

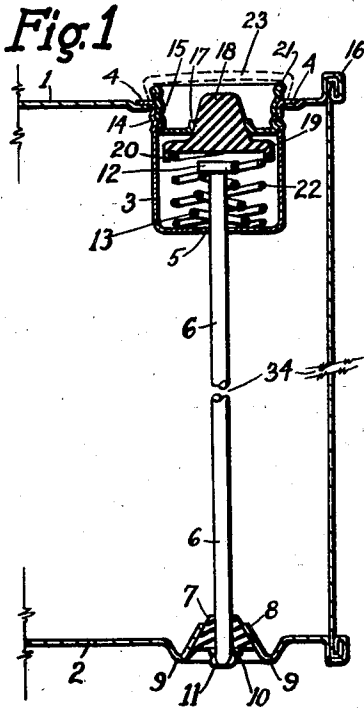
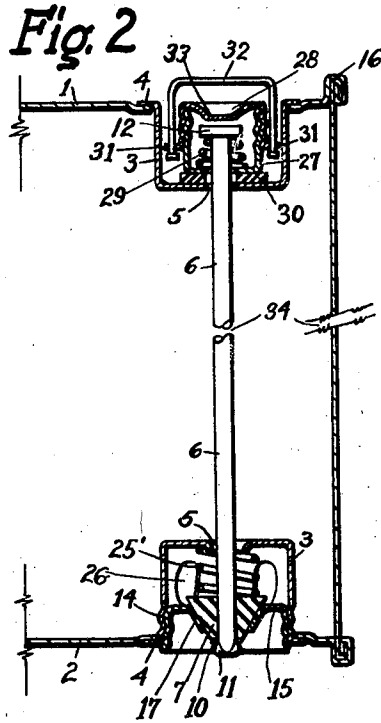
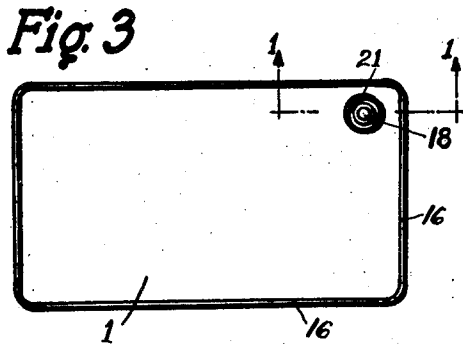
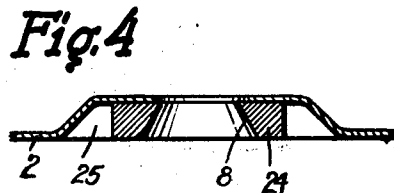
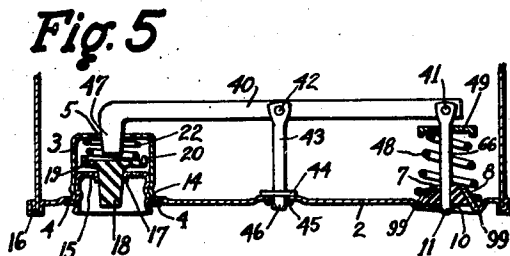
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J. D. LEVIT

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LIQUID DISPENSING CONTAINER

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JACOB D. LEVIT, INVENTOR.

BY

Abraham S. Greenberg

UNITED STATES PATENT OFFICE

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LIQUID DISPENSING CONTAINER

Jacob D. Levit, Brooklyn, N. Y., assignor to Sidney S. Rand, New York, N. Y.

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5 Claims. (Cl. 222-487)

The present invention relates to liquid dispensing containers, and more particularly to improvements in liquid containers of the type provided with dispensing devices.

In application Serial No. 335,479 filed May 16, 1940 by Sidney S. Rand, entitled "Liquid dispensing container," there is disclosed and claimed a receptacle for liquids which is characterized by its inclusion of a liquid dispensing mechanism that has no protruding portions when in non-dispensing state; the dispensing mechanism being so constructed that it provides a liquid outlet and air inlet to the container interior. More specifically, the dispensing mechanism comprises an air inlet valve and a liquid outlet valve which are substantially contiguous with opposed surfaces of the receptacle, and actuation of the air inlet valve causes actuation of the liquid outlet valve. The specific valve construction of the aforesaid type of receptacle possesses certain mechanical disadvantages.

It is an object of this invention to provide a container of the type disclosed in the Rand application with a more economical means for pouring out the contents and permitting air to flow freely into the container.

Some of the features of this invention reside in the simplicity of its component parts, the large tolerances permissible in their manufacture, and the ease with which they can be assembled.

Other and further objects and features will become apparent from the following description and the accompanying drawing in which like numerals of reference indicate identical parts in the different figures.

In the drawing:

Fig. 1 is a partial cross-section through a sheet metal container, along line I—I of Fig. 3, showing in section the preferred form of the invention;

Fig. 2 is a section, similar to that in Fig. 1, illustrating a modification of the preferred form;

Fig. 3 is a top view of a container into which the present invention has been incorporated; and

Fig. 4 illustrates, in section, a modification of the spout used in Fig. 1.

Fig. 5 is a cross-section of another modification.

Referring now to the drawing, in Fig. 1, numeral 1 is the top and 2 is the bottom of a sheet metal container. The sheet metal cup 3, completely soldered to the top 1 at its flanges 4, extends downwardly into the container. A hole 5 in the bottom of cup 3 is large enough to provide ample clearance for the valve stem 6 of valve 7.

Valve 7 has the shape of a truncated cone, and seats in the valve seat 8 formed by piercing and deforming the bottom 2 of the container into the corresponding hollow shape. The walls of valve seat 8 converge upward, and an annular depression in bottom 2 at the base of these walls form the head 9 which acts as a drip when liquid is being poured out of the container. Valve 7 is maintained on stem 6 by washer 10 and the end 11 of the stem which has been distorted by being flattened out.

The upper end of valve stem 6 terminates in the head 12. Compressed between head 12 and the bottom of cup 3 is spring 13 which serves to keep valve 7 tightly in seat 8. In the upper portion of the cup 3 adjacent the top 1 of the container is the rolled thread 14. Into this thread is screwed the cap 15. When cap 15 is entirely in place its outer free edges 21 lie below the plane of the edge 16 of the container. The bottom of cap 15 is pierced and the edges 17 of the aperture are turned upward to coincide with the surface of the air valve button 18. The upper portion of button 18 has the shape of a truncated cone, and terminates at its base into a flat circular disc 19 with depending edges 20. The spring 22, compressed between the bottom of disc 19 and the bottom of cup 3, is held in place by edges 20 concentrically about spring 13. The spring 22 serves to keep button 18 in the inoperative position sealed against edges 17 of the cap 15.

The valves in Fig. 1 are shown in the sealed position, and it should be noted that there is a substantial space between disc 19 and valve stem head 12.

The operation of the combination is simple. Assuming that the container is filled with liquid, in order to pour out some liquid through the spout, or valve seat 8, it is necessary to depress button 18. The initial movement of button 18, that is, until disc 19 contacts head 12, brings the interior of the container into communication with the atmosphere; additional movement of button 18 depresses valve stem 6 and valve 7 and out comes the fluid unimpeded by any vacuum within the container. With the removal of pressure on the button both button 18 and valve 7 go back to their sealing position.

The design of the mechanism as illustrated has several advantageous features. In the first place, the component parts, except the springs, are made by stamping, forging or casting processes; no machined parts are required. Valve stem 6 is made of the same material as a wire nail and the head 12 thereon is similar to a nail

head. The end 11 of the valve stem is spread between the jaws of a clamp. Valve 7 and button 10 are cross-hatched for a rubber or plastic material which could be made by die-casting; they could be forged out of soft metal. Cup 3 and cap 15 are metal stampings similar to those now used as bottle caps. The die to form valve seat 8 can be incorporated with the die that forms bottom 2 of the container. Because the valve seats are formed with steep angles of incline the valves are self-adjusting to compensate for wear so that no great precision need be exercised in their manufacture and assembly.

The mechanism can be assembled with ease. Valve seat 8, as stated above, is incorporated with bottom 2. Cup 3 is soldered to the top 1 of the container either before or after the container itself is completely assembled. Because there are no projecting parts the valve assembly can be brought quite close to the side of the container without interfering with the forming of edge 16 during the making of the container itself. Spring 13 is then slipped onto stem 6, and stem 6 is inserted through hole 5 and out of valve 8. Stem 6 as first made is longer than required so that as it is being inserted through the container the head 12 will extend enough beyond edge 16 so as to be easily manipulated. Valve 7 is then slipped onto the stem, then washer 10 if necessary; then in order to place spring 13 under proper compression tension is applied to the stem and the stem end is spread and cut to the proper length. Finally, spring 22 is placed within cup 3 followed by button 14, and then the cap 15 is screwed on. If it is desired to prevent tampering with button 10 while in transport, a cover, similar to a crown cap 23 (shown by dashed line) may be snapped over the edge 21 of cap 15.

In Fig. 4 is illustrated an alternative design for valve 8. Here instead of permitting the material of the bottom 2 of the container to form the walls of valve seat 8, the valve seat is ground out of another material 24, and this material is fastened to bottom 2 within a depression 25 formed therein.

The modification illustrated in Fig. 2 differs from the mechanism in Fig. 1 in that the valve combination must be lifted instead of depressed in order for the valves to open. Here both top and bottom of the container are supplied with cups 3, and cap 15 is screwed into the bottom cup. Valve stem 6 is substantially the same, but valve 7 is now an inverted truncated cone. The valve is kept against its seat by spring 25', and the contents flow out of the container through the valve 7 through holes 26 in the sides of the lower cup 3. The head 12 of the valve stem is enclosed within the tightly closed box formed by cup 27 and its cover 28. The spring 29 is concentric about stem 6 and compressed between head 12 and the bottom of cup 27. Intermediate the bottom of cup 27 and the upper cup 3 is positioned the gasket 30 which acts as the air seal.

In operation: the spring 25' acting upon valve 7 seals the outlet and spring 29 compresses gasket 30 between cup 27 and 3 to seal the air inlet. Naturally spring 25' must be substantially stronger than spring 29. To open the valve 7 it is necessary to pull up on the valve combination, and to facilitate this cap 28 is provided with a pair of ears 31 thru which the wire handle 32 passes. The center 33 of cap 28 is depressed so that when the handle 32 is down it may be readily picked up.

The containers may be filled initially, either

through their spouts after assembly or through a separate port-hole not shown in the drawing. The conventional sign, as at 34, to indicate that both valve stem and container have been fore-shortened serves to illustrate the fact that the length or size of the container do not materially affect the size of the dispensing mechanisms herein.

In Fig. 5 is shown in cross-section another modification of the embodiment illustrated in Fig. 1, in which both air inlet and liquid outlet valves are on the same side of the container, but at spaced points. The valve stem 6 of Fig. 1 is here replaced by the rocker element 40 hinged in a usual manner to a short valve stem 66 at 41. The rocker itself is fulcrumed at 42 to a support 43. The support 43, preferably made by a forging process, is riveted to the bottom of the container by having its free end 46 upset against washer 45 and thereby holding the material of bottom 2 between washer 45 and the shoulder 44 formed integral with the support. The free end 47 of the rocker is turned downwardly, and terminates within cup 3 of the air valve, and takes the place of valve stem head 12 of Fig. 1. The spring 48, concentric around valve stem 66, and compressed between the bottom 2 of the container and the washer 49, tends to keep the outlet valve closed. In all other respects the two valves are constructed substantially as described for Fig. 1. The sole difference is the specific location of the valves.

This modification is designed for large containers whereby the containers may be set up on a shelf with bottom 2 vertical and the air valve uppermost. In this position the contents of the container may be dispensed through the spout 99 without holding the container, except that tilting would be necessary when the level of the contents within is low. Spout 99 is canted as shown to facilitate pouring when face 2 is vertical.

Another advantage of this design, although having more parts than that in Fig. 1 is that the mechanism may be assembled on bottom 2 before the complete container is formed. Since in actual practice many containers are filled with the contents before the top of the container is added, this design will not interfere with such filling practice.

What is claimed is:

1. In a container for liquids of the type having a plurality of opposed, spaced plane walls, a liquid outlet valve arranged in one wall and having a control element thereof projecting into the container interior, means biasing said valve into closed position, an air inlet valve located in a second wall opposite to said one wall, said inlet valve being located entirely below the plane of the second wall and having no portion thereof projecting beyond the plane of the second wall; means biasing said inlet valve into closed position, said inlet valve having an actuating element normally spaced from, and independent of, said control element, and said control element being so arranged relative to said air inlet valve actuating element that actuation of the latter to admit air into the container interior results in pressure on said control element and causes said outlet valve to open.

2. In a container for liquids of the type having a plurality of opposed, spaced plane walls, a liquid outlet valve arranged in one wall and having a control element thereof projecting into the container interior, means biasing said valve into closed position, an air inlet valve located in a

second wall opposite to said one wall, said inlet valve having a manually-depressible portion located entirely below the plane of the second wall, means biasing said inlet valve into closed position, and said control element being so arranged relative to said air inlet valve that actuation of the latter to admit air into the container interior causes said outlet valve to open, said air inlet valve having an actuatable element normally spaced from said control element and physically independent thereof, actuation of said actuatable element beyond a predetermined point causing simultaneous motion and actuation of said control element.

3. In a liquid container having opposed walls, a liquid dispensing mechanism located wholly within the container interior and between the planes of a pair of opposed walls, said mechanism comprising a liquid outlet valve in one of said pair of walls, the outlet valve having a control rod projecting towards the second wall, an air inlet valve having a depressible element normally biased to spaced relation with respect to be in the control rod, depression of said depressible element causing air to flow into the container interior, said control rod being actuated by the pressure of said depressible element in response to depression of said element beyond a predetermined distance.

4. In a receptacle, a material dispensing mechanism comprising an outlet valve located in a wall of the receptacle, said valve having a control rod projecting into the interior of the receptacle, means located adjacent the interior end of the rod for biasing said valve in normally closed position, an air inlet valve located at a wall opposite said first wall, said inlet valve having a rod-actuating head located within the receptacle interior, means normally biasing said inlet valve to closed position and to maintain said actuating head spaced from said rod end, actuation of said inlet valve to open position causing said head to contact said rod end thereby to actuate said outlet valve to open position.

5. In a liquid receptacle, a dispensing mechanism comprising independent liquid outlet and air inlet valves, means operatively associated with each valve normally to bias each of them to closed position, said valves having complementary elements adapted to come into physical contact upon actuation of said air inlet valve thereby to cause the liquid outlet valve to open, said biasing means for said valves being so constructed and arranged that said complementary elements are maintained normally physically independent of, and spaced from, each other and said air inlet valve being located entirely within the interior of said receptacle.

JACOB D. LEVIT.