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3,278,094

POURING SPOUT FOR BATTERY FILLERS AND THE LIKE

Filed Feb. 7, 1966

2 Sheets-Sheet 1

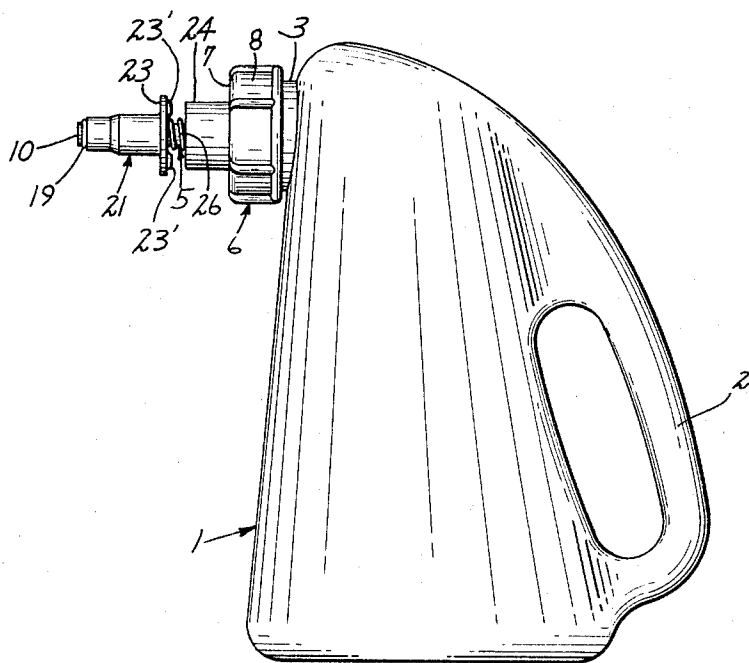


FIG. 1

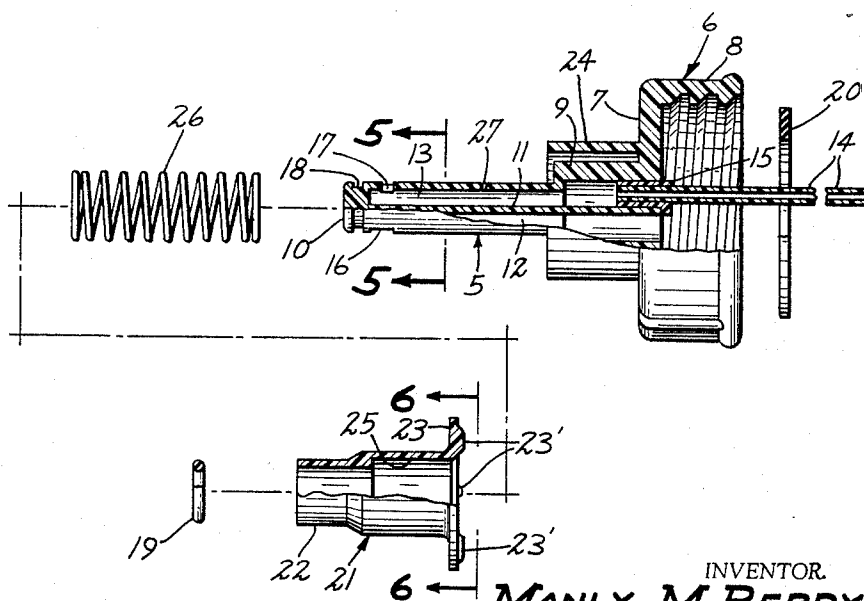


FIG. 2

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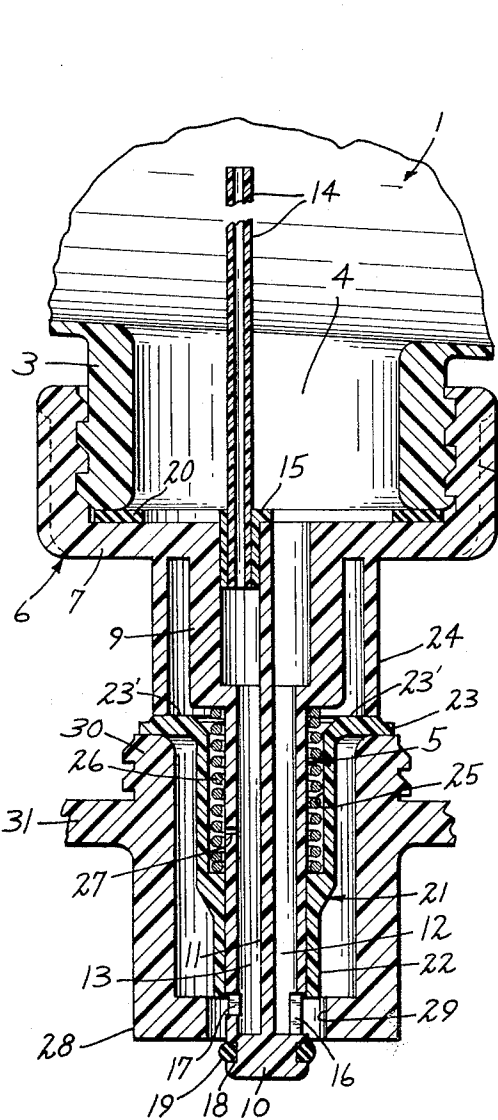


FIG. 3

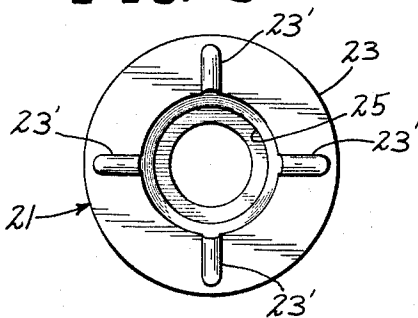


FIG. 6

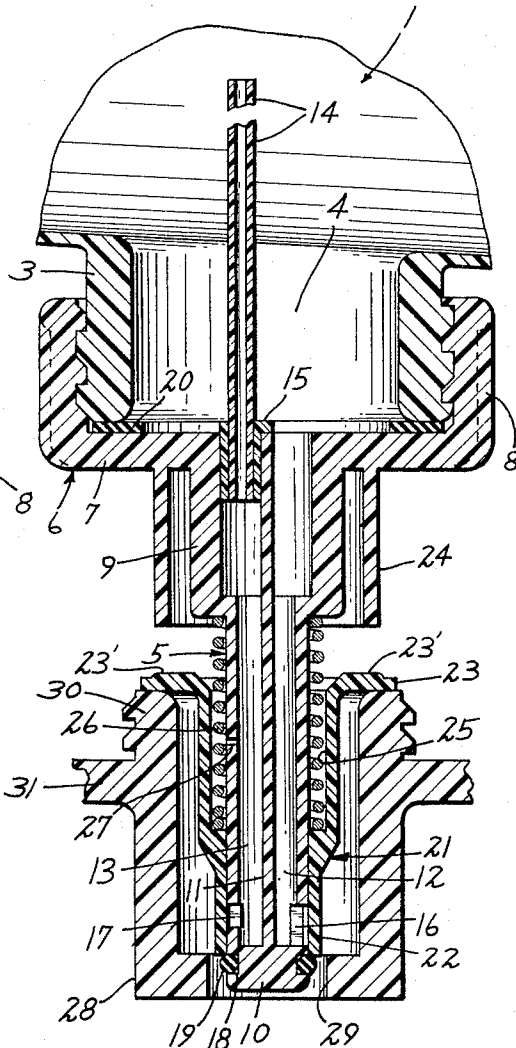


FIG. 4

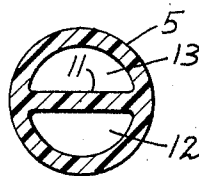


FIG. 5

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POURING SPOUT FOR BATTERY FILLERS AND THE LIKE

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4 Claims. (Cl. 222-479)

My present invention relates generally to liquid dispensing devices and more particularly, to an air vented pouring spout that is adapted to be secured to the discharge opening or neck of a fluid tight container to normally seal the contents thereof from accidental escape but which is adapted to dispense liquid from the container when the container is tilted or inverted, while simultaneously admitting air to the interior of the container.

More specifically, this invention relates to a pouring spout for use in filling storage batteries with liquid, such as distilled water or acid to a predetermined level; and is provided with means for automatically shutting off the flow of liquid from the container, to which it is connected, to the battery, when the liquid in the battery reaches said predetermined level.

An important object of this invention is the provision of a pouring spout for a battery filling container, having means for shutting off the flow of liquid at the discharge end of the spout whereby to minimize dripping of liquid from the spout when the supply of liquid is cut off.

Another object of this invention is the provision of a pouring spout as set forth which can be quickly and easily attached to a filler container and as easily and quickly removed to facilitate filling of the container with liquid, and which, when applied to the filler opening or well of a storage battery and pressed against the battery, will automatically fill the battery to a predetermined level.

Still another object of this invention is the provision of a pouring spout which is simple and inexpensive to produce, which is highly efficient in operation, and which is rugged in construction and durable in use.

To the above ends, I provide an elongated stem defining a pair of longitudinally extending liquid delivery and air vent passages which terminate in delivery and air inlet ports respectively in closely spaced relation to the outer end of the stem, the inner end of the delivery passage opening through attachment means at the inner end of the stem, for communication with the interior of a filler container to the discharge neck or opening of which the attachment means is rigidly but releasably connected. An extension tube is connected to the inner end of the stem and provides an air inlet extension to the interior of the container. A tubular member slidably encompasses the stem and has an outer end portion which alternately covers and exposes said ports responsive to movements of the tubular member in opposite directions, the extreme outer end of the tubular member being engageable with a valve acting sealing ring between the ports and the outer end of the stem to seal the ports from the surrounding atmosphere. The tubular member is biased toward engagement with the sealing ring by a coil spring and is provided with a battery engaging flange for moving the tubular member in the opposite direction to expose the ports when the stem is inserted into the filler opening or well of a battery.

The above, and still further highly important objects and advantages of this invention, will become apparent from the following detailed specification, appended claims and attached drawings.

Referring to the drawings, which illustrate the inven-

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tion, and in which like reference characters indicate like parts throughout the several views:

FIG. 1 is a view in side elevation of a liquid dispensing container, showing the pouring spout of this invention attached thereto;

FIG. 2 is an exploded view, partly in axial section and partly in side elevation, of the pouring or battery filling spout of FIG. 1, on an enlarged scale;

FIG. 3 is a still further enlarged axial section of the battery filler spout of FIG. 1, showing parts thereof in an operative position;

FIG. 4 is a view corresponding to FIG. 3, but showing parts thereof in a closed inoperative position;

FIG. 5 is a transverse section taken on line 5-5 of FIG. 2; and

FIG. 6 is a view in end elevation as seen from the line 6-6 of FIG. 2.

Referring with greater detail to the drawings, the numeral 1 indicates a liquid tight bottle-like container for use in replenishing the supply of liquid to storage batteries, the container 1 having a handle 2 and an externally threaded neck 3 which defines a discharge opening 4. The container 1 may be made from any suitable material, but is preferably molded from synthetic plastics.

The pouring spout comprises an elongated stem 5 that is firmly secured at its inner end to, or integrally formed with, a cup-like attachment coupling 6 having an annular wall 7, and internally threaded cylindrical wall 8 that is screw threaded on the externally threaded neck 3 of the container 1, and an axial hub 9 into which the inner end portion of the stem 5 is fitted, or with which the stem 5 is integrally formed. The stem 5 is hollow for the greater part of its length, having a solid outer end 10 and a longitudinal partition 11 extending from the outer end 10 to the inner end of the stem 5, whereby to divide the interior of the stem 5 into a liquid delivery passage 12 and an air vent passage 13. As shown in FIGS. 3 and 4, the liquid delivery passage 12 communicates with the discharge opening 4 in the container neck 3. A tubular extension 14 has one end secured in the inner end portion of the air vent passage 13 by means of a suitable bushing 15 and extends into the interior of the container 1 through the discharge opening 4 thereof, defining an extension for the air vent passage 13. Adjacent its outer end 10, the stem 5 is formed to provide a discharge port 16 communicating with the discharge passage 12, and an air vent port 17 which communicates with the outer end of the air vent passage 13. Longitudinally outwardly of the ports 16 and 17, the stem 5 is formed to provide a radially outwardly opening circumferential groove or channel 18 for reception of an annular valve element in the nature of a conventional rubber-like O-ring 19 which has an outer diameter greater than the diameter of the stem 5, so as to project radially outwardly therefrom. As clearly shown in FIGS. 3 and 4, an annular sealing washer 20 of rubber-like material is interposed between the annular wall 7 of the attachment coupling 6 and the adjacent outer end of the container neck 3.

A tubular member 21 encompasses the stem 5 intermediate the O-ring 18 and the hub 9, and is formed to provide a diametrically reduced outer end portion 22 which snugly encompasses the stem 5. The tubular member 21 is axially slidable on the stem 5 in opposite directions to alternately expose and cover the ports 16 and 17. The extreme end of the outer end portion 22 is adapted to seatingly engage the valve-acting O-ring 19, when ports 16 and 17 are covered, to prevent leakage of liquid from the delivery passage 13.

At its inner end, the tubular member 21 is formed to provide a radially outwardly projecting annular flange 23

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which engages a cylindrical skirt 24 that projects axially outwardly from the wall 7 and provides a stop element limiting axial movement of the tubular member 21 toward the attachment coupling 6. The tubular member 21 is provided at its inner end with a counterbore 25 which receives one end portion of a coil compression spring 26 that encompasses the stem 5, the opposite end of the spring 26 abutting the adjacent end of the hub 9. As shown, the spring 26 yieldingly urges the tubular member 21 in a direction wherein the outer end portion 22 thereof covers the ports 16 and 17 and seatingly engages the O-ring 19.

For a purpose which will hereinafter become apparent, the stem 5 is provided with a small diameter relief port 27 which connects the air vent passage to the atmosphere independently of the vent port 17. Preferably, the diameter of the relief port 27 is in the neighborhood of .002 inch, and the port 27 is disposed in closer proximity to the hub 9 than to the outer end of the stem 5, so that the port 27 is open to atmosphere in all positions of the tubular member 21. As shown, the flange 23 is formed to provide a plurality of circumferentially spaced radial ribs 23' that engage the stop element or skirt 24 to permit access of atmosphere to the relief port 27 when the tubular element 21 is in its liquid delivery position of FIG. 3.

In FIGS. 3 and 4, a filler neck or well portion of a conventional storage battery is indicated at 28, the same having an opening 29 at the bottom thereof providing access to the interior of the battery. A portion 30 of the filler well 28 projects upwardly from the top wall 31 of the battery to which the usual cap, not shown, is applied, when the battery is in use. When it is necessary to replenish the supply of liquid in the battery, the filler well cap is removed from the upstanding neck portion 30, and the stem 5 is inserted into the filling well 28 until the flange 23 engages the outer end of the neck portion 30, as shown in FIG. 4. The filler container 1 is then pressed downwardly to cause relative axial sliding movement between the stem 5 and the tubular member 21 to expose the ports 16 and 17, as shown in FIG. 3, engagement of the ribs 28 with the annular skirt 24 of the attachment coupling 6 limiting downward movement of the stem 5 through the opening 29 at the bottom of the filler well 28. As the ports 16 and 17 are uncovered, liquid flows from the container 1 through the passage 12 into the battery, air within the battery moving upwardly through the vent port 17 and vent passage 13 and into the container 1 through the tubular extension 14. When a sufficient quantity of liquid has been admitted to the interior of the battery so that the level thereof covers the ports 16 and 17, flow of liquid from the container 1 will automatically substantially cease due to the fact that air can no longer enter the container 1 through the port 17. The very small amount of air entering the air vent passage through the relief port 27 is insufficient to permit a noticeable flow of liquid through the delivery passage 12 when the ports 16 and 17 are covered with the liquid. The container 1 is then lifted, permitting the spring 26 to axially move the tubular member 21 into engagement of the outer end thereof with the valve acting O-ring 18 shutting further delivery of liquid to the battery. Placement of the O-ring 19 at the lower or outer end of the stem 5 minimizes dripping from the stem to a highly satisfactory degree. This is important, inasmuch as battery acid is highly injurious to many materials with which it may come in contact. It will be noted that, when the container 1 is lifted from a battery filler well, a small amount of the liquid will be entrapped in the air vent passage 13 adjacent the air vent port 17. When the filler spout is placed in a subsequent battery filler well and the container pressed downwardly as above described, air entering the relief port 27 will permit escape of the entrapped liquid from the vent passage 13, and air from the battery will be enabled to ascend the air vent pas-

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sage 13 through the port 17 and much more rapidly than through the relief port 27, thus insuring a rapid flow of the liquid from the filler container 1 to the battery. When the container 1 is again placed in an upright position, as shown in FIG. 1, any liquid which might remain in the delivery passage 12 will drain back into the container 1, as will the small amount of liquid entrapped in the air vent passage 13. It will be noted that the sliding fit between the stem 5 and the reduced end 22 of the tubular member 21 is such that little, if any, liquid escaped axially inwardly of the tubular member 21. It will be further appreciated that this fit, together with the sealing contact between the outer end 22 of the tubular member 21 and the O-ring 19 effectively prevents evaporation of liquid from the container when the same is unused for extended periods of time.

This invention has been thoroughly tested and found to be completely satisfactory for the accomplishment of the objectives set forth; and, while I have shown and described a commercial embodiment of my pouring spout, it will be understood that the same is capable of modification without departure from the spirit and scope of the invention, as defined in the claims.

What is claimed is:

1. In a pouring spout for a battery filler or the like having a discharge opening:

- (a) an elongated stem having inner and outer ends and attachment means at its inner end for releasably securing the stem to a battery filler at the discharge opening thereof,
- (b) said stem defining longitudinally extending liquid discharge and air vent passages terminating at one end inwardly of said outer end of the stem,
- (c) said liquid discharge passage terminating at its other end at said attachment means for communication with said discharge opening,
- (d) said stem having an elongated hollow extension portion at its inner end adapted to project into the battery filler and defining an extension of said air vent passage,
- (e) said stem defining laterally opening liquid delivery and air vent ports to said one end of the liquid discharge and air vent passages respectively,
- (f) an annular valve element on said stem between said outer end thereof and said ports,
- (g) an elongated tubular member concentric with said stem and having an outer end portion closely slidably encompassing said stem, said tubular member being movable axially of said stem toward the outer end thereof whereby said outer end portion of the tubular member covers said ports and seatingly engages said valve element, said tubular member being axially movable toward the inner end of said stem whereby said outer end portion of the tubular member disengages said valve element and exposes said ports to permit discharge of liquid through said discharge passage and entry of air into said air vent passage,
- (h) and yielding means urging said tubular member axially toward the outer end of said stem to cover said ports and engages said valve element,
- (i) said tubular member having an inner end portion defining a radially outwardly projecting battery engaging element spaced from the outer end portion of said tubular member a distance substantially greater than the diameter of said outer end portion of the tubular member,
- (j) said stem defining a relief port connecting said air vent passage to atmosphere intermediate said air vent port and said attachment means, said relief port being open to atmosphere at all positions of said tubular member.

2. The pouring spout defined in claim 1 in which said annular valve element comprises a ring of elastic sealing material, said stem defining a radially outwardly open-

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ing circumferential channel adjacent its outer end for reception of said ring.

3. The pouring spout defined in claim 1 in which said battery engaging element comprises a circumferential flange, said attachment means having a portion engaging said flange to limit axial movement of said tubular member in a port exposing direction against bias of said yielding means. 5

4. The pouring spout defined in claim 3 in which said yielding means comprises a coil compression spring encompassing said stem, said tubular member having a counterbore extending axially from its inner end, said spring having one end portion received in said counter- 10

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bore and having an opposite end abutting a portion of said attachment means.

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