

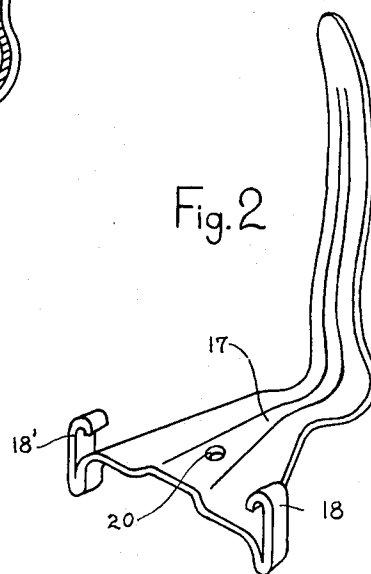
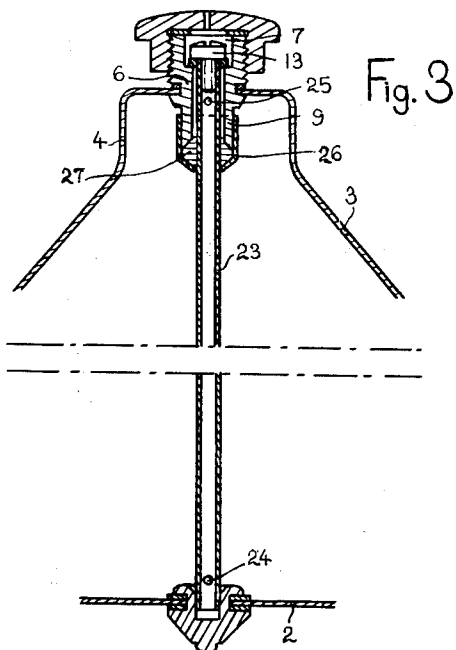
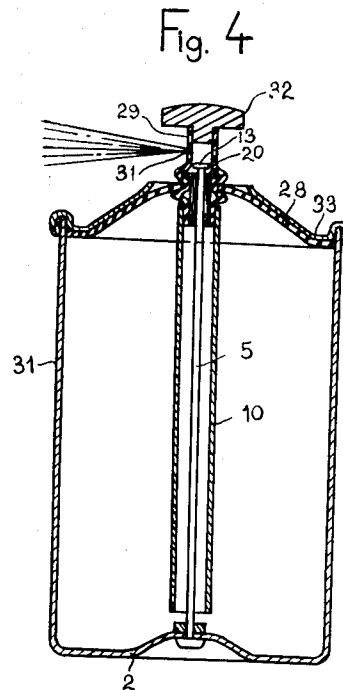
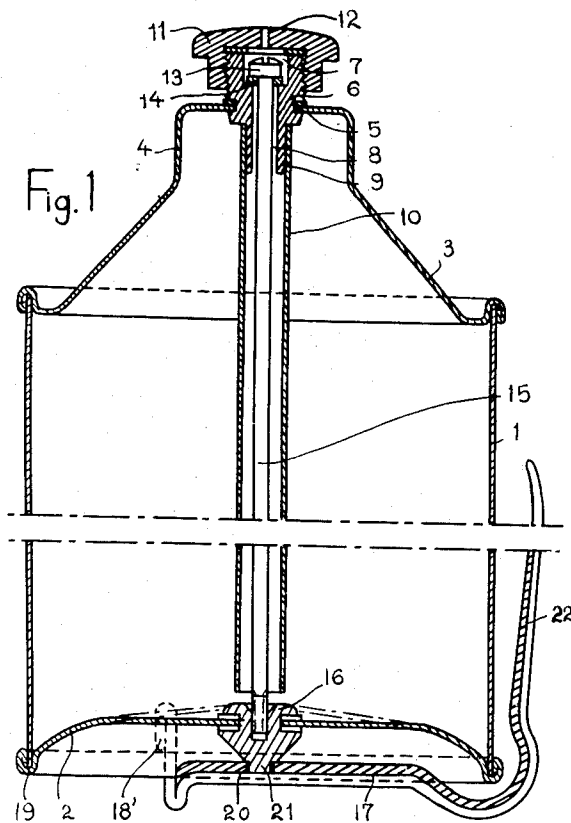
May 22, 1956

R. REMANÉ
ATOMIZING APPARATUS

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3 Sheets-Sheet 1



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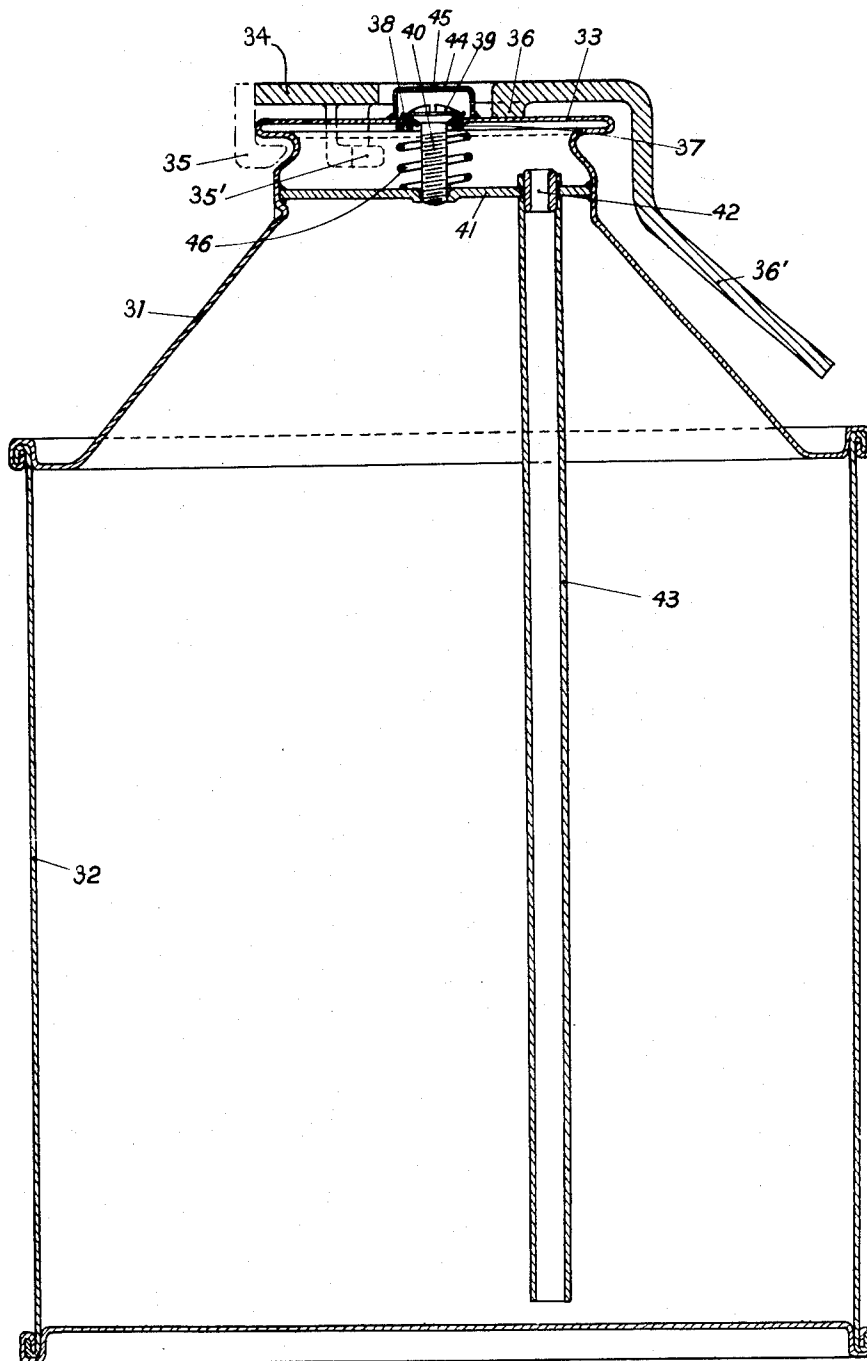


Fig. 5

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FIG. 7

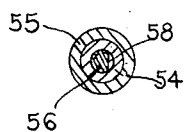


FIG. 6

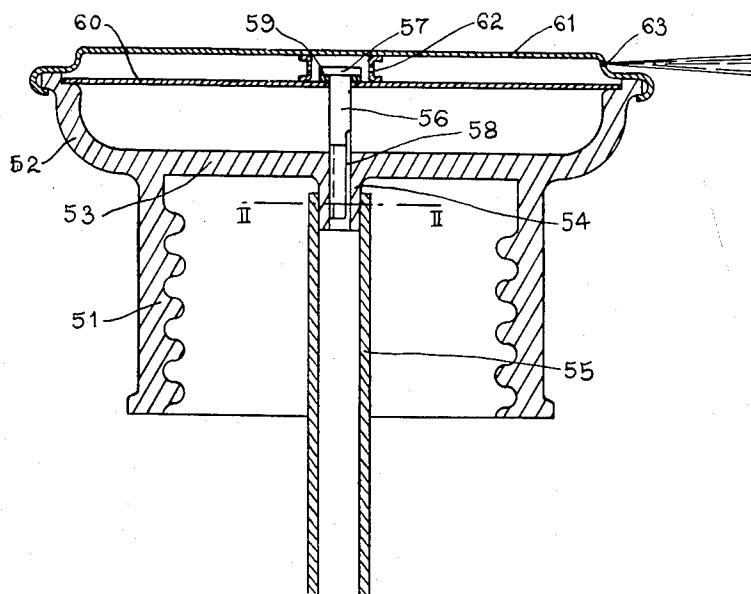
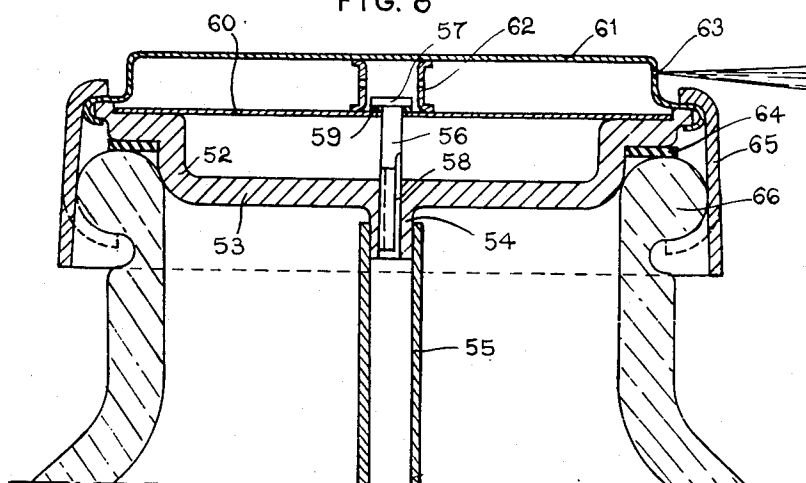


FIG. 8



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ATOMIZING APPARATUS

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8 Claims. (Cl. 299—95)

The present invention relates to an atomizer designed for a very fine atomization, in the shape of aerosol of products either dissolved or mixed in a gas liquefied under pressure and particularly of insect-killers, of up-keep, painting, varnishing products or of similar products soluble in a liquefied gas. It is known that the apparatus of this kind, generally designated as "bombs," consist of a container provided with a valve which is usually of the type used for the motocar tyres, the body of which is provided with a restricted discharge outlet and with a push button to control the opening of the valve. Such valves are nevertheless very expensive and offer for this use many drawbacks, the most important being that it is very difficult to secure their tightness.

The apparatus, object of the present invention, copes with these drawbacks and it is characterized in that the container of the liquefied gas is provided with a valve, engaging a seat surrounding an opening in a wall of the container and which is carried by a stem valve fixed at its other end to another wall of the container, one of these walls being flexible and resilient, thus allowing, on the one hand, the opening of the valve through a controlled deflection of the wall and, on the other hand, the application of the valve on its seat under the action of the gas pressure in the container.

By way of example, several embodiments of the atomizer according to the invention are described hereafter with reference to the annexed drawing in which:

The Figure 1 shows in vertical axial section a first embodiment of the apparatus, including a distortable bottom.

The Figure 2 illustrates in perspective the control wrench.

The Figure 3 illustrates in vertical axial section an alternative form of the above apparatus.

The Figure 4 illustrates in vertical axial section an alternative embodiment, in which the apparatus has a distortable lid.

The Figure 5 illustrates a third embodiment of the invention in which the two walls, distortable and rigid, between which is mounted the stem of the valve are located in the upper portion of the container.

The Figures 6 and 7 illustrate respectively, in axial and cross sections, another form of embodiment in which the valve is set on a removable plug.

The Figure 8 is an alternate form of the preceding plug.

The apparatus illustrated in Figure 1 includes a container for the liquefied gas wherein the product to be atomized is dissolved. This container comprises by a cylindrical body 1, a resilient flexible bottom 2, in the shape of a cup with a flat bottom and a set lid including a conical portion 3 and a cylindrical portion 4. A piece 6, constituting the body of the valve, is set in an opening 5 at the top of the cylindrical portion 4. The part of the valve body 6 situated outside the container has a cylindrical chamber 7 having a central boring 8 which extends through the cylindrical lower portion 9 of the

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body 6 inside the container and on which is fitted a pipe 10 opening close to the bottom 2 of the container 1.

The body 6 is provided with a screwed plug 11, in which is bored the atomization nozzle 12. The bottom of the cylindrical chamber 7 forms the seat for a valve 13, provided with a tight joint 14 and carried by a stem 15, the lower end of which is screwed in a piece in the shape of a nut 16, set in the center of the resilient bottom 2. Thus, by applying from outside a pressure on the bottom 2, said bottom will be deflected inwardly and the stem 15 will be lifted up and the valve 13 is opened; as soon as the external pressure disappears, the valve 13 is closed under the action of the gas pressure on the bottom 2.

When the pressure inside the container ranges about 15 2 kg., the deflection of the bottom 2 of the container requires stresses too heavy to be applied directly with the hand. Therefore, a control wrench is foreseen in the apparatus (Figs. 1 and 2). It consists of a small plate 17 with two hooks 18, 18' engaging the setting flange 19 of the bottom 2 on the body 1 and of a bore 20 to receive the head 21 of the nut 16 set in the bottom 2. The plate 17 extends in a handle 22, bent upwards: when the handle 22 is applied against the body of the container (in the direction of the arrow), the required deflection of the bottom 2 is produced and the valve 13 is lifted.

The apparatus according to the invention is simple, strong, and possesses a perfect and lasting tightness as the force exerted by the compressed gas upon the valve 13, through the bottom 2 and the stem 15 and maintaining said valve on its seat is very important. In addition, as the valve 13 can be removed by simply unscrewing the stem 15, the apparatus can be used several times: once the apparatus is empty, the plug 11 and the valve 13 are unscrewed, the product to be urged in solution is introduced in the container through the central pipe 10, the valve 13 is anew placed in position and the container is filled with the liquefied gas, the valve being kept open for this purpose. It must be pointed out, and this is of importance with quick drying cellulosic painting, that the small amount of gas remaining in the chamber 7 of the valve when the valve 13 is closed is enough to clear the atomization nozzle which has no tendency to be choked by dry paint and therefore, it is unnecessary to clear the nozzle before using anew the apparatus.

According to the form of embodiment illustrated in Figure 3, the valve stem 15 and the central pipe 10 are combined in a single member: the valve 13 is therefore fixed at the upper end of a tubular stem 23, the lower end of which is screwed in the bottom of the container 1. The tube 23 is provided, close to the bottom 2, with an aperture 24 connecting it with the inside of the container 1 and, in the immediate vicinity of the valve 13, with an aperture 25 through which the gas expands in the room 7. The tube 23 enters the container 1 through a tight joint, for instance a junk packing, formed by a ferrule 26 mounted on the lower end 9 of the valve body 6 and containing a compressed felt 27.

The Figure 4 illustrates an embodiment of the atomizer which is suitable when the internal pressure in the container 1 is comparatively small, thus allowing to control directly the valve with the hand, without using a wrench.

In such a case, the lid of the apparatus includes, on the one hand a resiliently flexible membrane 28, made of a plastic material or a thin metal, in the center of which is set a tubular piece 29 forming the body of the valve provided with a flat seat 30, a nozzle 31 for the side atomization and a plug 32 which is used in same time as a control push button. A rigid metallic sheltering lid 33 covers on the other hand the flexible membrane, except in its center part. The valve 13 is mounted as above described, for instance according to the embodiment of

Fig. 1, on a solid stem 15, screwed in the bottom 2 and surrounded by the pipe 10.

When operating the apparatus, the push button 32 is depressed whereby the flexible membrane 28 is lowered together with the valve body 29 and valve seat 30, resulting in that, as shown in Fig. 4, the valve 13 disengages the seat 30, allowing the gas to escape from the container into the valve body 29 and to be discharged therefrom through the restricted outlet 31.

Of course, the apparatus illustrated in Fig. 4 could also be made with a rigid lid and a distortable bottom.

In the embodiment illustrated in Fig. 5, the container which is to receive a product dissolved in the liquefied gas includes an upper frusto-conical part 31, set on the cylindrical body 32 and ending in a flat lid 33 which can be deflated by means of a wrench 34 which engages the flange of the lid 33 by means of three hooks 35, 35', 35" and imparts to the lid, through a teat 36, the pressure applied to the hand-grip 36', thus producing a slight resilient deflection of the center part of the lid. An aperture 37 is provided in the central part of the lid. This aperture is fitted with a joint preferably made of a plastic material in the shape of a flange 38 and forming a seat for a valve constituted by the head 39 of a screw, the stem 40 of which is screwed with a tight fit in a small rigid plate 41 soldered inside the part 31 of the container, at some distance under the lid 32. This small plate 41 has an aperture 42 connecting the valve 38—39 with the inside of the container and in which is set the end of a tube 43. A cap 44, provided with a small aperture 45, acting as an atomization nozzle, is fixed, either by soldering or in a removable way, to the lid of the container above the valve.

A return spiral spring 45 is arranged round the stem 40 of the valve between the rigid plate 41 and the distortable lid 33.

The device operates as follows:

The stress applied on the wrench 36 produces, through the resilient deflection of the lid 33, a lowering of the seat 38 and thereby the opening of the valve; the gas can expand out of the container, carrying along the product dissolved therein. When the wrench 36 is released, the gas pressure and also the return spring 46 will bring the lid to its initial position, securing a tight closing of the valve.

The Figures 6 to 8 relate to a form of embodiment of the invention allowing an atomization valve of the above described type to be provided on a glass flask, particularly intended to spray perfumes, Cologne water and other perfumery products which are usually contained in glass flasks, without altering the outside appearance of these products.

This embodiment is characterized in that the valve is set in a hollow plug having a rigid bottom in the center of which is fixed, in a taped opening, the threaded valve stem, provided with a grooved or flattened face for the outflow of the gases, whilst the seat of the valve is arranged in the center of an intermediate flexible partition which is tightened against the upper flange of the hollow plug by an also flexible fastening, set on said flange, bearing an atomization nozzle and made integral with the intermediate partition by means of a central tubular flange, and surrounding the valve head and having lateral apertures.

The atomizer illustrated in Figs. 6, 7 comprises a plug made of metal or of a plastic material, comprising a cylindrical threaded part 51 to be screwed on the flask (not shown) and an upper part 52, having the shape of a cup or a dish with a rigid bottom 53 having in its middle part a tapped pipe 54 upon which, on the one hand the plunger 55 of the atomizer is firmly fixed and on the other hand the threaded stem 56 of the valve 57 is screwed, this stem being provided with a flattened face 58 to allow the escape through the pipe 54 of the gas carrying the product to be atomized.

The valve 57 rests on a seat constituted by a fluid-tight packing 59 fixed in the middle of a flexible wall 60 which closes the upper part 52 of the plug and is kept into position by an also flexible fastening set on the part 52 of the plug and made integral with the wall 60 by means of a perforated tubular flange 62 surrounding the valve 57. An atomization nozzle 63 is drilled in the fastening 61, for instance in the vicinity of the periphery of the plug.

When a stress is applied to the flexible fastening 61, the deflection of this fastening is transmitted by the flange 62 to the flexible wall 60 which yields slightly, lowering the seat 59 of the valve 57 and giving way to the outflow of the gases through the holes of the flange 62 and the atomization nozzle, and carrying along the atomized product. When the stress applied to the fastening 61 is released, the resilience of the two flexible walls 60 and 61 brings about the closing of the valve 57 and stops the atomization.

In the embodiment illustrated in Fig. 8, the threaded part 51 of the plug has been suppressed and the hollow body 52, in the shape of a cup, is disposed by means of a fluidtight packing 64 upon the upper edge of the flask having a circular boss 66, whilst a metallic belt bearing upon the atomizing-plug with its upper edge bent inwardly, allows the plug to be set on the bottle like a cap, by hooking the lower edge of the belt 65 under the boss 66, as shown in dotted lines.

The apparatus functions exactly like the apparatus of Figs. 6 and 7.

What I claim is:

1. An atomizing apparatus for storing and dispensing products dissolved in or mixed with a liquefied gas retained under pressure, comprising a container having a flexible resilient lid provided with a central opening, a valve seat arranged around said opening, an intermediate rigid partition arranged in the upper portion of the container above the level of the liquefied gas, a valve adapted to engage said seat, a valve stem carrying said valve extending through said opening inside the container and having its lower end connected to said rigid partition, an opening provided in said rigid partition, a conduit extending from said opening into the lower partition of the container, and means to deflect the said flexible resilient lid whereby the valve is made to disengage the valve seat.

2. An atomizing apparatus for storing and dispensing products dissolved in or mixed with a liquefied gas retained under pressure, comprising a container having an expansion chamber formed by a flexible resilient lid provided with a central opening and by a rigid transverse partition fixed inside the top part of the container below the resilient lid, said rigid partition having an opening and a conduit extending from said opening into the lower portion of the container, a valve seat arranged around the central opening of the resilient lid, a cap fixed onto said lid and having a restricted discharge outlet, a valve adapted to engage said seat, a valve stem carrying said valve, extending downwardly through said opening and having its lower end rigidly connected to the rigid transverse partition, and means to deflect inwardly the said resilient flexible lid carrying the valve seat whereby the valve is made to disengage the set and to discharge the liquefied gas.

3. An apparatus according to claim 1 wherein a helical spring surrounding the valve stem is arranged between the rigid partition and the resilient lid to reinforce the valve closing action of the gas pressure in the expansion chamber.

4. An apparatus according to claim 1 wherein the lid deflecting means comprise a wrench formed by a plate having a central aperture, hooks engaging the edge of the said lid, projections provided on the lower side of the plate to contact the upper side of the lid and a hand grip extending downwardly from said plate substantially parallel to the outer surface of the container.

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5. An atomizing apparatus for storing and dispensing products dissolved in or mixed with a liquefied gas, a container, a removable hollow plug having a tubular part to tightly engage the top part of the container and a dish shaped rigid upper part, a flat flexible resilient lid adapted to tightly close said rigid dish shaped part and having a central opening, a cap fixed onto said resilient lid and having a restricted discharge outlet, a valve seat arranged around said opening, a valve adapted to engage said seat, a valve stem carrying said valve, extending downwardly through said opening and having its lower end rigidly connected to the rigid dish like part, an aperture provided in said dish shaped part and a conduit extending from said aperture into the lower portion of the container, means being provided to deflect inwardly the resilient lid.

6. An atomizing apparatus for storing and dispensing products dissolved in or mixed with a liquefied gas, comprising a container, a removable hollow plug having a tubular part tightly engaging the top part of the container, an upper rigid dish like part, a flexible resilient plate adapted to tightly close said rigid dish like part and having a central opening, an inverted flexible resilient dish shaped part arranged above the resilient plate and engaging the edges thereof, a tubular member provided with restricted lateral openings centrally arranged between the resilient plate and the inverted resilient dish like part which latter is further provided with a restricted lateral discharge outlet, a valve seat arranged around the central opening of the resilient plate, a valve adapted to engage said seat, a valve stem carrying said valve, extending

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downwardly through said opening and having its lower end rigidly connected to the rigid dish like part, an aperture provided in said dish shaped part and a conduit extending from said aperture into the lower portion of the container.

7. An apparatus according to claim 6 wherein the opening provided in the rigid dish shaped part is arranged centrally, the lower part of the valve stem being threaded and screwed into said opening, and a longitudinal groove being provided on said threaded part of said stem to connect the inner of the container with the inner of said hollow plug.

8. An apparatus according to claim 6 wherein the tubular part of the hollow plug is formed by a removable cylindrical flange having its upper edge bent inwardly to engage the edges of the superimposed dish like parts, whilst the container has a neck provided with an outside boss to be engaged by the lower edge of the said flange.

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