May 5, 1953 H. WOLCOTT 2,637,470

VENTED FLUID DISPENSING CONTAINER

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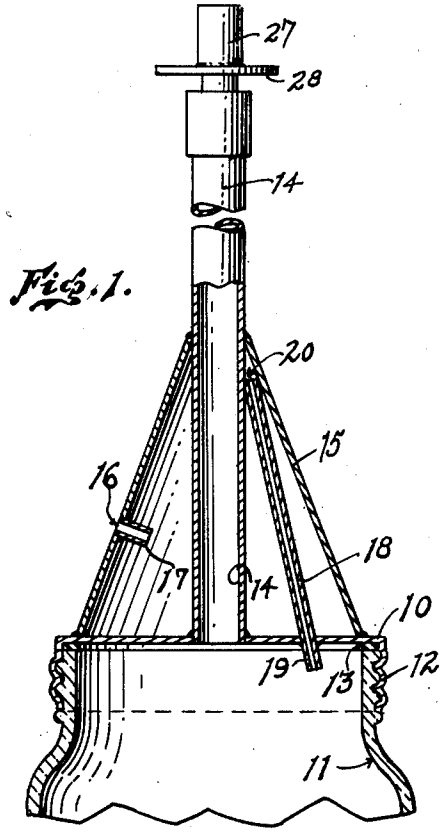


Fig. 1.

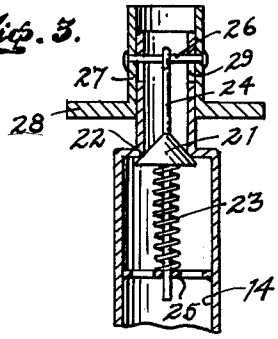


Fig. 3.

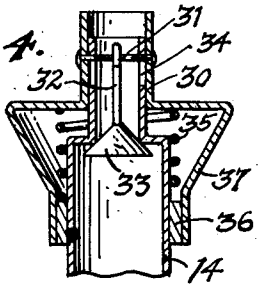


Fig. 4.

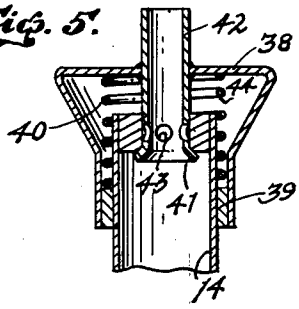


Fig. 5.

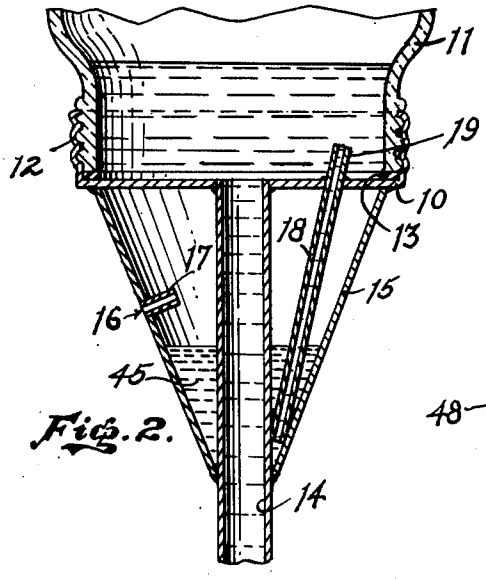


Fig. 2.

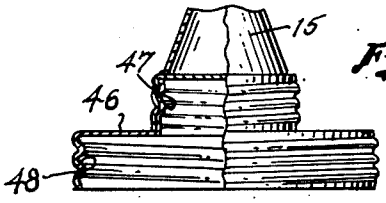


Fig. 6.

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VENTED FLUID DISPENSING CONTAINER

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3 Claims. (Cl. 222—481)

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The present invention relates to fluid dispensing containers and more particularly to a novel venting and fluid flow controlling means for a container from which lubricating oils, brake fluids and the like may be dispensed and/or held in a substantially sealed condition.

The principal object of the invention is to provide a fluid dispensing container having a novel venting means that will protect the fluid against contamination when the container is in use.

Another object of the invention is to provide a new and novel venting means for a sealed container which will operate without danger of any seepage of fluid through the venting aperture when the container is in use.

A further object of the invention is to provide a vent for a sealed container having a fluid control valve that is rendered operable when the container is in an inverted position.

Other objects and advantages of the invention will be in part evident to those skilled in the art and in part pointed out hereinafter in connection with the accompanying drawing, wherein there is shown by way of illustration and not of limitation a preferred embodiment of the invention.

In the drawing:

Figure 1 is a fragmentary view of a container constructed in accordance with the invention and with venting means, shown in section, as applied thereto,

Figure 2 is a view similar to Figure 1 showing the container in an inverted position,

Figure 3 shows a fragmentary sectional view of a fluid controlling valve of the type illustrated in Figure 1,

Figures 4 and 5 are modified forms of the valve which may be substituted for valve of Figure 3, and

Figure 6 is a fragmentary view, partially in section, of a container closure accommodating support by which the invention may be applied to jars or other containers of different sizes.

The purpose of a vent, such as is contemplated by the present invention, is to provide for a substantially uniform flow of a dispensed fluid from the container without gurgling or the entrapment of air by the discharging fluid as it flows from the container. Where a fluid such as lubricating oil, brake fluid or other semi-viscous liquids are dispensed from a container it is desirable to retain the fluid in a substantially sealed condition and against contamination when the container is not in use and at the same time provide for the admission of air to the interior of the container as the fluid flows therefrom in being

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applied to a point of use. In the dispensing of lubricating oil, brake fluid and the like, it is also a requirement that the container be provided with a pouring spout which can be directed into a more or less restricted fluid receiving opening into which the fluid is to be poured. In connection with this particular problem it is also desirable that means be provided whereby a control of the flow of fluid from the container is possible and to solve this particular problem I employ a simple form of valve in the form of an inverted stopper or valve member which is operated by merely bringing a valve operating member at the outer end of the fluid discharging spout into engagement with the side of a fluid receiving inlet of any receptacle, for example, such as an automobile crankcase or a fluid containing chamber of a hydraulic brake system.

At the present time where vents are provided for sealed containers of the type here contemplated it is the general practice to provide a long smaller diameter tube which is in direct communication with the atmosphere at its outer end and is extended downwardly into the container to a point closely adjacent the bottom thereof. While this form of venting means is satisfactory in a great many places it is open to the objection that the vent pipe has a tendency to pick up a certain amount of the fluid being dispensed by capillary attraction. Then as the container is inverted this fluid within the vent tube has a tendency to drip out and accumulate on the outside of the container. This is one of the problems which my present invention is designed to avoid. A further objection to the downwardly extended type of vent pipe is that when the cover of the container with such a vent pipe is removed there is danger of the vent pipe being bent or broken off. Another objectionable feature found with this type of vent pipe is that the closure member, when equipped with such a venting means, can only be used with a container having a depth substantially equal to and in no event less than the extending length of the vent pipe, whereas with the venting means here proposed there is no extension of the vent pipe into the fluid of the container and it is therefore adaptable for use with containers of varying depths.

While the invention is here described and shown in the drawing as applied to a portable container such as a glass jar which, when not in use, is placed in an upright position, it will be clear from what follows that the venting means here proposed will be equally effective both to retain fluid and also vent a container which is

permanently supported in an inverted position. Therefore, in order to take full advantage of the novel operating characteristics of my improved vent it will be found desirable to provide a valve means at the outer end of the pouring spout of the container which can be operated to permit the escape of fluid from the container in its inverted position.

For a consideration of what I believe to be my invention, reference is now made to Figures 1 and 2 of the drawings, wherein the numeral 10 designates a closure means that is adapted to be applied to either a glass jar or other container 11. In this instance, the cover 10 is shown as provided with a threaded flange 12 by which it is screwed upon a glass jar 11, a gasket 13 is also shown as providing an airtight seal between the cover 10 and the container 11. Centrally of the cover 10 there is a coaxially extending tubular spout 14 which terminates with its inner end flush with the inside of the cover 10 and may be extended outwardly to any desired point depending upon the conditions under which the contained fluid is to be dispensed. Secured to the cover 10 and disposed about the spout 14 and in sealing engagement with the latter at its apex there is a truncated conical chamber forming member 15 that is provided with a single vent opening 16 which in the present instance is shown as a short length of tubing 17 projecting inwardly at a right angle to the wall of the chamber forming member 15.

Extending through the cover 10 and at a point radially outward from the spout 14 there is a relatively smaller vent pipe 18 which extends a short distance through the cover 10 as at 19. At its upper end the vent pipe 18 terminates at the apex of the chamber formed by the chamber forming member 15 as at 20. With this arrangement, it was seen that when the container 11 is inverted as shown in Figure 2 of the drawing and fluid is being discharged through the pouring spout 14 air will flow to the interior of the container 11, through the small vent 16 to inside of the chamber formed by the member 15 and thence through the vent pipe 18 to the interior of the container 11. This latter figure of the drawing illustrates an extreme condition wherein a certain amount of fluid has accumulated within the venting chamber. Under these conditions the vent pipe 18 will suck up this fluid when the valve provided at the discharge end of the spout 14 is opened, as will be hereinafter described.

Reference is now made to Figures 3, 4 and 5 of the drawing wherein I have shown different arrangements for a valve such as will be found particularly suited for application to the end of the fluid pouring spout 14 as illustrated in Figure 1 of the drawing. First, as shown in Figure 3, the arrangement consists of a valve member 21 which is biased into sealing relation with a valve seat 22 formed by a restricted extension at the outer end of the pouring spout 14 by means of a compression spring 23. The valve member 21 is mounted upon a guide rod 24 that extends at its lower end through a spider 25 against which the spring 23 is seated and at its upper end the guide rod connects with a transversely extending pin 26 which is carried by a slidable sleeve 27 that forms a movable extension at the end of the pouring spout 14. This sleeve 27 has an annular operating collar or flange 28 that is adapted to be brought into contact with the side of an opening of a receptacle into which the fluid is to be discharged. The pin 26, as here indicated, extends through two oppositely spaced elongated slots 29 formed in the reduced outer end of the pouring spout 14 and when not in use the valve member 21 will be held in its uppermost position by the spring 23. With this arrangement it will be seen that no fluid will be discharged from the pouring spout 14 when the container 11 is inverted until the valve 21 has been opened by bringing the flange 28 of the slidable sleeve 27 into contact with the side of a fluid receiving aperture.

In Figure 4 the valve arrangement is somewhat similar to that shown in Figure 3 except that the valve biasing spring is disposed externally of the pouring spout 14 so that the spider described above is not required. In this arrangement a slidable valve operating member 30 carries a pin 31 to which a stem 32 of a valve member 33 is attached. The pin 31 moves within oppositely disposed slots 34 formed in a constricted end of the pouring spout 14 and a valve biasing spring 35 is enclosed within the operating member 30 to close the valve. At its lower end the spring 35 seats against a collar 36 which is fixed upon the pouring spout 14. In this arrangement the valve operating member 30 has a depending skirt-like portion 37 which slides freely over the fixed collar 36. Thus when the valve operating member 30 is out of contact with a fluid receiving receptacle the valve 33 will be held in its closed position by the spring 35.

In the arrangement of Figure 5 a valve operating member 38 of modified form is shown as slidably mounted upon a fixed collar 39 carried by the pouring spout 14 and at the outer end of the spout 14 there is a valve seat forming bushing 40 against which a flared end 41 of a tubular valve member 42 is seated. The tubular valve member 42 is secured intermediate its ends to the operating member 38 and at its lower end and within the limits of the valve seat forming bushing 40 it has a number of apertures 43 through which fluid may flow from the pouring spout 14 when the valve is operated in the manner above indicated. In this arrangement a compression spring 44 is provided for biasing the flared end 41 of the tubular extension 42 into sealing relation with the valve seat forming bushing 40.

With all of the above described valve arrangements it will be seen that when the fluid dispensing container 11 is equipped with a vent of the character described and is provided with any one of the above valve arrangements, no fluid will flow from the container either through the spout or through the vent tube until the valve is opened at the end of the pouring spout. By now referring back to Figure 2 of the drawings it will be seen that when the valve at the outer end of the pouring spout 14 is closed, the pouring spout will become completely filled with fluid as will also the vent tube 18, but when an equilibrium in air pressure has been obtained within the container no fluid will flow through the pouring spout 14 or the vent tube 18 until the valve is opened. In the event of an accumulation of fluid which may flow through the vent tube during a filling up of the pouring spout 14 it will be readily seen, as here illustrated, that when the valve at the outer end of the pouring spout 14 is opened the column of fluid within pouring spout 14 will cause air to be drawn in through the vent tube 17 of the venting chamber and thence into the container 11 through the vent tube 18. During this operation any oil, here designated by the numeral 45, which may have accumulated in the venting chamber will be

drawn back into the container 11 and as a consequence there will be no seepage or inadvertent spilling of the fluid through the vent tube as is the case with other forms of venting means wherein the vent tube is not extended into a sealed venting chamber which, as here illustrated, provides what might be properly referred to as a fluid sealing air trap.

As shown in the drawing my improved pouring spout with its venting chamber is mounted upon a screw cap 10 such as might be used with any ordinary glass jar of a definite size and to render this pouring spout adaptable for use upon other types of containers and particularly one having an open end of larger diameter, there is shown in Figure 6 an attachment, designated by the numeral 46, having an inner threaded portion 47 comparable in diameter to the threaded flange 12 of the arrangement shown in Figure 1 and an outer threaded portion 48 which may be of a diameter comparable to the open end of a larger container.

While I have, for the sake of clearness and in order to disclose the invention so that the same can be readily understood, described and illustrated specific devices and arrangements, I desire to have it understood that this invention is not limited to the specific means disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention what I claim and desire to secure by Letters Patent is:

1. In a fluid dispensing device, the combination of a container having an open top, a closure member for the open top of said container having an outwardly extending tubular fluid discharge pipe communicating with the interior of said container when said closure member is applied thereto, a vent pipe carried by said closure member extending outwardly along and adjacent said fluid discharge pipe and also communicating with the interior of said container at a point above any fluid therein when in an upright position, means forming an air chamber externally of said container into which the extending end of said vent pipe is enclosed, said air chamber having a vent opening positioned remote from the extending end of said vent pipe, and a valve means carried by said discharge pipe disposed outwardly beyond the extending end of said vent pipe and said air chamber, whereby upon inversion of said container said vent pipe will siphon back into said container any fluid which may have accumulated in said air chamber.

2. In a fluid dispensing device, the combination of a container having an open top, a closure member secured to the open top of said container having an outwardly extending tubular fluid discharge pipe communicating with the interior of said container, a vent pipe carried by said closure member extending outwardly from the top of said container and along said fluid discharge pipe and also communicating with the interior of said container and above any fluid therein when said container is in its upright position, and means forming an air chamber externally of and about said fluid discharge pipe into which the outwardly extending end of said vent pipe is enclosed, said air chamber having a vent opening positioned remote from the extending end of said vent pipe, whereby upon inversion said container will be vented through said air chamber without leakage through said vent when said container is inverted.

3. In a fluid dispensing device of the character described, the combination of a container for fluids, a closure member secured and sealed to the top of said container, an outwardly extending tubular discharge pipe secured to said closure member, said discharge pipe communicating with the interior of said container and having a normally closed shut-off valve at its outer end to control the flow of fluids therethrough, a cone shaped air chamber sealed at the apex to said discharge pipe and at its base to said closure member, a siphoning vent tube secured to the said closure member and extending within and to the apex of said cone shaped chamber, said siphoning air vent tube communicating with the interior of the container and above any liquid therein when in its upright position, an air vent tube extending through the side of said cone shaped air chamber and positioned remote from the extending end of said siphoning air vent tube, whereby upon inversion of said container and an opening of said shut-off valve the fluids trapped in said cone shaped air chamber will be automatically siphoned back into the container.

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