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W. F. ROBB ET AL
CONTAINER CLOSURE CAPS

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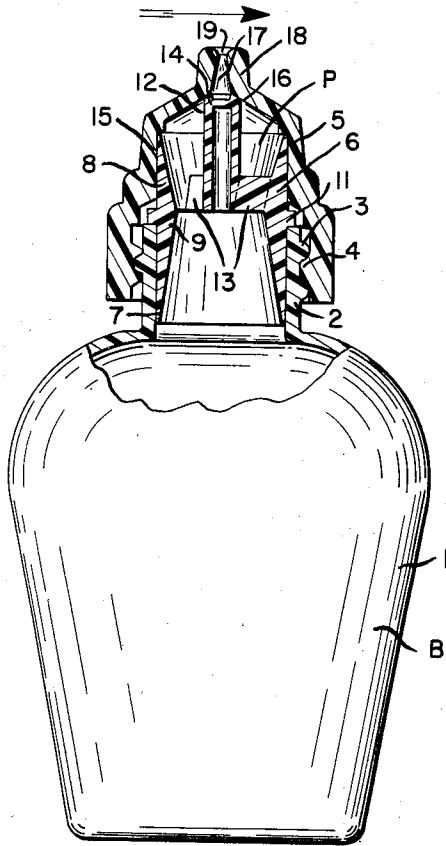


FIG. 1.

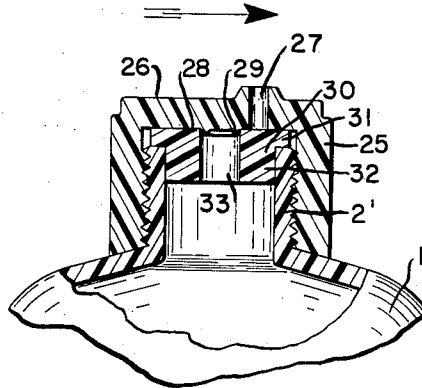


FIG. 4.

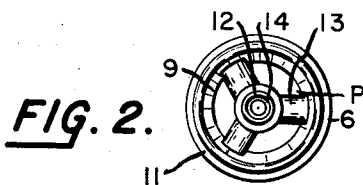


FIG. 2.

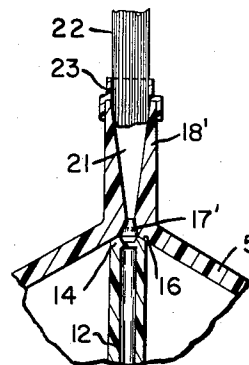


FIG. 5.

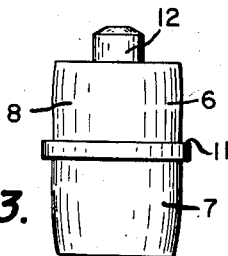


FIG. 3.

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CONTAINER CLOSURE CAPS

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5 Claims. (Cl. 222—521)

This invention relates to dispensing and more particularly to closure caps for containers used in the dispensing of liquid or any flowable material from a receptacle or bottle primarily made from pliable material.

As is well known in this art, containers for such materials must be provided with a closure cap structure which is simple for the user to operate and yet provides a protective seal for the material in the container when the latter is not being used. Many types of closure caps have been developed and are commercially available, but it is one of the objects of this invention to provide a container for liquids or any flowable materials having improved cap or closure means.

Another and more particular object of this invention is to provide a dispensing cap structure for a container of the pliable type having improved means permitting dispensing through an opening when the cap structure is turned in one direction, complete sealing of the opening when the cap structure is turned in another direction and a seal between the container and cap structure, regardless of the said direction which the latter is turned.

Still another object of this invention is to provide an improved dispensing cap structure for a pliable container including an integral valve member and a cap member, one of said members having an annular ridge extending therefrom providing a complete seal when the cap member is in one position.

A still further object of the invention is to provide a pliable container for materials to be discharged, including a valve member having bowed skirt portions for sealing with the neck of the container and with a cap member, said valve including a unique closure means adapted for sealing with the cap member and said cap member being movable relative to the neck of the bottle and the valve member with said skirt portion providing a seal with the cap member throughout its movement to seal or unseal the closure means.

Yet a further object of the invention is to provide a cap structure for controlling dispensing of material such as liquid from a container or bottle of the type described in the preceding paragraph wherein the cap member includes an extending portion provided with a discharge opening for the liquid and having protruding therefrom bristles or the like through which the liquid may permeate.

Still a further object of the invention is to provide a dispensing cap of the type referred to above which has improved means associated therewith for assuring "locked" closed condition of the orifice when the cap is turned to the closed position.

Yet another and particular object of the invention is to provide a cap structure for a pliable dispensing tube or container, said structure including an integral valve member positioned in the neck of the container, said valve member having a central passageway therethrough for the material in the container, a cap member having a substantially flat top and being movable relative to the neck of the container, an opening in said cap member offset and disaligned with said passageway and said cap

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member having depending therefrom an annular ridge engageable in said passageway to seal the latter when the cap member is in one position and disengageable from the passageway when the cap member is in another position, thereby providing communication between the passageway and the opening.

Still another object of the invention is to provide improved cap structure for dispensing bottles or tubes which is simple in construction and operation and yet provides improved sealing means for the material in the container.

Other objects of the invention will become apparent from the description taken in connection with the accompanying drawing wherein:

Figure 1 is a side view of a liquid container embodying one form of the invention, said container having its cap structure shown in section;

Figure 2 is a bottom plan view looking into the inner end of the insert;

Figure 3 is a sectional view of one of the parts shown in Figure 1;

Figure 4 is a sectional view of a modified form of the invention and merely discloses the container in outlined form; and

Figure 5 is a detailed sectional view of a third form of the invention.

Referring to the drawings in detail wherein like numerals represent similar parts throughout the dispensing bottle or receptacle B comprises a hollow container body 1 which is to be made from a pliable material which preferably can be molded. The invention depicted in Figure 1 is primarily adapted for use with a container and the invention shown in Figure 4 is preferably used in connection with a tube, but actually all forms of the invention are applicable whether or not the receptacle B is a container or tube or as long as it is constructed of a pliable material.

A preferred substance from which the receptacle B may be made is a plastic material known as polyethylene, although it may be made from other pliable materials if desired, such as rubber, synthetic rubber or other plastics. The type of material may vary in accordance with the fluid or substance to be contained therein and, therefore, the type of container is not to be construed as limited to any particular material for its construction outside of the requirement that it be pliable so that it may be "squeezed" to facilitate dispensing. Similarly, the shape or configuration of the container or receptacle is immaterial as all forms of invention reside in the particular cap structure included with the receptacle.

Referring to the embodiment of the invention depicted in Figures 1, 2 and 3, the pliable bottle 1, which is typical of many commercially available containers, is provided with an upstanding annular neck 2. The exterior of the neck has thread 3 thereon to receive the internal thread 4 of a cap member 5 whereby the cap member may be threadedly moved relative to the neck. It is to be understood, of course, that the cap member 5 could be arranged on the neck 2 for sliding movement instead of movement by a screw arrangement and such a modification is believed obvious.

Numerals 6 represents a plastic integral insert, valve or plug member including annular skirt portions 7 and 8 and a bulging area 9 which is shown as dividing or centrally of the skirts 7 and 8. Each of the skirt portions, as clearly shown in Figure 3, is bowed or flared outwardly for a purpose that will be hereinafter explained and the skirt portions are tapered from the bulging area 9 from which extends an annular flange 11. Due to the taper, each skirt portion increases in flexibility towards its tip. The plug member 6 also includes an upstanding stem member 12 of inverted U-shape, this member be-

ing spaced from skirt 3 and supported by web members 13, as illustrated in Figure 2. It is to be noted that the member 12 is hollow throughout its height and is provided at its top with an annular skirt or ridge 14 forming a closure portion. The plug member 6 and cap 5 and preferably all parts of all forms of the cap structures are made of plastic, such as polyethylene, but the plastic material is somewhat more rigid than that of the container body.

Again referring to the cap member 5, it is believed apparent that the shape thereof may take other forms than shown, the only limitations being that it is constructed to be mounted for movement relative to neck 2 and provided with a cylindrical wall 15 and a conically shaped closure portion 16 which defines and forms the entrance of a tapered passage or nozzle bore 17 in the body 5. Actually, the passage 17 need not be of the size or shape illustrated, but may be reduced although it is preferred to have a cap provided with a portion 18 extending vertically above the closure portion 16 and provided with bore 17 communicating with a final discharge opening 19.

The annular skirt 7 of plug 6 is positioned within the neck 2 of the bottle 1 with the flange 11 resting on top of the neck. Due to the bowed shape of the skirt 7, a tight wedge-like or press fit is provided between the skirt 7 and the interior surface of the neck 2 to provide a seal for the liquid or other material within the bottle 1. Similarly, the skirt portion 8, due to its bowed or arched configuration, provides a press fit and thereby a complete seal with the cylindrical wall 15 of the cap member 5 regardless of the movement or position of the cap 5 relative to the neck 2. The annular ridge or closure portion 14, as is believed apparent, is adapted for forming a seal with closure portion 16 of the cap member and due to the construction of this annular ridge and stem member 12, it is quite flexible to provide improved sealing characteristics.

In operation, the cap 5 may be rotated in the direction shown by the arrow to separate closure portion 16 from the annular ridge 14 and thereby permit squeezing of body 1 and liquid or other material to travel upwardly through the passage P in the hollow plug 6 for discharge through bore 17 and opening 19. When this occurs, the liquid has sufficient pressure to deform the tips of skirts 7 and 8, respectively, outwardly against the neck 2 and wall 15, respectively, to further increase the seals caused by the skirts.

By a slight twist on the cap member 5 in a direction opposite to that shown by the arrow, the closure portion 16 and the annular ridge 14 are caused to come in engagement to provide a seal preventing a flow of liquid into opening 17. It should be noted that regardless of the direction of movement of cap member 5, skirt portion 8 always provides a positive seal with cylindrical wall 15 and the skirt portion 7 has positive sealing action with skirt 2. In connection with annular ridge 14 or closure portion and stem 12, its construction permits flexibilities thereof to provide increased sealing action. The cross members or webs 13, as stated, support the stem 12 and these webs, which do not restrict the passage P to any material extent, will flex to a certain degree under stress. This allows the ridge 14 to make a resilient seal with the conical or cone-shaped seat 16 and the webs can be progressively flexed during closing of the cap to create increased mechanical pressures on ridge 14.

Referring to the modification disclosed in Figure 5, the parts are identical to those shown in Figure 1 with the exception of the fact that portion 18 has been changed to provide a fairly extensive nozzle 18', this nozzle including a cone-shaped opening 21 for receiving a plurality of bristles 22 of suitable material and communicating with passage or bore 17'. The bristles 22 are bunched within the tube area of opening 21 and are supported in place by any suitable means, such as an adhesive, and

a bracket 23 which is frictionally held on extensive nozzle 18'. The structure shown in Figure 5 operates in the same manner as that of Figure 1 and the material discharged through passage 21 travels into the bristles 22 to lubricate and permeate same and permits use of the bristles for cleaning purposes, such as the cleaning of dentures.

In connection with the form of Figures 1 and 5, it has been mentioned that cap 5 preferably is arranged and constructed for threaded or sliding cooperative movement on stem 2. However, due to the skirt 8, there is cooperation and relative movement between the skirt 8 and wall 15 of cap 5 and in view thereof the said cooperation between the neck 2 and cap 5 could be eliminated. Nevertheless, threaded engagement between the cap and neck is desirable as such provides more positive action.

The embodiment illustrated in Figure 4 preferably is used in connection with a tube 1 containing paste and the like, although it may be employed with a pliable bottle 1 of the type shown in Figure 1. A cap 25 of substantial inverted U-shape is positioned for sliding or screw adjustment, as shown, on neck 2' whereby it may be moved relative to the neck. The top portion 26 of the cap member or the base of the U is provided with an opening 27 extending therethrough and offset from the center of the cap. The majority of the bottom surface 28 of the cap is flat, but adjacent to the center thereof there is provided an annular depending ridge 29.

Positioned within the neck 2' is an integral insert, valve or plug 30 having a flange 31 which rests on the top of neck 2' and a depending skirt portion 32 having a bowed or arched exterior surface (comparable to surface 7 prior to insertion within neck 2') which forms a seal with the neck and a tight wedge-like fit with the neck 2' to maintain the plug 30 substantially integral within the neck. Plug 30 has a central passage 33 extending vertically therethrough of a diameter slightly greater than the diameter of the extremity or exterior periphery of ridge 29.

In operation, when the cap member 25 is rotated in the direction of the arrow, the ridge member 29 together with the surface 28 is raised to provide a space between plug 30 and top 26. In this position a tube or bottle 1' may be squeezed and paste or liquid ejected through passage 33 to discharge opening 27. Upon rotating cap member 26 in reverse, the surface 28 of top 26 engages the plug 30 to provide a sealing action and a further seal is caused by the resilient ridge 29 protruding within aperture 23 and in this position the liquid or paste within the receptacle is entirely sealed.

The embodiments disclosed may not only be used in connection with dispensing liquids, such as shaving lotions, but also for dispensing acids, pastes and sauces, creams and other flowable materials and all dispensing may be carried out with maximum safety, cleanliness and convenience. Further, the seals provided permit container storage or shipping without loss or contamination.

From the foregoing it will be seen that this invention is one well adapted to attain all the ends and objects hereinabove set forth, together with other advantages which are obvious and which are inherent to the structure of the several embodiments. It will be understood that certain features and subcombinations are of utility and may be employed with reference to other features and subcombinations and this is contemplated by and is within the scope of the claims. As many alterations may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A closure structure for application to a pliable chambered flowable material dispensing container having a neck, comprising an insert member having a depending hollow skirt portion bowed outwardly to provide when

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inserted in said neck a tight wedge-like engagement with the interior wall of said neck and a continual seal for material therebetween, a cap member substantially embracing said insert member and supported for movement relative to said neck and insert member, said cap member having an opening for discharge of material from the container, said insert member having a passageway for conducting material from the container to said opening when said cap member is moved in one direction, and an annular ridge extending from one of said members between the passageway and opening for providing a seal between the opening and the passageway when the cap member is moved in the other direction.

2. A closure structure for application to a pliable chambered flowable material dispensing container having a neck comprising a hollow insert having a pair of thin annular skirt portions joined by a bulging portion, each of said skirt portions being bowed outwardly with respect to said bulging portion, an annular flange extending outwardly from said bulged portion, one of said skirt portions being positionable in tight wedge-like engagement with the interior of the neck and with the flange resting on top of the neck, said insert being provided with a closure portion spaced from and within at least in part the other of said skirt portions, a cap member arranged for movement relative to said neck, part of the interior wall of said cap member embracing and being positionable for tight wedge-like engagement with the other skirt member, said cap member being provided with an inner closing surface defining an opening in said cap member, said closure portions being adapted to be seated and unseated during relative movement of the cap member, said insert being adapted to conduct said material from within the

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container through the opening when the closures are unseated, said one skirt portion in cooperation with the neck and said other skirt portion in cooperation with the interior wall of the cap creating with said neck and wall when positioned relative thereto seals for the material regardless of the movement of the cap member.

3. A closure structure as defined in claim 2 wherein the closure portion of the insert comprises an integral tip in the form of an annular ridge and the closure portion of the cap member comprises a conical shaped surface.

4. A closure structure as defined in claim 3 wherein the closure portion of said insert is supported in position by flexible web members which may be flexed to a certain degree upon seating the closure portions to create increased sealing pressures.

5. A closure structure as defined in claim 3 wherein each of the skirt portions tapers from the end adjacent the bulging portion to the other end whereby the thickness of each skirt portion varies to provide increased flexibility toward the other end of each.

References Cited in the file of this patent

UNITED STATES PATENTS

25	1,357,024	Behrman	Oct. 26, 1920
	1,509,419	Colgate et al.	Sept. 23, 1924
	1,905,994	Burke	Apr. 25, 1933
	2,060,622	Jones	Nov. 10, 1936
	2,533,915	Brooks	Dec. 12, 1950
30	2,565,954	Dey	Aug. 28, 1951
	2,642,208	Kissling	June 16, 1953
	2,669,740	Main	Feb. 23, 1954