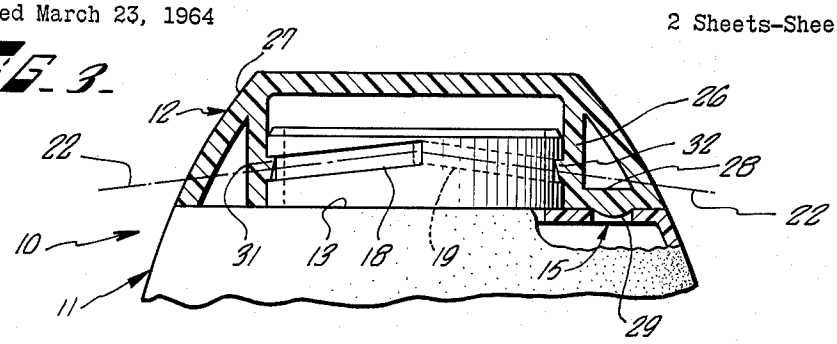
Jan. 25, 1966 P. H. McCONNELL 3,231,155

CONTAINER AND CLOSURE CAP THEREFOR

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FIG. 3



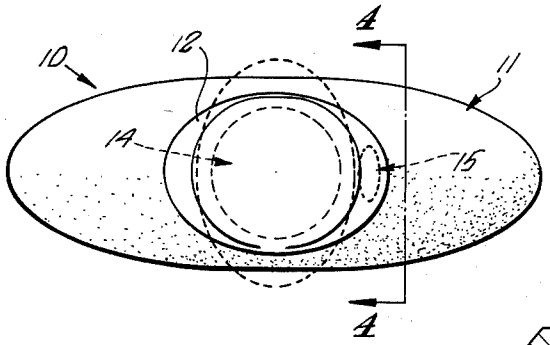
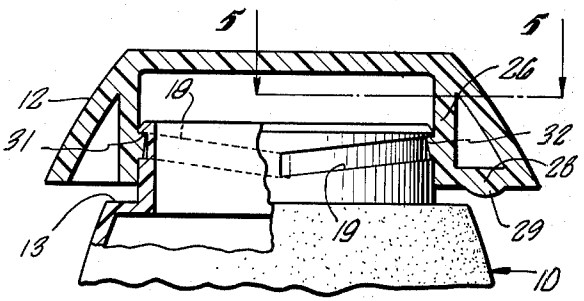


FIG. 2

FIG. 4



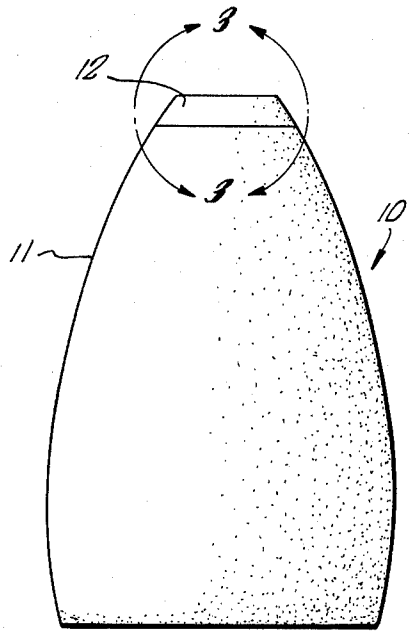
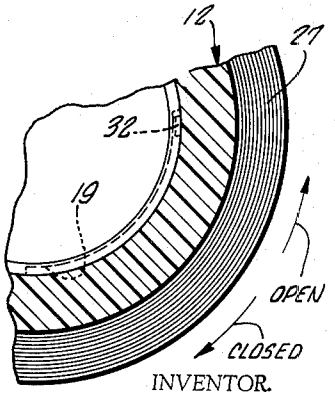


FIG. 1

FIG. 5



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CONTAINER AND CLOSURE CAP THEREFOR

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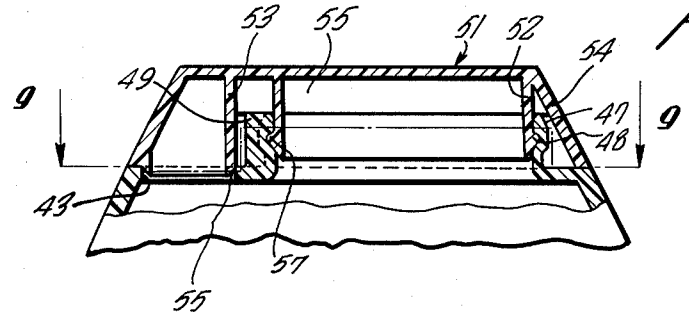


FIG. 6

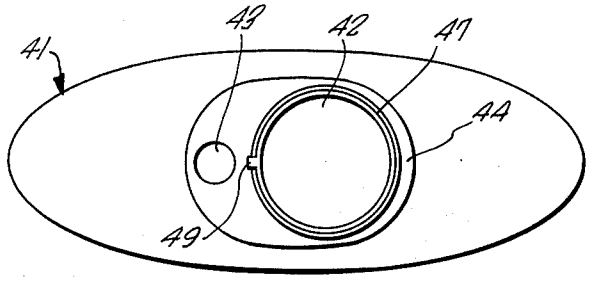


FIG. 7

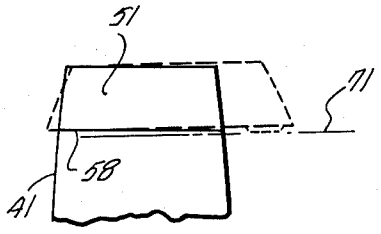


FIG. 10

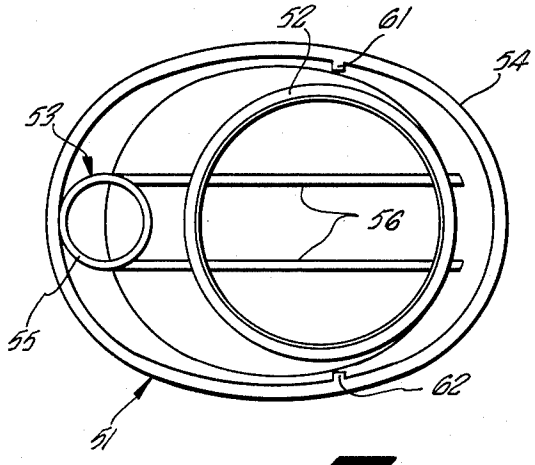


FIG. 8

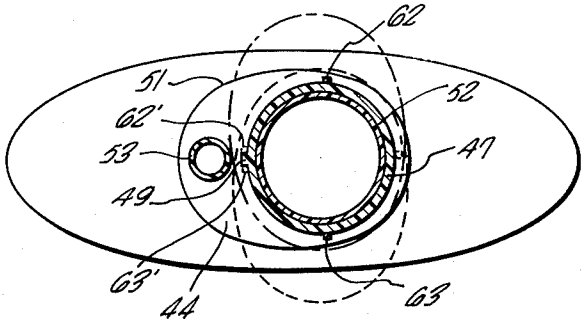


FIG. 9

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United States Patent Office 3,231,155 Patented Jan. 25, 1966

3,231,155

CONTAINER AND CLOSURE CAP THEREFOR

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Filed Mar. 23, 1964, Ser. No. 353,865
17 Claims. (Cl. 222—482)

This invention relates to containers, and more particularly to containers having closure caps adapted to rotate between open and closed positions.

The prior art is replete with various containers having caps to cover their dispensing orifices. In spite of the number disclosed in the prior art, however, none are simple enough to be entirely satisfactory. The advent of plastic or collapsible containers for storing a variety of liquid and powder products make an economic solution really feasible, but it also discourages the use of the multipiece caps so prevalent in the past. A container must be economical to fabricate, yet permit an effective seal to be obtained when its cap is closed. In short, the container must be economical, sturdy, serviceable and attractive.

Of course, plastic container caps have been produced—many of them using unitary construction—but the effective ones have had to have a variety of projecting shoulders, lips and the like to seal the cap since the cap itself was not sufficiently rigid. Another difficulty with many containers, at least when the dispensing aperture is relatively small, is that the container may have to be finished or closed after the liquid or powder material to be dispensed is placed therein or the material must be forced in under pressure. Thus, the container is not reusable nor easy to fill.

These and other shortcomings of many prior art containers are obviated by the present invention because it employs a construction that makes the unitary cap fairly rigid after it is snapped into position over the filling orifice of the container. The closure cap and body are also proportioned and shaped to provide unbroken exterior surfaces when the cap is in its closed position to avoid any projections that can snap or be torn off.

In accordance with the concept of the present invention, the top of the container body has a relatively large filling aperture or orifice and a relatively small dispensing aperture spaced therefrom, and the closure cap is rotatably supported about the edge of the filling aperture for movement between a closed position which seals the dispensing aperture and a dispensing position. Pivoting the closure cap about the relatively large bearing surface adjacent the filling orifice lends rigidity to the cap and, at the same time, permits the hollow bearing to be used for filling the container body before the cap is snapped into position.

An object of the present invention, therefore, is to provide an improved container having a closure cap pivoted about a relatively large apertured bearing on the top of the container which is also a filling aperture for the container body.

Another object of the invention is to use the resistance of the cap to deformation to bias the sealing portion of the cap against the dispensing orifice in the container body.

Yet other objects of the invention are to provide a container which is inexpensive to manufacture, simple to assemble, effective in sealing the orifices in the container body when the cap is in its closed position, and which has no external projections thereon.

In its broadest form, the improved container of the present invention combines a body having filling and dispensing apertures formed therein in spaced-apart relation, a closure cap supported about the filling aperture for movement between a closed position overlying the dispensing aperture and an open position which uncovers the dispensing aperture, and means associated with the cap to seal the dispensing aperture when the cap is closed.

In one exemplary embodiment of the invention, the support means for the cap includes a pair of oppositely disposed arcuate grooves formed in an upstanding shoulder defining the filling aperture which receive projecting tabs formed on opposite sides of the wall of a shoulder depending from the closure cap. In order to urge the sealing part of the closure cap against the dispensing orifice when the cap is in a closed position, the grooves are formed as segments of threads so that the cap in rotating is screwed downwardly against the top of the container body to force the seal on the cap against the dispensing aperture.

In a second exemplary embodiment of the present invention, the cap support means is an outwardly projecting annular shoulder or ridge on the shoulder depending from the cap which rides in a groove formed interior of the upstanding shoulder associated with the container body. In this embodiment, positive closure of the dispensing aperture is provided by locating a closure plug on the underside of the cap below the plane of the top of the container body so that the cap is slightly distorted as the plug cams over the top of the body until the plug depends into the dispensing aperture to seal it.

In both cases, since the supply aperture is three or four times the area of the dispensing aperture and the cap is journaled about a shoulder defining it, the strength of the cap is used to urge the sealing plug into or against the surfaces adjacent the dispensing aperture.

In most prior art closure caps, since the bearing surface for the closure cap is small in comparison to the aperture to be closed, it is not possible to utilize this resilient characteristic of plastic. It is for this reason that many prior art container caps are provided with a U-shaped projection or lip on an outer edge which engages a lip on the top of the container to hold the cap tightly against the top of the container.

These and other objects, advantages and features of the present invention may be more fully understood when the following detailed description is read with reference to the drawings in which:

FIG. 1 is a side view of an improved container formed in accordance with both exemplary embodiments of the present invention;

FIG. 2 is an enlarged plan view of the first exemplary embodiment of the present invention with the open position of the closure cap indicated by the dotted lines;

FIG. 3 is an enlarged partial cross-section of the side of the upper part of the container and the closure cap of the first embodiment illustrating the means which supports the closure cap on the top of the container body and seals the dispensing aperture;

FIG. 4 is an enlarged partial cross-section taken along line 4—4 of FIG. 2 when the cap is in the open position shown by the dotted outline to illustrate the relationship of the container body and cap;

FIG. 5 is an enlarged partial cross-section taken along line 5—5 of FIG. 4 with certain portions omitted to show the means supporting the cap on the container body;

FIG. 6 is an enlarged cross-section of the side of the second exemplary embodiment of the present invention illustrating the manner in which the closure cap is supported on the container body and the position of the dispensing orifice sealing plug when the cap is closed;

FIG. 7 is an enlarged plan view of the container body of the second embodiment of the present invention;

FIG. 8 is an enlarged bottom view of the closure cap of the second embodiment of the present invention;

FIG. 9 is an enlarged section view of the improved container of the second embodiment taken along line 9—9 of FIG. 6 with the opposite open positions of the cap indicated by the dotted and dashed lines thereon; and,

FIG. 10 is a partial end view of the improved container of the second embodiment with the cap shown in one of its two open positions by the dotted outline.

Looking to the first embodiment of the present invention, disclosed in FIGS. 2 through 5, the improved container **10** comprises a container body **11** and a closure cap **12**. The container body **11** has a planar top surfcae **13** having a circular filling orifice **14** and an elliptical dispensing orifice **15** formed therethrough.

The filling aperture **14** has an upstanding annular shoulder **17** adjacent its edge, and a pair of oppositely disposed cap retaining slots or grooves **18** and **19** of approximately 90° arcuate length formed along intersecting planes **21** and **22**.

The cap **12** has a circular shoulder **26** depending from its undersurface and a skirt **27** encircling the depending shoulder. The edge of the skirt **27** and the circular shoulder **26** terminate in a common plane (which is parallel to plane **13**). At one part of the circular shoulder **26**, there is provided a rib **28** connecting the edge of the skirt **27** thereto. An elliptical plug **29** on the rib **28** depends below the common surface of the edges of the skirt **27** and the circular shoulder **26**.

As particularly illustrated in FIG. 5, a pair of oppositely disposed, inwardly projecting tabs or lips **31**, **32** are provided. When the cap **12** is snapped into position, the tabs **31** and **32** engage respective slots **18** and **19** to support the cap above the upper surface **13** of the body **11**.

When the cap is rotated to its open position, as shown by dotted lines in FIG. 2, the tabs **31** and **32** are in the upper ends of the slot **18** and **19** (FIG. 4 illustrates the position) and the dispensing aperture **15** is uncovered. When the cap **12** is rotated in a clockwise direction to the closed position, shown by the solid line in FIG. 2 and in cross section in FIG. 3, the depending plug **29** engages the edges of the aperture **15** to seal it.

Note that the ends of the slots **18** and **19**, which are approximately 90 arcuate degrees in length, provide the stops defining the open and closed positions of the cap **12**. Moreover, as the cap **12** is rotated into the closed position (illustrated in FIG. 3), the projecting plug **29** cams across a part of the upper surface of the container body **11** until it depends into the dispensing aperture **15**. The resiliency of the cap **12** is such that it urges the plug **29** to bear against the edge of the dispensing aperture **15** to provide a firm seal.

It will also be observed that when the closure cap **12** has been snapped itno position on the upstanding shoulder **17** of the container body **11**, the interior of circular shoulder **26** cooperates with the upper end of the annular shoulder **17** to seal the large filling orifice **14**.

The combination as disclosed provides a relatively large aperture **14** for filling the container, and, at the same time, permits a small aperture such as **15** to be used for dispensing purposes. The combination also permits aperture **15** to act as an air escape passageway so that the container can be filled rapidly.

Turning to the second embodiment of the present invention, which is illustrated in FIGS. 6 through 10, the container body **41** is formed much like that of the first embodiment. Specifically, a pair of spaced-apart apertures **42** and **43** are provided on the planar top surface **44** of the container body **41** and the supply or filling aperture **42** is substantially larger than that of the dispensing aperture **43**.

In the illustrative embodiment, the diameter of the filling aperture is approximately four times that of the dispensing aperture. Obviously, however, various other proportions can be used, the only restrictions being that the

bearing surface about the supply aperture **42** should be sufficiently large to permit the flexibility of the cap **51** to be utilized to urge the dispensing aperture cover **53** against the edges of the aperture **43**. This is particularly important in connection with the second illustrative embodiment inasmuch as the stop position is defined by the entrance of the dispensing plug **53** into the dispensing aperture **43**, as hereinafter explained.

As in the case of the first embodiment, an upstanding annular shoulder **47** defines the filling aperture **42**. The shoulder **47** has an annular groove **48** formed along its interior surface, and a projection **49** intermediate the two apertures **42** and **43** which acts as a stop for the cap **51** as it rotates between open positions on either side of the closed position (see FIG. 9).

The cap **51**, as particularly illustrated in FIG. 6, has a flat upper surface and circular shoulders **52** and **53** depending from the under surface thereof. Shoulder **53** is the sealing plug for the dispensing aperture **43** and shoulder **47** supports the cap as hereinafter explained. A pair of parallel ribs **56** are formed along the underside of cap **51** to strengthen it so that its overall weight and thickness can be kept down, and the dispensing aperture plug **53** has its lower edge beveled at **55** so that it seats firmly on the edges defining the dispensing aperture **43**. An annular projection **57** is formed circumferentially around the outside of the downwardly depending circular shoulder **52** to snap into the groove **48** in the upstanding shoulder **47** to provide the rotatable support means for the closure cap **51**. The depending circular shoulder **52** and dispensing aperture plug **53** are encircled by a skirt **54** depending from the top of the closure cap **51**. With the cap **41** snapped into position on the container body **51**, the lower edge **58** of the skirt **54** is parallel to, and substantially contacting, the top planar surface **44** of the container body **41**. When the cap is placed in its closed position, the sides of the skirt **54** form a substantially continuous surface with the sides of the body **41**.

A pair of oppositely disposed projections **61** and **62** are also formed interior of the skirt of the closure cap **51** (see FIG. 8) and are so positioned to abut the projection **49** on the annular shoulder **47** so as to stop the rotation of the closure cap **51** approximately 90° on either side of the closed position. These positions are indicated generally in FIG. 9 by the dotted and dashed positions of the closure cap **51**. The projection **62** engages one side of projection **49** (at **62'**) when the cap is rotated in a counterclockwise direction (with respect to FIG. 9) and projection **63** abuts the other side of projection **49** (at **63'**) when the cap **51** is rotated in a clockwise direction.

The means urging the plug **53** against aperture **43** is most clearly illustrated in FIG. 10. The plane in which the beveled edge of **53** lies is identified as **71** and the lower edge of the skirt **54** and top **44** of the container body **41** lie in plane **58**. It can be seen that the plane **71** is below that of the edge of the cap **51** so that the beveled edge **55** is cammed over the edge of the container body **41** and moves along surface **44** until it depends into the dispensing aperture **43** (see FIG. 6). This camming action causes the cap **51** to be biased upwardly until the dispensing aperture **43** is closed, at which point the resistance of the cap **51** to deforming forces acts to continue to urge the beveled end **55** of the plug **53** interior of the dispensing aperture **43**.

In the preferred embodiments the cap and body may be formed of polyethylene, polypropylene or some comparable plastic. However, it is really only necessary that one of the two members be formed of one of these materials or of a material having sufficient flexibility to permit the cap to be snapped onto the shoulder on the body. In some cases, it might be advantageous to use a body of plastic-coated glass, for example, and a plastic cap.

While the presnet invention has been described with respect to two exemplary embodiments, it should be obvious to those skilled in the arts that various other con-

figurations can be visualized without departing from the spirit and scope of the invention. For this reason, the invention should be limited only to the extent of the claims.

What is claimed is:

1. A container for storing, transporting and dispensing a powder or liquid material comprising, in combination, a body having filling and dispensing apertures formed therein in spaced-apart relation, a closure cap retained and supported in sealed relation about said filling aperture for movement between a closed position wherein the dispensing aperture is closed and an open position wherein the dispensing aperture is uncovered, and means associated with said cap biased when said cap is in its closed position to seal said dispensing aperture.

2. A container for dispensing a powder or liquid material in accordance with claim 1 wherein said means to seal said dispensing aperture is a plug, and including means urging the sides of said plug against the edges of said dispensing aperture when the cap is in its closed position.

3. A container for dispensing a powder or liquid material in accordance with claim 1 wherein the filling aperture about which the cap is supported for angular movement is large in comparison to the dispensing aperture and stop means associated with said body and said cap are provided to define preselected limits for rotation of said cap between said open and closed positions.

4. A container for dispensing a powder or liquid material comprising, in combination, a body including a top having spaced-apart filling and dispensing orifices therein; said body having a shoulder defining said filling orifice; and a closure cap having a depending plug; said cap supported on said shoulder for rotation generally about said filling orifice between a closed position overlying said dispensing orifice and an open position that uncovers said dispensing orifice; said cap cooperating with said shoulder to close said filling orifice whenever the cap is supported on said shoulder; and said plug engaging the surfaces of the body defining said dispensing orifice and projecting below the top thereof to seal said dispensing orifice when the cap is in said closed position.

5. A container for dispensing a powder or liquid material in accordance with claim 4 wherein the cap has a skirt encircling said plug and said cap supporting means, and the dimensions of the skirt do not exceed those of the top of the body whereby no part of the cap projects outwardly beyond the sides of the body when the cap is in its closed position.

6. A container for dispensing a powder or liquid material in accordance with claim 4 wherein the normal position of said plug when said cap is in its closed position is below the top of said body, and the cap is formed of a rigid but flexible material so that it urges the plug against the edges of said dispensing orifice.

7. A container for dispensing a powder or liquid material comprising, in combination, a body including a surface having spaced-apart large and small apertures formed therethrough; said body having an upstanding annular shoulder defining said large aperture; a removable closure cap having a downwardly projecting circular shoulder and a seal; said circular shoulder cooperating with said annular shoulder to seal said large aperture whenever said cap is rotatably supported on the body; and means including said circular and annular shoulders to support said cap for rotation adjacent said body surface between a closed position overlying said small aperture and an open position that uncovers said small aperture; said cap seal covering said small aperture when the cap is in said closed position.

8. A container for dispensing a powder or liquid material in accordance with claim 7, and including means on said cap and said body to limit the rotation of said cap between said open and closed positions.

9. A container for dispensing a powder or liquid material in accordance with claim 7 wherein said cap seal is urged against the surface defining said small aperture by the distortion of said cap.

10. A container for dispensing a powder or liquid material comprising, in combination, a body including a top planar surface having formed therethrough a small dispensing aperture and a large filling aperture spaced-apart therefrom, the latter at least three times the diameter of said small aperture; said body having an upstanding annular shoulder surrounding said large aperture; a removable closure cap having a downwardly projecting circular shoulder and a plug spaced apart therefrom; and means including said circular and annular shoulders to support said cap for rotation in a plane substantially parallel to said top surface between a closed position overlying said small aperture and an open position; said circular shoulder cooperating with said annular shoulder to seal said large aperture whenever said cap is rotatably supported on the body; and said plug engaging the surfaces defining said small aperture to seal it when the cap is in said closed position.

11. A container for dispensing a powder or liquid material in accordance with claim 10 wherein said cap support means includes a plurality of arcuate grooves formed in circumferential, spaced-apart relation in the outersurfaces of said annular shoulder, and inwardly projecting lips formed in spaced-apart relation on interior walls of said circular shoulder to engage respective sidewalls of said grooves.

12. A container for dispensing a powder or liquid material in accordance with claim 11 wherein said plurality of grooves is an oppositely disposed pair which define arcs of approximately 90° with the ends of said grooves acting as stops for the cap to define said open and closed position.

13. A container for dispensing a powder or liquid material in accordance with claim 12 wherein said oppositely disposed grooves are cut as segments of threads so that the cap moves downwardly toward the top surface of said body to force the plug interior of said small aperture when the cap is rotated from the open to the closed position and moves the plug above the plane of the top surface when rotated from the closed to open position.

14. A container for dispensing a powder or liquid material in accordance with claim 10 wherein said cap support means includes a circumferential groove formed interior of said annular shoulder to receive an outwardly projecting circumferential shoulder formed on said circular shoulder.

15. A container for dispensing a powder or liquid material in accordance with claim 14 wherein at least one open position is defined by a stop formed on one side of said body adjacent the path traversed by the rotation of said cap which engages a projection on said cap, and said closed position is defined by said plug projecting interior of the small aperture in said body.

16. A container for dispensing a powder or liquid material in accordance with claim 10 wherein said cap has a skirt encircling the circular shoulder and plug, the edge of said skirt lies in a plane parallel to the top surface of said body and immediately adjacent thereto, and the end of said plug depends below the planes of said edge and said top surface whereby, as the cap is rotated towards its closed position, the plug cams the cap upwardly across said top surface until the plug under the bias force of the resilient cap can move into said small aperture to seal the aperture and act as a stop for said cap.

17. A flexible container for holding and dispensing liquids, powders, and the like comprising, in combination, a body having large and small apertures formed in the

top surface thereof, said large aperture being three to four times larger in cross-section area than said small aperture; an upstanding circular shoulder formed on said body adjacent said large aperture, the interior surface of said shoulder having a circular groove formed therein; a flexible cap having a skirt therearound; a journal depending downwardly from the underside of said cap and having an annular shoulder on the outer surface thereof, said journal proportioned to snap interior of said upstanding shoulder with the annular shoulder on said journal engaging the groove in said upstanding shoulder to seal the opening and permit the cap to rotate with the edge of its skirt in immediate juxtaposition to said top surface; oppositely disposed stop means associated with the top of said body to confine the rotation of said cap between open positions on each side of said small aperture; and a downwardly projecting beveled plug formed on said cap in spaced-apart relation to said journal to overlie the small aperture when the cap is in its closed

position and to engage the edges thereof, said plug extending below the plane of the top of the body whereby the beveled edge of the plug cams the cap upwardly across the top of the body as the cap is rotated to the closed position at which point the plug moves into said small aperture to seal it.

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CHARLES R. CARTER, *Examiner.*

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,231,155 January 25, 1966

Paul H. McConnell

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

In the grant, line 3, after "California," insert -- assignor to United States Borax & Chemical Corporation, of Los Angeles, California, a corporation of Nevada, --; line 12, for "Paul H. McConnell, his heirs" read -- United States Borax & Chemical Corporation, its successors --; in the heading to the printed specification, lines 3 and 4, for "Paul H. McConnell, 1811 Las Flores Drive, Glendale, Calif." read -- Paul H. McConnell, Glendale, Calif., assignor to United States Borax & Chemical Corporation, Los Angeles, Calif., a corporation of Nevada --.

Signed and sealed this 7th day of February 1967.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents