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3,335,896

DUAL-PURPOSE SEALER CAP

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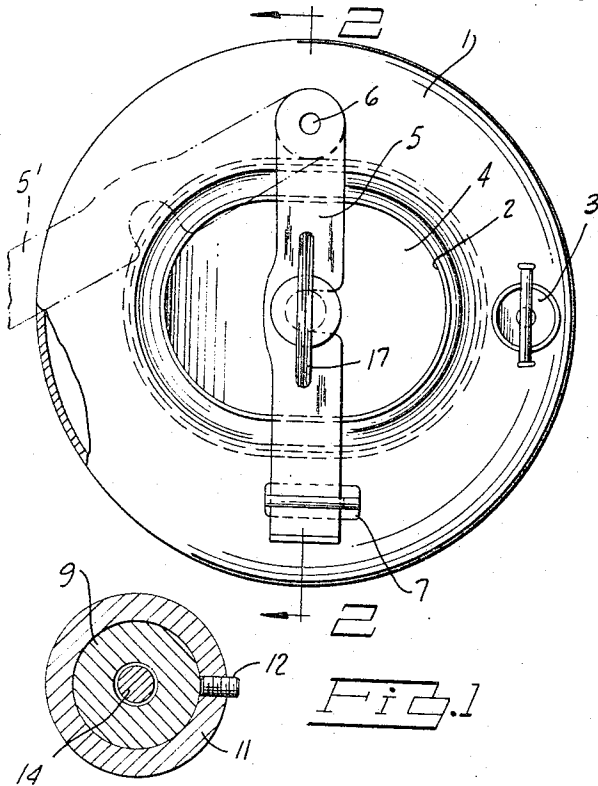


Fig. 4

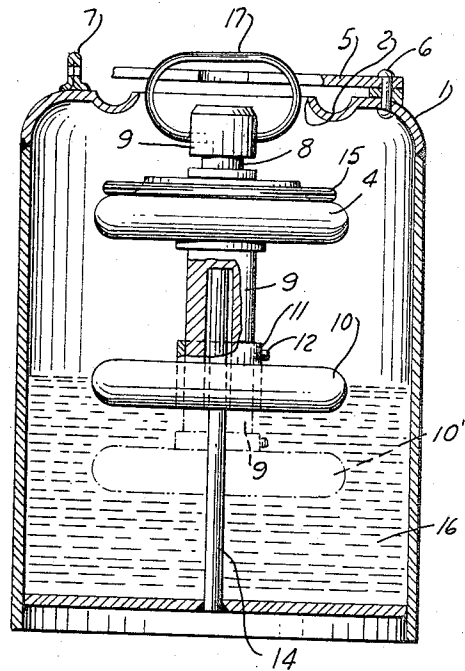


Fig. 3

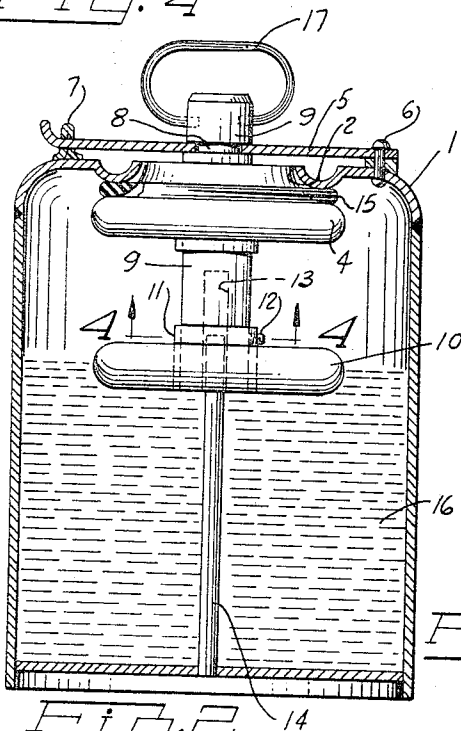


Fig. 2

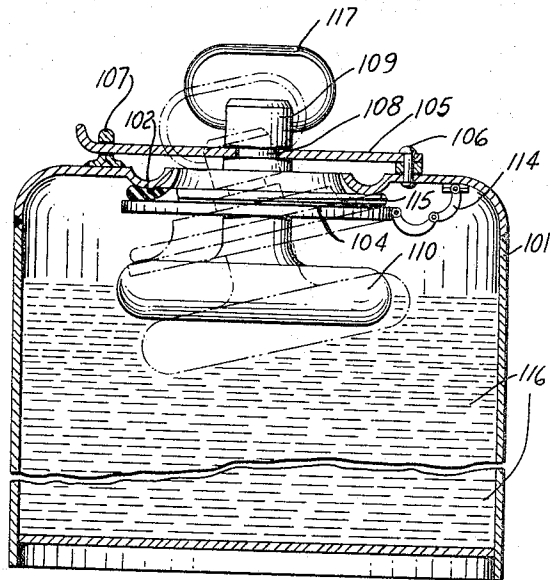


Fig. 5

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DUAL-PURPOSE SEALER CAP

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8 Claims. (Cl. 220—25)

The present invention relates to fluid containers. It relates particularly to fluid containers for liquids under pressure requiring a predetermined volume of compressible gasses to be present when the container is filled with liquid. More particularly, it relates to a floating type closure for liquid containing vessels in which the closure device has a sealing member actuated by a liquid level responsive member that assures a predetermined volume of air will be trapped in the container when it is filled with liquid.

Priorly, containers for liquids under pressure did not have sealing means that were responsive to liquid level and it was necessary to visually observe the height of the liquid and the amount of air being trapped in the container. If the liquid in the tank was too high before the filling operation was concluded, it was necessary to pour out part of the liquid to obtain the proper proportion of compressible and non-compressible fluids. Examples of this prior art are U.S. Patent No. 2,544,854, Oys et al., and U.S. Patent No. 2,638,255, Fletcher.

Certain liquid containing pressure tanks such as those used for painting and spraying insecticides or as fire extinguishers must have a minimum volume of air in the container which is compressed to maintain pressure during the spraying operation without the necessity of continuously operating a compressor or pump. In the prior art this maintaining of air volume was by separate tank or by visually or otherwise approximating the level to which the tank is filled.

It is therefore an object of the present invention to provide a closure means for a liquid pressure tank having correlation between liquid level and actuation of the sealing means.

It is another object of this invention to provide a low-cost, liquid-level responsive pressure tank sealing means.

It is a further object of the present invention to provide a liquid level responsive sealing means having an adjustment whereby the sealing action may be set to occur at a predetermined liquid level.

It is a further object of the present invention to provide a sealing means for a container which pivots into sealing position when the liquid therein is filled to a predetermined height.

It is a still further object of the present invention to provide a closure for the opening of a pressure tank which is permanently attached to the tank so it will not become lost during filling operations.

The described embodiment of this invention is illustrated on a pressure tank of the type normally used for insecticides. It could be utilized for any liquid tanks where it is desired to limit the level of the liquid without departing from the teaching of this invention.

This novel closure has a sealing means to engage the edge of the filling opening in the tank and contains a float which will force the seal into engagement with the edge of this opening when the liquid reaches a predetermined level, during filling. This assures that a predetermined volume of air or other gas will be included above the level of the liquid to aid in maintaining pressure on the liquid during the spraying operation.

In one aspect of the present invention, the handle on the closure member is such as to be in a locking position when the float forces the seal into the engaged position.

While this invention is illustrated in connection with a pressure tank, it may well be used on a fuel tank or on

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any tank where it is desired to maintain the level of the liquid below the filling opening of the container.

These and various other objects and features of the invention will be more clearly understood from a reading of the detailed description of the invention in conjunction with the drawings in which:

FIGURE 1 is a top plan view of a container provided with a closure according to the invention and showing the means of locking the closure in place;

FIGURE 2 is a partial vertical cross section of one embodiment of the invention showing a linear moving float actuated sealing means, taken along the line 2—2 of FIGURE 1, and looking in the direction of the arrows;

FIGURE 3 shows the linear moving float actuated sealing means in the unsealed or filling position and the adjustment of the float for different predetermined filling levels;

FIGURE 4 is a cross section taken along the line 4—4 of FIGURE 2 and showing in detail the means for adjusting the float; and,

FIGURE 5 shows a hinged modification of the present invention in which the closure member containing the sealing means and the float rotates about a fixed point.

Referring more particularly to the drawings in which similar reference characters represent similar parts in each of the several views, FIGURE 1 shows a container 1 having a filling opening 2 therein and a pump 3. The opening 2 is closed by a cap 4 which cap is held in closed position by a pivoted locking plate 5 pivoted on a pin 6 and secured under a bracket 7.

Referring to FIGURE 2, it will be seen that the plate 5, which pivots about the pin 6, engages reduced diameter area 8 of the rod 9 which is attached to the oval shaped member 4. This rod 9 extends out the lower side of the member 4 and is adjustably connected to the float 10 by means of a sleeve 11 and a set screw 12. This rod 9 has a cavity 13 therein into which guiding rod 14 is inserted to guide the assembly in a vertical direction. The member 4 has a resilient seal 15 thereon capable of engaging the edge of the opening 2 to provide a gas-tight seal when the assembly is pushed upward by the force exerted on the float 10 by the liquid 16.

FIGURE 3 shows the float closure assembly in the open position with the rod 9 resting on the guiding rod 14. It also shows the float 10 as vertically adjustable on the member 9. This adjustment is obtained by sliding the sleeve 11 on the member 9 and maintaining it in the adjusted position by the set screw 12. In the lower position as shown the bar 5 is of course pivoted out of engagement with the rod 9. As the liquid 16 rises in the container it engages the float 10 and carries the float closure assembly in a vertical direction until the seal 15 engages the lip 2 of the opening forming a seal between this lip and the closing member 4. When the assembly is in this position the member 5 is pivoted into engagement with the groove 8 of the member 9 to thus hold the assembly firmly into the fully closed position. A ring 17 is provided for manually raising the float closure assembly to close the tank when it has been emptied or for some other reason it is desired to close the container when partially filled.

A second specie of the invention is shown in FIGURE 5 which is a cross section of a pressure tank having a pivoted closure assembly utilized. In this figure the pressure container 101 has an opening 102 therein with a sealing cap 104. In this specie the cap 104 is pivoted on a hinge member 114. It has a resilient sealing member 115 capable of forming an air-tight junction between the member 104 and the lip 102 of the filling opening in the container. This closure cap 104 has a rod 109 extending therethrough with a groove 108 therein which may be

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engaged by the bar 105 to maintain the closure 104 engaged with the opening lip 102. The rod 108 extends through the member 104 to engage the float 110 so that the float 110, the cap 104, and the resilient seal 115 form a floating closure pivoted at 114. This floating closure assembly is driven upward under the force of liquid 116 as the container is filled so that when the level of the liquid reaches a predetermined height the opening is sealed in a closed position and the assembly may be locked in the sealed position by pivoting the bar 105 around the pin 106 until it engages the groove 108 and then hooking the member 104 under the bar 107.

It may thus be seen that in both species of my invention the closure sealing member is automatically driven to the closed position by the buoyant effect of the liquid as the container is filled. In one specie the float closure assembly is driven in a linear direction, while in the second specie it is driven in a circular direction to the closed position.

It will, therefore, be seen that my invention may be utilized to permit the production of a low cost closure for a liquid containing tank to automatically control the height of the liquid to permit the inclusion of air above the liquid level of the tank.

While I have shown and described two illustrative embodiments of this invention, it is understood that the concepts thereof may be applied to other embodiments without departing from the spirit and scope of this invention.

What I claim is:

1. In a fluid container having a top end wall provided with a filling opening, a closure for said opening comprising:

- a resilient sealing means in said container for engagement with the inner surface of the container around the opening to be sealed;
- a rigid impervious cap in said container for enclosing said opening and carrying said sealing means; and
- a float operatively connected to said cap in a position spaced inwardly from said cap, whereby when the

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container is filled with the liquid, the liquid in the container will engage said float and thereby actuate said cap toward said top end wall and engage said sealing means with said wall around said opening, whereby the opening is sealed at a predetermined height of said liquid in said container.

2. The structure defined in claim 1, including: guide means for guiding said cap against said opening.

3. The combination according to claim 2 wherein said guide means includes an elongated guide member secured in said container means carried by said cover for engaging said elongated guide member.

4. The combination according to claim 2 wherein said guide means includes linkage means connecting said cap to said container.

5. The structure defined in claim 1, including:

a first locking means on said cap; and

a second locking means on said container for engaging said first locking means to secure the cap in place against said top end wall to enclose said opening.

6. The structure as defined in claim 5 including a handle and wherein said first locking means is positioned between said handle and said cap.

7. The structure as defined in claim 6 wherein said first locking means includes a cylindrical portion and wherein said second locking means includes a member movably mounted on said container and having a notch therein for engaging said cylindrical portion.

8. The structure as defined in claim 4 wherein said linkage means includes means hingedly coupling said cap to said container.

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