

[54] METHODS OF AND APPARATUS FOR DISPENSING POTABLE LIQUIDS

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[22] Filed: Feb. 3, 1972

[21] Appl. No.: 223,212

[52] U.S. Cl. 222/325, 222/396, 222/400.7, 239/373, 220/29

[51] Int. Cl. B67d 1/04

[58] Field of Search 222/394, 325, 400.7, 222/130, 129.2, 396; 220/29, 57; 239/373; 169/31 R

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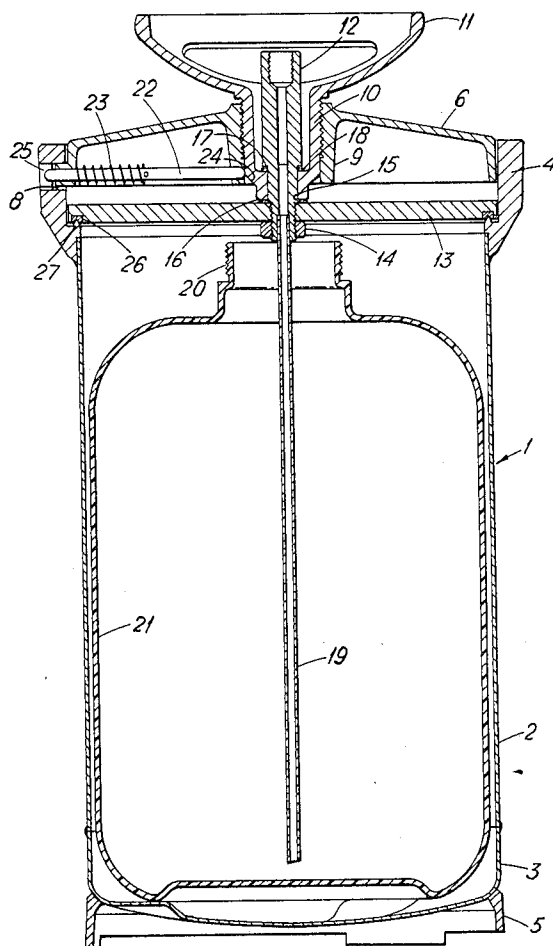
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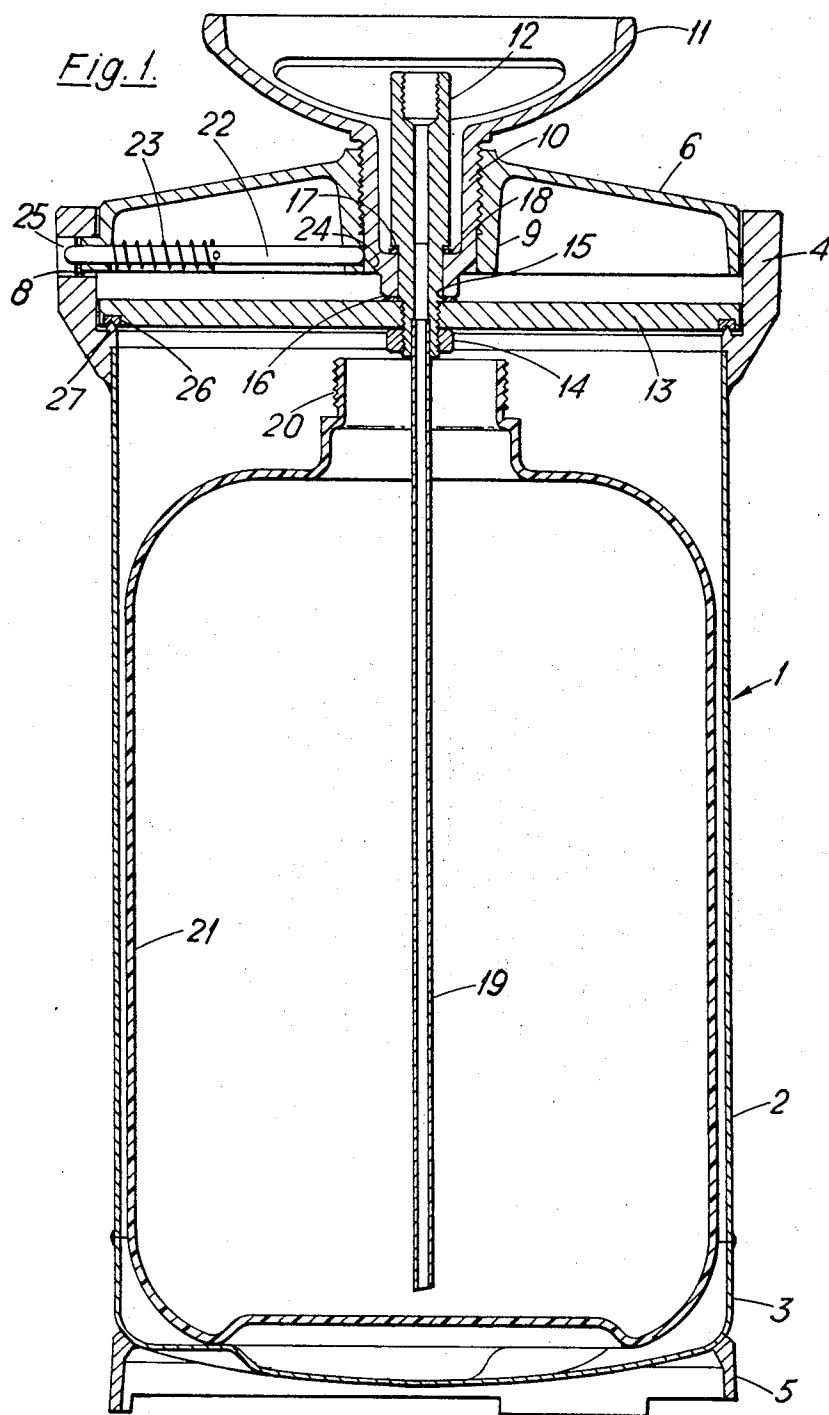
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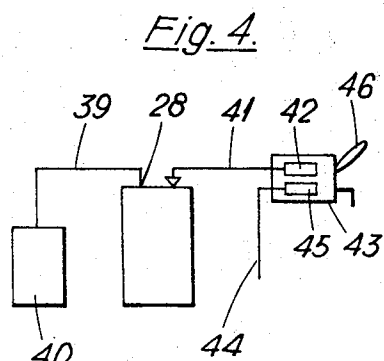
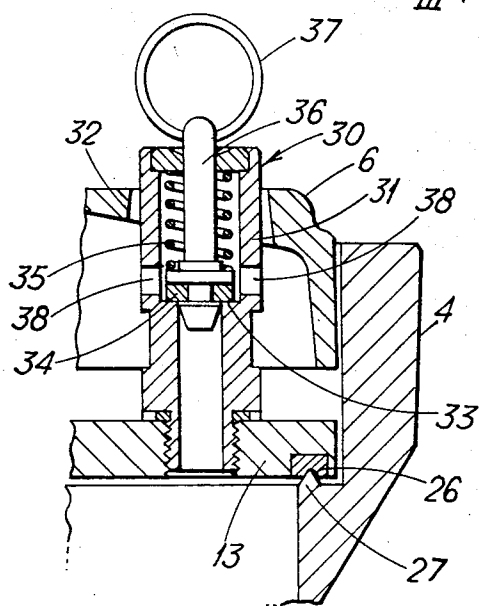
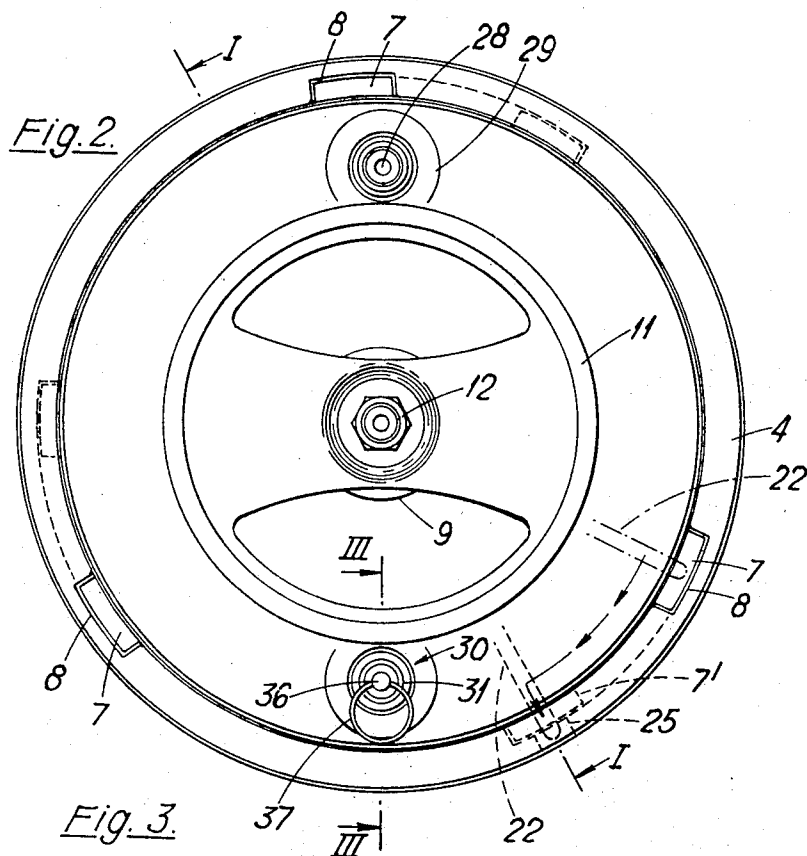
[57] ABSTRACT

Apparatus for dispensing a potable liquid from a container which has a top opening but is unable to withstand an unbalanced internal pressure, comprising a casing having a removable cover extending over an opening of such a size that the container can be inserted through it into the casing, a union for the connection of a supply of gas under pressure to the casing to produce a super-atmospheric pressure in the casing and an outlet tube which extends downwards in the casing in a position in which, in use, it extends into and near to the bottom of the container through its top opening. Preferably the casing has its opening extending over the whole area of its top and the union for the connection of the gas supply and the outlet tube both extend through the cover downwards into the casing.

8 Claims, 4 Drawing Figures







METHODS OF AND APPARATUS FOR DISPENSING POTABLE LIQUIDS

Drinks, and in particular soft drinks, sold in public houses and other places for consumption on the premises are now commonly manufactured as concentrates and the concentrates are distributed in bulk in containers each holding several gallons.

The concentrates are dispensed in the same way as keg beer by attaching a dispensing fitting to the top of the container. The fitting comprises an outlet tube extending to near the bottom of the container and a gas pressure inlet tube by which the space in the container above the surface of the concentrate is pressurised. The outlet tube is connected to a further tube which usually leads to a post-mix unit. The post-mix unit includes a valve which controls the flow of the concentrate and a second valve which controls the flow of a diluent which is usually soda water. When operated, the post-mix unit dilutes the concentrate with an accurately proportioned quantity of the diluent. The container is continuously pressurised and therefore whenever the valves of the post-mix unit are opened the concentrate is forced up through the outlet tube and out of the unit.

Since the containers are continuously pressurised for dispensing the concentrate, they must be robustly made and be sufficiently strong to withstand the internal pressure which is commonly of the order of 2 to 4 atmospheres. Further, the containers must be resistant to attack by the concentrates which may contain substantial quantities of natural acids. For this reason it has been customary to make the containers of stainless steel.

A very large number of these containers is necessary since some are in use for dispensing their contents, others are in transit and still others are with the manufacturers being washed and refilled with concentrate. The cost of the containers themselves therefore contributes very substantially to the cost of the drinks which are sold.

To reduce the number of expensive stainless steel containers necessary, the concentrates have sometimes been transported in cheaper containers, for example drums made of plastics materials, which are unable to withstand an internal pressure and they are then poured from these containers into the containers which can be pressurised at the place where the concentrate is to be dispensed. The disadvantage of this arrangement is that the concentrate is likely to be spilt and the containers which are pressurised tend not to be cleaned each time they are refilled. There is therefore a considerable hygiene problem. Also, the refilling of the pressurised containers is time consuming which is a nuisance at busy periods in bars.

The present invention stems from our realisation that it is possible to dispense the concentrate or other potable liquid directly from a container which is itself unable to withstand internal pressure by placing the container within an outer casing which can be pressurised and then on pressurising the casing, the liquid container is subjected to a gas pressure both internally and externally so that there is no out of balance pressure to be withstood, but nevertheless the internal pressure acting on the surface of the liquid in the liquid container still forces the liquid upwards through an outlet tube.

Thus, according to the present invention, apparatus for dispensing a potable liquid from a container which has a top opening but is unable to withstand an unbalanced internal pressure, comprises a casing having a removable cover extending over an opening through which the container can be inserted into the casing, means for supplying gas under pressure to the casing to produce a super atmospheric pressure in the casing and an outlet tube extending downwards in the casing in a position which enables it, in use, to extend into, and to near the bottom of, the container through its top opening.

The use of this apparatus gives rise to a method of dispensing a soft drink concentrate or other potable liquid which, also in accordance with the invention, comprises placing a container holding the liquid and having an opening in its top in a surrounding casing, inserting an outlet tube having a control valve into the container through its top opening, closing and sealing the casing, supplying gas under pressure to the casing to raise the pressure in the casing and to subject the container both internally and externally to a super atmospheric pressure, and opening the control valve so that the liquid is dispensed through the outlet tube and through the control valve by the super atmospheric pressure acting on the surface of the liquid in the container.

When the liquid is a soft drink concentrate, the control valve is generally incorporated in a post-mix unit which dilutes the concentrate in the manner already described.

By using the apparatus in accordance with the invention it is no longer necessary to transport the concentrate or other potable liquid in pressure-resisting containers and neither is it necessary to pour the liquid from the containers in which it is transported into containers which are able to withstand an internal pressure. Time is therefore saved when it is necessary to change-over to a new full container from an empty one and stocktaking is facilitated as a partly used container can be withdrawn from the casing to enable the amount of liquid remaining to be seen. Drums or large bottles made by blow moulding out of thermoplastic material can be used and the cost of these is only a very small fraction of for example less than 1/100th of the cost of the stainless steel containers previously used.

The opening in the top of the container is generally a neck fitted with a screw threaded cap and the container as a whole is placed in the casing before the cap is removed so that there is no possibility of spillage. What is more, since the casing which is subsequently pressurised no longer comes directly into contact with the liquid which may be acid-containing, even the casing need not be made of stainless steel. Indeed, in a preferred example, the casing is made of aluminium and the cost of the casing may be less than half of that of the stainless steel containers previously used. Since only one casing is necessary at each dispensing point and the stainless steel containers previously used for transport and storage are no longer necessary, the overall saving in cost is very considerable indeed.

Preferably the casing has its opening at its top and the opening extends over the whole plan area of the casing. The cover may comprise a plate having a seal around its periphery, the seal engaging a rim surrounding the opening when the cover is closed. In this case a clamping device is provided for pressing the plate over the opening and clamping the seal against the rim.

An example of an apparatus and a method in accordance with the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 is a vertical section through the apparatus as seen in the direction of the arrows on the line I—I in FIG. 2;

FIG. 2 is a plan of the apparatus;

FIG. 3 is a sectional detail of the apparatus as seen in the direction of the arrows on the line III—III in FIG. 2; and

FIG. 4 is a circuit diagram showing the apparatus connected to the other components of the system for dispensing soft drinks.

As shown in FIGS. 1 and 2, the apparatus comprises a casing 1 which is made of aluminium and is formed from a cylindrical tube 2 having a pressed bottom 3 welded to its lower end and a cast rim 4 welded to its upper end. The bottom 3 is fixed to a cast flange 5 which forms a stand for the apparatus.

The open upper end of the casing 1 is provided with a cast outer cover 6 which fits within the upper part of the rim 4 and has three equally-angularly spaced lugs 7 which project radially from its periphery. The lugs 7 fit into L-shaped slots 8 in the inner periphery of the rim 4. The lugs 7 and the slots 8 together form a bayonet coupling for fixing the outer cover 6 to the rim 8. In use, to fix the outer cover 6 to the casing, the lugs 7 are inserted into the upwardly projecting arms of the L-shaped slots 8 as shown in FIG. 2 and the outer cover 6 is then turned to move the lugs 7 into the positions shown in dotted lines at 7' within the horizontally extending arms of the slots 8.

The outer cover 6 has a central tubular part 9 which is internally screw threaded and has a tubular stem 10 screwed into it. The stem 10 is integral with a handle 11 by which the stem 10 can be turned to screw it upwards or downwards within the tubular part 9. A delivery tube 12 extends through the tubular stem 10 and has a sealing plate 13 attached to its lower end by a nut 14. The upper surface of the sealing plate 13 is held against a shoulder 15 on the tube 12 by the nut 14 and a sealing ring 16 is interposed between the lower end of the stem 10 and the upper surface of the plate 13. The tube 12 has a shoulder 17 and a thrust washer 18 is interposed between this shoulder and the bottom part of the stem 10 so that the stem 10 is able to rotate on the tube 12, but as the stem 10 is screwed into and out of the tubular part 9, the tube 12 and the sealing plate 13 move upwards and downwards with it. The main parts of the apparatus so far described are made of aluminium, or an aluminium alloy, but projecting downwards from the lower end of the tube 12 is an outlet tube 19 which is made of stainless steel because, in use, it passes through a neck 20 of a bottle 21 within the casing 1 and dips into soft drink concentrate within the bottle 21 which is made of plastics material.

In order to insert the bottle 21 of soft drink concentrate into the casing 1, the outer cover 6 together with the sealing plate 13 and the tube 19 attached to it are removed from the casing and the bottle 21 is inserted through the open top. With the stem 10 unscrewed into a position in which the upper surface of the plate 13 abuts the lower end of the tubular part 9, the outer cover 6 and the parts attached to it are placed in position and the outer cover 6 is turned to move the lugs 7 into the positions shown at 7' in FIG. 2 as already described. With the stem 10 unscrewed, a locking bolt 22

is retracted radially inwards by its spring 23 so that its outer end lies just within a bore through the lug 7.

After this the stem 10 is screwed inwards by means of the handle 11 and this causes a cam shoulder 24 on the stem 10 to engage with the inner end of the bolt 22 and move it outwards against the action of the spring 23 so that the outer end of the bolt 22 engages in an opening 25 in the rim 4. This prevents the outer cover 6 from being turned into a position in which the lugs 7 can be released from the slot 8.

At the same time as the stem 10 moves the bolt 22 outwards, it also moves the sealing plate 13 downwards and clamps a sealing gasket 26 which is held in a groove in the underside of the plate 13 firmly against an upwardly projecting ridge 27 formed on the rim 4.

In this way the casing 1 is sealed except for the opening through the bores of the tubes 12 and 19 and a gas inlet opening 28 which is shown in FIG. 2 and is formed in a boss 29 which includes a gas pipe connecting union.

To prevent the casing 1 from being subjected to too great an internal pressure from the gas supply through the opening 28, the sealing plate 13 is provided with a spring-loaded safety valve 30 shown in detail in FIG. 3 of the drawings. The valve 30 comprises a tubular housing 31 which extends upwards from the plate 13 and extends freely through an opening 32 in the outer cover 6. The housing 31 has an internal annular shoulder forming a valve seat 33 and a valve closure member 34 is pressed onto the seat 33 by a coiled compression spring 35. The closure member 34 has a stem 36 which projects from the top of the housing 31 and has a pull-ring 37 attached to it. Thus the valve closure member 34 can be lifted from its seat to open the valve either by excess internal pressure within the casing 1 acting against the spring 35 or by pulling the ring 37 upwards. When the valve is opened, gas within the casing 1 escapes through ports 38.

In use, the apparatus so far described is connected into the system shown in FIG. 4. The gas inlet opening 28 is connected by a flexible pressure pipe 39 to a cylinder 40 containing carbon dioxide under pressure. The cylinder 40 is, of course, fitted with a shut-off valve as usual, but this is not shown. The tube 12 is connected by a flexible pipe 41 to one valve 42 of a conventional post-mix unit 43. A water supply pipe 44 is connected to a second valve 45 of the post-mix unit which has a handle 46 which operates with the valves 42 and 45 simultaneously. The union on the gas inlet opening 28 has a different thread from that in the socket at the top of the tube 12 so that the pipes 39 and 41 cannot be connected the wrong way round.

When all the connections have been made, the valve on the cylinder 40 is opened so that carbon dioxide under pressure is admitted to the casing 1. The bottle 21 is subjected both internally and externally to the carbon dioxide pressure so that there is no out of balance pressure acting upon it. The carbon dioxide pressure acting through the neck 20 of the bottle 21 on the surface of the soft drink concentrate in the bottle forces the concentrate through the tubes 19 and 12 and the flexible pipe 41 to the post-mix unit 43. Thus as soon as the handle 46 is moved to open the valves 42 and 45, the soft drink concentrate suitably diluted with water issues from a spout 47 on the post-mix unit. The post-mix unit is adjustable in a conventional manner to

alter the dilution of the soft drink concentrate as required.

When the bottle 21 is emptied down to the lower end of the tube 19, the valve on the carbon dioxide cylinder 40 is shut, the safety valve 30 is opened by pulling the ring 37 to release the pressure within the casing 1 and the handle 11 is then unscrewed until the bolt 22 is released. The outer cover 6 is then turned to release the lugs 7 from the slots 8 and the cover 7 with its attached parts is removed to enable the bottle 21 to be replaced by a full one. Thus it will be seen that at no time does the soft drink concentrate come into contact with any part of the casing assembly other than the stainless steel tube 19.

An advantage of the apparatus described with reference to the drawings is that the casing may receive containers of different heights, so that without any change the concentrate or other liquid can be dispensed from containers of different capacities, say 2 gallon containers or 4 gallon containers.

A further advantage of the apparatus is that it enables the tubes leading to the post-mix unit or other dispensing point to be washed out very easily. All that is necessary is to place a bucket or other container of water or other washing liquid in the casing and then to pressurise the casing and open the valve on the post-mix unit. This at once causes the washing liquid to be blown through the whole dispensing system and as soon as the bucket is empty, the system is purged by the carbon dioxide.

I claim:

1. In apparatus for discharging a liquid from a container of low strength, said apparatus comprising a pressure-withstanding casing having an annular seat defining a top opening and receiving the container through the top opening, a lid to engage the seat for closing the top opening, clamping means operative between the casing and the lid and securing the lid in its casing-closing position on the seat whereby the casing may be internally gas-pressurized, a pressure-gas inlet, and a liquid outlet tube carried by the lid and reaching towards the bottom of the casing; the improved clamping means comprising abutments on the casing above the seat, a lid retainer, a handle screwed into said lid retainer whereby up and down movement of the handle results from rotation of the handle in said lid retainer, said lid being mounted on said handle to partake of its up and down movement but being free to rotate relatively to the handle, and said lid retainer being provided with abutments movable between a position beneath the abutments on said casing to a position clear of said last mentioned abutments when said lid retainer is rotated, whereby screwing down of the handle clamps the lid against the seat and forces said abutments on the lid retainer into contact with the abutments of the casing and whereby unscrewing of the handle positively retracts the lid from the seat, whereupon further rotation of both handle and lid retainer releases the abutments for disengagement of the lid retainer from the casing.

2. Apparatus as claimed in claim 1, in which the abutments on the casing and lid retainer are annularly arranged and engageable by rotation of the lid retainer relatively to said casing in one direction and disengageable by rotation of the lid retainer in the opposite direction, said lid retainer being entrained by the handle and

rotated in said opposite direction by continued rotation of the handle after it is fully unscrewed.

3. Apparatus according to claim 1, comprising a locking member carried by the lid retainer and displaceable into engagement with the casing to lock the lid retainer and casing together, and means for effecting said locking displacement of the locking member in response to screw-down of the handle.

4. Apparatus according to claim 3, in which the locking member is a bolt radially slidable in the lid retainer, one end of the bolt being positioned to enter a hold in the casing when said abutments are in engagement and the other end contacting a cam on the handle, and said apparatus comprising a spring urging the bolt towards the cam.

5. Apparatus according to claim 1, in which said lid is mounted on the outlet tube and the outlet tube extends centrally through both the lid and the handle, said apparatus comprising a fluid-sealed rotating bearing between the tube and the handle whereby the handle is rotatable relatively to the tube and lid when being screwed down and when being unscrewed.

6. Apparatus for dispensing a potable liquid from a container which has a top opening but is unable to withstand an internal pressure, said apparatus comprising a casing, an annular seat on said casing defining a top opening therein through which said container is insertable into said casing, detachable closure means for closing and sealing said opening, means for admitting gas under pressure to said casing to produce a super-atmospheric pressure therein and outlet tube means extending downwards in said casing into and to near the bottom of said container through said opening, said closure means comprising a cover extending over said opening, means for forming a seal between said cover and said seating, abutment means on the side of said cover remote from said seating, means releasably interlocking said abutment means with said casing for resisting forces on said abutment means towards and away from said cover, screw clamping and disengaging means acting between said cover and said abutment means, means positively attaching said screw means to said cover and means for rotating said screw means whereby rotation of said screw means in one direction produces a thrust from said abutment to said cover to hold said cover sealingly on said seating and rotation of said screw means in an opposite direction exerts a pull on said cover from said abutment to positively separate said cover from said seating.

7. Apparatus as claimed in claim 6, further comprising locking means operative to prevent release of said means interlocking said abutment means with said casing and means operated only by rotation of said screw means sufficiently far to separate said cover from said seating for releasing said locking means and allowing said interlocking means to be released.

8. Apparatus as claimed in claim 6, further comprising an outer cover member forming said abutment means, lugs projecting radially outwardly from the periphery of said outer cover member, a rim secured to said casing surrounding said seating, means defining slots in said rim, said lugs being interlockingly engageable in said slots by rotation of said cover member relative to said rim, a bolt mounted on said cover member for radial sliding movement between a locking position in which said bolt engages in an opening in said rim when said lugs are interlockingly engaged in said slots

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to prevent rotation of said outer cover member relative to said casing and thus also to prevent release of said lugs from said slots, and a release position clear of said rim, and means actuated by said clamping and disengaging means for causing said bolt to move between said positions whereby, when said clamping and disen-

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gaging means is operated to hold said cover on said seating, said bolt is in said locking position and, when said clamping and disengaging means is operated to separate said cover from said seating, said bolt is moved to said released position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,768,706 Dated 30 October 1973

Inventor(s) ARNOLD M. HILL

It is certified that error appears in the above-identified patent
and that said Letters Patent are hereby corrected as shown below:

[30] Foreign Application Priority Data
February 16, 1971 Great Britain.....4748/71

Signed and sealed this 23rd day of April 1974.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents