located near the bottom of the receptacle 1. This casing contains one valve 19 controlling an axial passage and under the influence of a spring 20 and another valve 42 controlling a transverse passage and under the influence of a spring 43, the transverse passage last named establishing a connection between a chamber 41 and the pipe 22. A tube 8 corresponding to the tube 8 of Fig. 1 connects the chamber 4 with the interior of the receptacle 1 and is bent into a horizontal coil with its exit end projecting upwardly.

To withdraw liquid from the receptacle of this last form a gas under pressure is forced through the tube 7 into the chamber 4 and from thence through the tube 8 into the interior of the receptacle 1. The pressure of said gas will thus be exerted on the liquid and will by way of the chamber 41 cause the said liquid to force the valve 42 against its seat to close the above mentioned transverse passage, while at the same time the liquid will raise the valve 19 and thus pass through the axial passage controlled thereby, through the pipe 22 and out of the passage 25, it being understood that the valve 14 is open to make this possible. When filling the receptacle 1 the operation is the reverse: that is the liquid is caused to enter through the passage 25 and through the pipe 22 and will open the valve 42 and thus pass through the chamber 41 into the interior of the receptacle, while at the same time the valve 19 will

be forced firmly upon its seat. During this operation the gas contained in the receptacle will pass through the tube 8 into the chamber 4 and out through the tube 7. It will be seen that with this form the receptacle may remain in the same position during withdrawal of the liquid or while liquid is being introduced into same, thus making it unnecessary to bring said receptacle to a horizontal position when it is desired to fill same.

Instead of providing the tubes 8 with various forms of bends or bows for instance as in Figs. 1 and 7 the said tubes may be provided with transverse openings controlled by spring pressed flap valves 45 and 46 located respectively externally and internally of said tubes, the one end of which in this case would be sealed. Thus the valve 45 will open to permit gas to enter the interior of the receptacle when it is desired to withdraw liquid therefrom, the valve 46 meanwhile serving as an outlet valve. If desired ball valves or valves of other types might be substituted for the valves 45 and 46.

It will be seen in all the forms of my improvement that air is prevented from reaching the contents of the receptacle, even when the valve 14 is open or the closure 27 has been destroyed and the said contents are prevented from unintentionally flowing from said receptacle. My improved receptacles may thus not only be used for the purpose of permitting a safe withdrawal or filling in of inflammable liquids but may also be used for storing and transporting such liquids without danger of explosion or fire.

Various changes in the specific forms shown and described may be made within the scope of the claims without departing from the spirit of my invention.

I claim:

1. A container of the kind described comprising a receptacle for the liquid, a tube therein, a valve chamber connected with said tube, an axial operating valve and a transverse operating valve in said chamber, said axial valve being opened by pressure as the liquid is withdrawn through said tube while said transverse valve remains closed and said transverse valve being opened by pressure as liquid is introduced through said tube to fill the receptacle while said axial valve remains closed and means through which a gas may be introduced to expel said liquid through said tube and to permit said gas to escape as the receptacle is filled, the said transverse valve and axial valve acting independently of each other.

2. A container of the kind described comprising a receptacle for the liquid, a tube extending into said receptacle, a valve chamber at the inner end of said tube, a valve therein adapted to be opened under the pressure of outflowing liquid whereby said tube may be used to withdraw liquid from said recep-

tacle, a second valve arranged to be opened under the pressure of inflowing liquid whereby said tube may be used to introduce liquid into said tank, the pressure of the liquid in each instance tending to close that valve which is not opened thereby, and means whereby a medium for expelling said liquid may be introduced into said receptacle.

3. A container of the kind described comprising a receptacle for a liquid, an outlet for said liquid, means for conducting an expelling gas into contact with said liquid, and a closure operatively combined with said means and adapted to be destroyed by heat or flame whereby the flow of the expelling gas is diverted and the expulsion of the liquid arrested after said closure has been destroyed.

4. A container of the kind described comprising a receptacle for a liquid, a casing carried by said receptacle and located exteriorly thereof, said casing being divided into two compartments separate from each other and from said receptacle, means connecting each of said compartments with the exterior of said casing, and connections from each of said compartments to the interior of said receptacle, one of said last named connections including a portion curved in a plane transverse to a contiguous portion of said connection.

5. A container of the kind described comprising a receptacle for a liquid, a casing carried by said receptacle and located exteriorly thereof, said casing being divided into a gas compartment and a liquid compartment separate from each other and from

said receptacle, means connecting each of said compartments with the exterior of said casing, a tube of relatively small internal diameter connecting said gas compartment with the interior of said receptacle, said tube including a portion curved in a plane transverse to a contiguous portion of said tube, a connection from said liquid compartment to the interior of said receptacle, and a valve controlling said connection and arranged to open under the pressure of the outflowing liquid and to close under a pressure in the reverse direction.

6. A container of the kind described comprising a receptacle for the liquid, a casing carried by said receptacle and located exteriorly thereof, a connection whereby said casing may be connected with a source of gas under pressure, a dividing wall whereby the interiors of said casing and receptacle are separated from each other, a tube extending from said wall and connecting the interior of the casing with the interior of the receptacle, said tube being curved in a plane approximately parallel with said dividing wall and being further curved in a plane transverse to said first plane and means whereby liquid may be withdrawn from said receptacle.

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

ERNST HURLBRINK.

Witnesses:

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