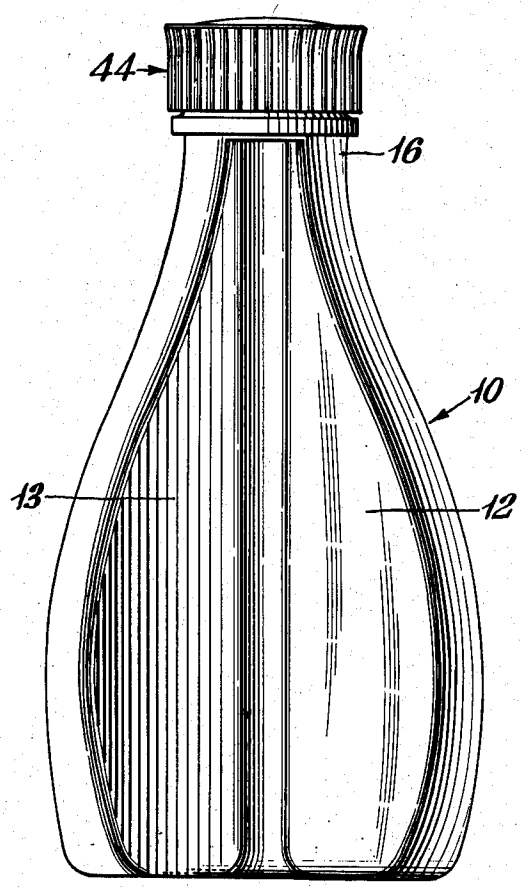
Feb. 5, 1963 R. H. THOMAS 3,076,573

DISPENSING CLOSURE

Filed May 12, 1960 2 Sheets-Sheet 1

Fig. 1.



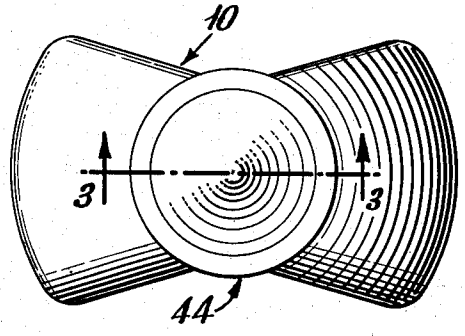


Fig. 2.

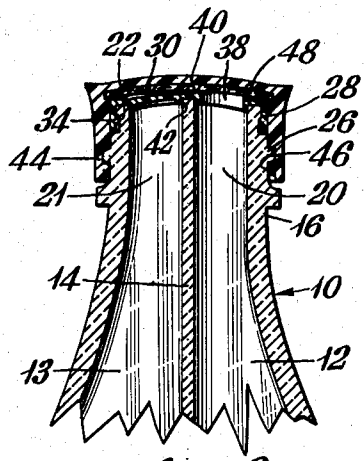


Fig. 3.

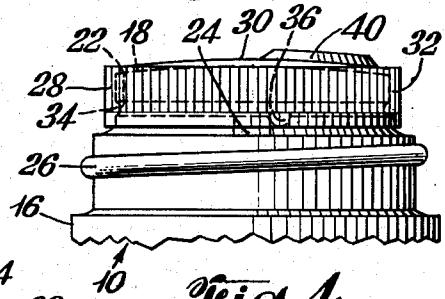


Fig. 4.

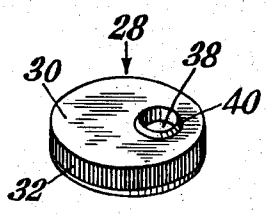


Fig. 5.

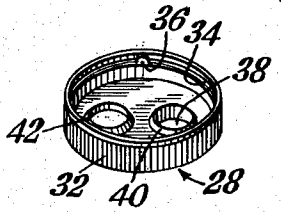


Fig. 6.

INVENTOR
Ralph H. Thomas
BY George P. Maskas
ATTORNEY

Feb. 5, 1963 R. H. THOMAS 3,076,573

DISPENSING CLOSURE

Filed May 12, 1960 2 Sheets-Sheet 2

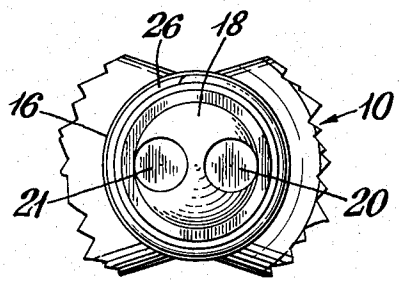


Fig. 7.

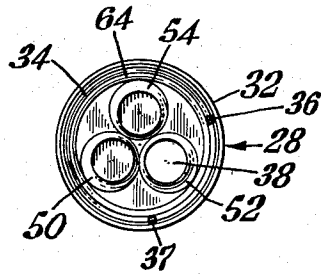


Fig. 8.

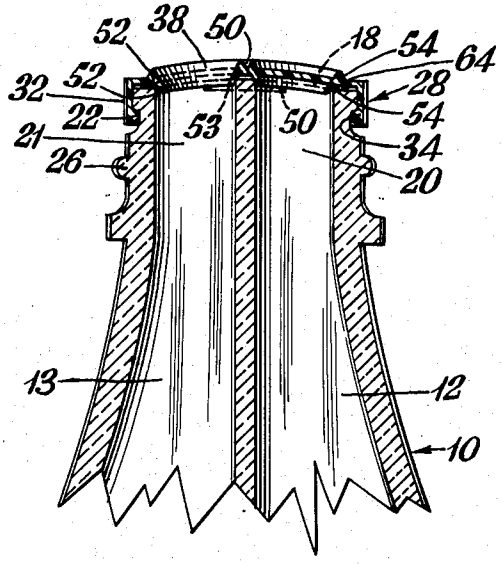


Fig. 9.

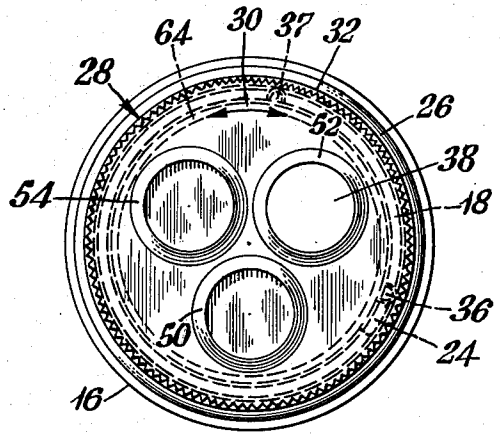


Fig. 10.

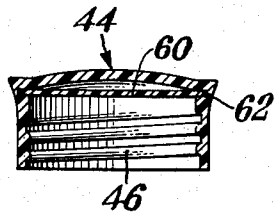


Fig. 11.

INVENTOR
Ralph H. Thomas
BY George P. Mackey
ATTORNEY

United States Patent Office

3,076,573

Patented Feb. 5, 1963

3,076,573

DISPENSING CLOSURE

Ralph H. Thomas, Clark, N.J., assignor to Bristol-Myers Company, New York, N.Y., a corporation of Delaware

Filed May 12, 1960, Ser. No. 28,686
7 Claims. (Cl. 215—6)

This invention relates to a resilient dispensing closure having means to register, in a resiliently yieldable manner, the dispensing opening with a container opening. More particularly, this invention relates to a dispensing closure of this type for use with a compartmented container having separate openings for selectively dispensing material from each compartment.

It is desirable to have a dispensing closure with a homogeneous construction or even a few simple parts for registering the dispensing opening with a container opening by simple resiliently yieldable means. A particular advantageous use of such a dispensing closure is with a compartmented container having a single neck with separate openings for communicating with each compartment since it is often desirable to have available or to package for sale two or more different materials in a single unit with a closure or series of closures to selectively dispense the desired material. Materials which can be advantageously packaged in a single container for facilitating their use include cleaner and polish; vinegar and oil; nail polish and remover; various shampoo compositions such as a shampoo composition which is an effective hair and scalp cleanser and a second shampoo composition which is an effective hair conditioner; home permanent wave solution and neutralizer; bleach and blueing; salt and pepper and two or more lubricating oils.

Although many different types of dispensing closures are known they often suffer from various shortcomings particularly when adapted for compartmented containers. Thus, some of the prior art dispensing closures lack positive means for effectively holding the dispensing closure and the container opening in positive registering relationship; others are formed by metal pressing or bending operations to produce dispensing closures which are not fluid tight; while still others which employ substantially fluid tight positive means for positioning a dispensing opening to selectively dispense materials from a compartmented container, require various accessory parts such as housings for valves and coil springs, rotatable spring loaded protruding nozzles, a series of cooperating spring loaded lugs and stops and the various accessory mechanical parts such as bolts, rivets, gaskets or knobs for assembling and using the mechanism. In general the prior art dispensing closures used with compartmented containers have a plurality of parts, are expensive to manufacture or assemble, are not fluid tight, or do not employ positive means for selecting or holding in registry the desired container opening. Also, many of the dispensing closures are designed to cooperate with containers whose neck or head portions must have cooperating valves, springs, housings and the like.

The problems outlined above are solved and further advantages are obtained with the provision of the novel, inexpensive dispensing closure of this invention. In general the dispensing closure of this invention is a resilient cap comprising a dispensing opening, means for attachment to the neck of a container, and ridges or protuberances on the cap to cooperate alternately, upon movement of the cap, with raised and depressed portions on the container neck so as to alternately produce an outwardly tensioned and an inwardly relaxed condition of the dispensing cap as the dispensing opening is taken in or out of resiliently yieldable registry with an opening in the container neck. In a preferred embodiment, this dispensing

closure is a one piece homogeneously integral resilient cap having means for attachment about the neck of a container to provide unlimited rotation of the cap while in the attached relationship and one side of the dispensing cap top contains an annular opening surrounded by an inwardly depending annular rib. The annular opening and rib are adapted to be rotatably and selectively registered with openings in the head of a container with the annular rib fitting snugly within each opening. The resiliency of the dispensing closure permits the slidable rotation of the annular rib out of each opening, over a top portion of the container neck and its snapping into another opening of the container upon further rotation.

It is a general object of this invention to provide an effective inexpensive dispensing closure which has positive, resiliently yieldable dispenser opening selector means.

It is another object of this invention to provide a one piece homogeneously integral dispensing closure of this type which can be molded in a single operation on a high speed automatic plastic molding machine.

It is still another object of this invention to provide a fluid tight dispensing closure which is adapted for selectively dispensing materials from a compartmented container and which is easy to use, simple in construction and does not require cooperating springs, housings, gaskets and the like.

It is a further object of this invention to provide a dispensing closure for selectively dispensing materials from a compartmented container wherein the closure automatically signals its accurate registry with the desired compartment opening.

Additional objects of this invention include the provision of a selective dispensing closure of this type which can be easily attached to the neck of a container and wherein the container neck does not employ cooperating valves, springs, gaskets and the like.

These and other features of the invention contributing satisfaction in use, economy in manufacture and adaptability to various conditions will be more fully understood from the following description of preferred embodiments of the invention when taken in connection with the accompanying drawings wherein identical numerals refer to identical parts.

FIG. 1 is a front elevation of a compartmented bottle with a screw type cap attached thereto;

FIG. 2 is a plan view of FIG. 1;

FIG. 3 is a fragmentary section on the line 3—3 of FIG. 2 and shows the novel dispensing closure;

FIG. 4 is a greatly enlarged fragmentary portion of the bottle and dispensing closure of FIG. 3;

FIG. 5 is an isometric view showing the top of the dispensing closure of FIG. 3;

FIG. 6 is an isometric view showing the interior of the dispensing closure of FIG. 3;

FIG. 7 is a fragmentary plan view of the bottle head of FIG. 3 with the dispensing closure and screw type cap removed therefrom;

FIG. 8 is a bottom view of a modified dispensing closure;

FIG. 9 is a fragmentary sectional view of the dispensing closure of FIG. 8 attached to a bottle;

FIG. 10 is a plan view of the dispensing closure of FIG. 8 attached to a bottle; and

FIG. 11 is a cross-sectional view of a screw type cap adapted for securing about the bottle neck.

The embodiment of the invention as illustrated in FIGS. 1–7 comprises a bottle **10** having compartments **12** and **13** which extend through the cylindrical bottle neck **16** and have annular openings **20** and **21** in the top of the neck or bottle head **18**. The compartments **12** and **13** are separated by partition **14**. The neck **16** has an outer

annular groove or horizontal circular depression 22, a projecting stop 24 and screw threads 26. The dispensing closure, or simply cap 28 has a top 30 and a depending cylindrical flange or skirt 32. Flange 32 has an inner annular snap-on bead 34 for detachably securing within the neck groove 22. The cap 28 has a projecting lug 36 which cooperates with the neck stop 24 to limit rotation of the cap 28. To one side of the center of the cap top 30 there is an annular opening 38 which is surrounded by an annular rounded rib 40 which fits snugly within either of the head openings 20 or 21. The rib 40 projects below the cap top 30 by a sufficient protrusion so that upon rotation of cap 28 the rib 40 yieldably slides out of the head opening 20. A conventional cap 44 having screw threads 46 can be secured to neck 16 by cooperation with neck threads 26 when it is desired to store the assembled dispenser. Cap 44 has a gasket 48 which forms a seal over rib 40. In addition to rib 40 the cap 28 has a second annular rib 42 which is devoid of the annular opening 38. Rib 42 fits snugly and in sealing relationship within either of the opposite openings 20 or 21 when rib 40 is in one of the openings 20 or 21. A second lug, such as 36, not shown in FIGS. 1–7, is positioned on the cap 28 in an almost diametrically opposite location from that of lug 36. The two lugs in cooperation with stop 24 provide effective means for arresting the rotation of the cap 28 when opening 38 registers with the neck openings 20 or 21. The lugs are positioned so as to compensate for the thickness of stop 24 in its abutting relationship with the lugs and still maintain the registering positions irrespective of which lug is abutting stop 24. In order to dispense fluid from compartment 12 as shown in FIG. 3, the screw cap 44 is removed, the bottle is inverted whereupon liquid flows out of the bottle head opening 20 and the dispensing cap opening 38. The different liquids of bottle 10, such as a shampoo hair cleanser and a shampoo hair conditioner, in the compartments 12 and 13 respectively do not intermingle since the annular ribs 40 and 42 are held in sealing relationship with the head openings 20 and 21 by the resiliency of the cap 28. In order to dispense liquid from compartment 13, the dispensing cap 28 is simply rotated so that the annular ribs 40 and 42 slide out of the openings 20 and 21 respectively and automatically snap into the openings 20 and 21 for dispensing fluid from compartment 13. The snap in action is easily perceived while rotating the top since it requires a greater amount of force to slide the ribs 40, 42 out of the openings 20, 21 than to merely slide the ribs over the bottle head 18. Also, the stop 24 prevents additional rotation in the same direction. The automatic snap in action is due to the tensioning of the resilient cap 28 when the ribs 40 and 42 are slidably rotated out of the cooperating bottle openings 20 and 21. The cap 28 is in a relaxed or non-tensioned position when the ribs 40 and 42 are in openings 20 and 21. Cap 28 attains a maximum resilient tension when the ribs 40 and 42 are sliding over the top of head 18 since the cap top 30 is being forced upwardly. The stop 24 aids in the registry of the ribs 40 and 42 with openings 20 and 21 by cooperation with a lug such as 36. Preferably two lugs are employed and are so positioned that abutting relationship with stop 24 is attained upon the application of a rotational force but while the ribs 40 and 42 are slightly displaced within openings 20, 21 in the direction of the applied rotational force to cause a slight tensioning of the cap 28 so that upon release of the rotatable force on cap 28, the cap rotates slightly in the reverse direction of the applied force and centers itself in registry with openings 20, 21. The use of the stop 24 and the cooperating lugs permits automatic and accurate positioning and registry of the cap opening 38 with the desired bottle opening irrespective of the amount of rotatable force employed. Illustratively, when a fairly large amount of rotatable force is employed the ribs 40, 42 can snap in and then out and past the desired openings when the cooperating stop 24 and lug 36 are not employed. Also, the provision of normally permitting a slight rotation past the registering relationship compensates for dimensional errors of the various parts of neck 16 and cap 28. It is preferable that the dispensing closure of FIGS. 1–7 be molded from conventional low density polyethylene.

The dispensing closure of FIGS. 8–10 shows certain modifications of the invention. Thus, cap top 30 has three downwardly dependent annular ribs 50, 52 and 54 in the shape of unsymmetrical hollow truncated cones having their smaller diameter away from top 30. These ribs are equally spaced at 120° angles about the center of top 30. Ribs 50, 52 and 54 extend above the cap top 30 in the form of rounded annular ribs such as 40 in FIGS. 1–7. Rib 52 forms an annular flange for top opening 38. The sides of ribs 50, 52 and 54 toward cap skirt 32 project further from cap top 30 so as to compensate for the curvature of bottle head 18. Also, the angle of the sides of these ribs closer to the cap skirt 32 is more obtuse with respect to the surrounding top than the angle of the sides closer to the center of the top in order to compensate for the curvature of bottle head 18 in forming a fluid tight seal. The ribs 50, 52 and 54, due to their angular relationship with cap 30 and bottle head 18 act as individual springs to give added resiliency to cap 28 as they bear on the various parts of bottle head 18. This particular construction is particularly advantageous with plastic materials which have less resiliency than conventional low density polyethylene but which are harder and can act effectively in the manner of a thin leaf spring. Such a resin is high density polyethylene or high density polypropylene. These high density resins have a greater amount of crystallinity than the conventional, i.e., low density polyethylene and can be produced with the well known Ziegler type polymerization catalyst. A downwardly depending annular rib 64 is found on the cap top 30 which cooperates with bottle head 18 to aid in forming a fluid tight seal particularly when the screw threaded cap 44 is secured over the dispensing cap 28 and neck 16. Skirt 32 has an inner annular cylindrical bead 34 which cooperates with neck groove 22 for detachably securing to the neck 16. Skirt 32 also carries two lugs 36 and 37 which cooperate with the single outwardly projecting stop 24 to provide positive means for arresting the rotation of cap 28. The lugs 36 and 37 are laterally displaced about the circumference of cap 28 so that upon rotation of the cap the ribs are moved slightly beyond their seating position with the head openings or depressions 20, 21 and blank opening 53 but an insufficient amount for the ribs to be raised out of the head openings. Thus, the stopping action due to the lugs 36 and 37 occurs slightly past the registry point of the downwardly extending ribs and cooperating head openings so that when the rotatable force is released the cap 28 rotates slightly in the reverse direction since the ribs are still within the head openings and the springiness of the ribs and resiliency of the entire cap 28 exert sufficient rotatable force upon being thus released to cause the cap 28 to move to a less tensioned position. Bottle head 18 of FIGS. 8–12 has openings 20 and 21 and recess or blank opening 53. Blank 53 has a diameter such as that of openings 20 and 21 but does not communicate with the compartments 12 and 13. This is shown in FIG. 9 which is a fragmentary cross section between the centers of ribs 52 and 54 which are within the bottle openings 21 and 20 whereas rib 50 is within blank 53. The blank 53 and openings 20, 21 register with the top ribs 50, 52 and 54. The blank recess 53 permits the fluid tight sealing of the bottle while the cap 28 is in the relaxed or untensioned position by simply registering rib 52 which carries the top opening 38 with recess 53. Cap skirt 32 also has outer serrations to facili-

tate grasping by the fingers for rotation. The embodiments shown in FIGS. 8 to 10 operate in much the same fashion as that of FIGS. 1–7 but with added advantages such as the spring action of ribs **50**, **52** and **54**; the sealing advantage of annular rib **64**; the provision for blank **53** for registry with opening **38** to facilitate fluid tight sealing without the aid of screw cap **44** when the cap **28** is in a relaxed position; and the use of 3 annular ribs above the cap top instead of one.

FIG. 11 shows a modification of the screw cap **44** wherein a smooth, rotatable resilient plate **60** is snap fitted within cap groove **62**. This modification enables the screw cap **44** to be tightly applied with only a slight or no rotational force on the ribs **50**, **52** and **54** which extend above the cap top **30**.

Examples of resilient plastic materials which can be used for fabricating the dispensing closure are polyethylene, vinyl chloride-vinyl acetate copolymer; polyvinyl plastisols; polybutyl methacrylate; polytrifluoromonochloroethylene; neoprene rubber, synthetic rubbers, natural rubber; polyethylene-polyisobutenlene compositions; polyvinylidene chloride; nylon and other polymeric compositions of matter which are resilient.

While certain embodiments of the invention have been shown and described, it is to be understood that the invention is capable of many modifications. Changes therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as disclosed in the appended claims.

What is claimed is:

1. A compartmented dispenser suitable for dispensing two different fluids, comprising a bottle, said bottle having a top of substantially circular horizontal cross section, a bottom, a hollow body portion and a fluid tight vertical partition extending between the top and bottom forming two compartments, each of the compartments having one annular opening through the bottle top, each of said openings having substantially the same circumferential configuration, a horizontal circular depression about the exterior of said bottle below the bottle top; an integral resilient cap telescoped over the bottle top, said cap comprising a top having an annular flange which projects below the cap top, said flange having an inwardly disposed annular bead snapped within the bottle circular depression, said top having a downwardly disposed annular ribbed means within the cap top area circumscribed by said flange and being entirely to one side of the cap center, said ribbed means having inclined peripheral surfaces, an annular opening within the cap top area circumscribed by said annular ribbed means, a second downwardly disposed annular ribbed means within the cap top area circumscribed by said flange and being entirely to one side of the cap center, said second ribbed means having inclined peripheral surfaces and having a fluid tight transverse partition therein, said inclined peripheral surfaces of both the annular ribbed means registering in resilient wedging sealing relationship within the bottle openings, said annular ribbed means circumscribing a circle upon the bottle top on rotation coinciding with both the bottle top openings and cooperating with the bottle top and bottle openings upon rotation of the resilient cap to alternatively produce on the cap top a relaxed condition upon registry of the annular ribbed means within the bottle top openings and a tensioned condition upon being slidably and rotatably displaced from the bottle top openings.

2. The dispenser of claim 1 wherein the bottle has exterior screw threads below the bottle horizontal depression; and a screw cap having internal threads cooperatively engaging said bottle threads, said screw cap having above the internal threads thereof a horizontal circular groove and a resilient circular disk snapped within said groove, said disk having a flat smooth surface in contact with the resilient cap top and sealing the dispensing opening therethrough.

3. A homogeneously integral resilient plastic dispensing cap adapted for selectively dispensing fluids from a compartmented container, said cap comprising a cylindrical top having a circumferential flange extending below the top, said flange having a circular inwardly disposed bead adapted for snap-on engagement about a compartmented container, said dispensing cap top having two downwardly disposed annular ribbed means having substantially smooth inclined circumferential surfaces, said ribbed means spaced at equal radial distances from the axial center of said top wherein the cap top area circumscribed by one of the ribbed means has a dispensing opening therethrough, and wherein the cap top area circumscribed by the second ribbed means has a fluid tight wall thereacross.

4. The dispensing cap of claim 3 wherein the ribbed means are in the shape of a truncated cone.

5. A compartmented dispenser for dispensing fluid materials comprising a container having a top, a bottom, sides and a hollow body portion, a fluid tight vertical partition extending between the top and bottom forming a first and second compartment within said container, the container top having a first and a second annular opening communicating with said first and second compartments respectively, the said top openings spaced at an equal radial distance from the center of said top, means on the exterior of said container below the top for securable rotatable attachment of a cap; a resilient cap having a top and an annular flange which projects below the cap top, said flange having means for securable rotatable attachment with the container attaching means, said cap telescoped over the container top and rotatably attached thereto, said cap top having a downwardly disposed annular ribbed means and a dispensing opening through the top within the ribbed means, a second downwardly disposed annular ribbed means having a fluid tight partition within said ribbed means, both of said ribbed means being at the same distance from the cap top center as the radial distance of the container top openings, both of said annular ribbed means being within the cap top area circumscribed by the cap flange, the exterior circumference of said ribbed means and the interior circumference of the container top openings registering in resilient fluid tight wedging sealing relationship, the said first and second ribbed means circumscribing a circle on the container top upon rotation of said cap.

6. The dispenser of claim 5 wherein the container top is circular, the cap is homogeneously integral, wherein the means for securable rotatable attachment of the container and cap is a horizontal annular groove on the container exterior cooperating with an inwardly directed rib on the cap flange for snap-on rotatable attachment, the cap top having a downwardly disposed substantially circular bead concentric with the cap flange and container top about both of the downwardly disposed ribbed means and the container top openings, the said bead having a diameter less than that of the container top, the vertical thickness of said bead throughout its entire circumference being substantially uniform and less than that of the downwardly disposed ribbed means, the said bead being in fluid tight contact with the container top when the ribbed means are seated within the container top annular openings.

7. The dispenser of claim 1 including a resilient lug on the cap flange and a radial stop on the bottle, the said lug and stop cooperating in abutting relationship to arrest rotation of said cap about said bottle top upon application of external rotary force to the cap, the said arresting of rotation occurring past the registering position of the two ribbed means and bottle top openings but while the ribbed means are within said openings and yieldably forced to one side thereof in the direction of the applied rotation of the cap, the ribs automatically sealing in normal registry within the top openings by

movement of the cap in the reverse direction of the applied force due to the resilient force of the ribs upon ceasing the application of external rotary force to the cap.

References Cited in the file of this patent

UNITED STATES PATENTS

1,273,779	Harris	July 23, 1918
2,206,209	Thorn	July 2, 1940
2,349,724	Henderson	May 23, 1944
2,576,416	Randlett	Nov. 27, 1951
2,961,133	Ankney	Nov. 22, 1960
2,970,724	Lacy	Feb. 7, 1961

FOREIGN PATENTS

161,589	Australia	Mar. 1, 1955
348,887	Great Britain	May 21, 1931