

[54] **FLEXIBLE CONTAINER WITH DISPENSING CAP**

[75] Inventor: **Paul A. Marchant**, Kansas City, Mo.

[73] Assignee: **Ethyl Development Corporation**,
Kansas City, Mo.

[22] Filed: **Nov. 18, 1970**

[21] Appl. No.: **90,754**

[52] U.S. Cl. **222/494, 222/173**

[51] Int. Cl. **B65d 35/50**

[58] Field of Search **222/213, 105, 494,**
222/562, 496; 239/534, 535, 587; 137/535

[56] **References Cited**

UNITED STATES PATENTS

2,696,337	12/1954	Dinhofer.....	222/213
3,117,701	1/1964	Stull.....	222/562 X
2,556,571	6/1951	Bobbs et al.	222/494 X
1,590,636	6/1926	McManus et al.	222/105
1,945,872	2/1934	Tappe.....	222/496
2,550,356	4/1951	Jarvis.....	222/496
2,792,161	5/1957	Thomas.....	222/522
1,922,204	8/1933	Johnson.....	222/494
3,134,514	5/1964	Booth.....	222/496 X
1,905,936	4/1933	Heard.....	222/494

1,883,716 10/1932 Greenless..... 222/496

FOREIGN PATENTS OR APPLICATIONS

406,966 8/1966 Switzerland..... 222/494

Primary Examiner—Samuel F. Coleman

Assistant Examiner—Norman L. Stack, Jr.

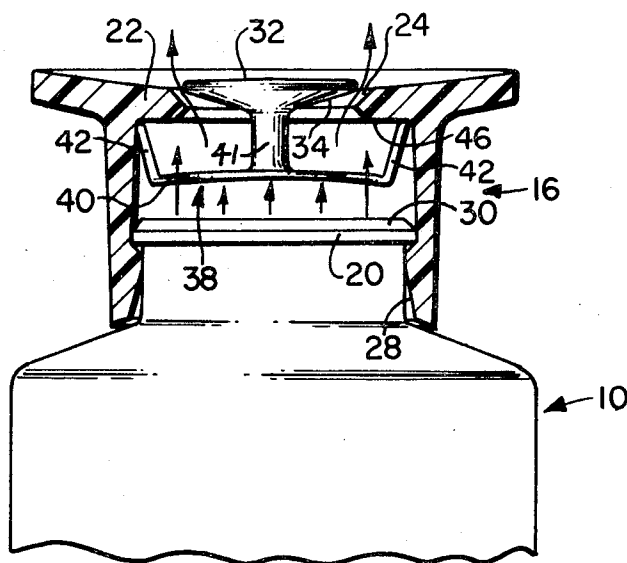
Attorney—Donald L. Johnson, John F. Sieberth, E. Donald Mays and Arthur G. Connolly

[57]

ABSTRACT

A plastic container having flexible sidewalls adapted for dispensing viscous materials. The container is provided with a hollow, cylindrical neck section which receives a two-piece, snap-on dispensing cap. The dispensing cap contains a spring-loaded, normally closed valve member that is opened by application of pressure to the container to force the product to lift an upstanding tapered boss carried by the valve member from a sealing engagement with a central opening in the dispensing cap. When the pressure is released, the valve member automatically closes and prevents intrusion of air into the container.

3 Claims, 6 Drawing Figures



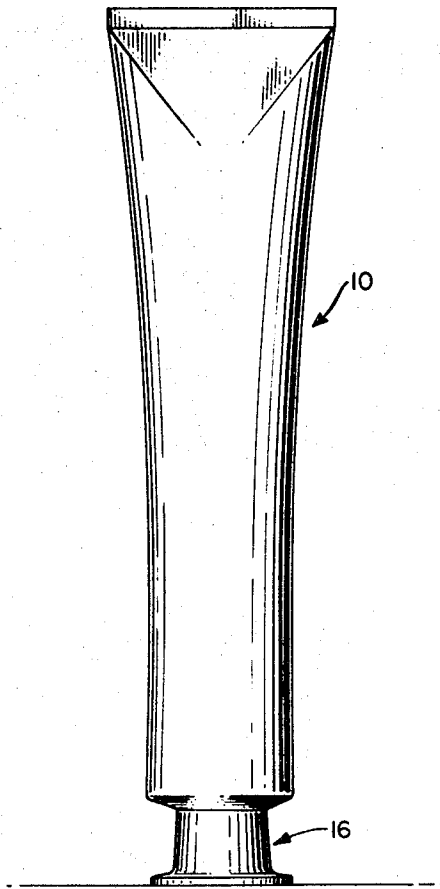


FIG. 1.

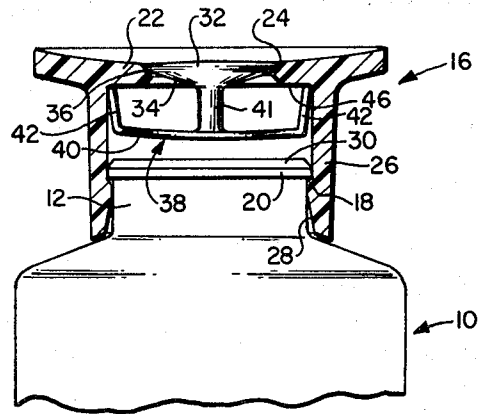


FIG. 2.

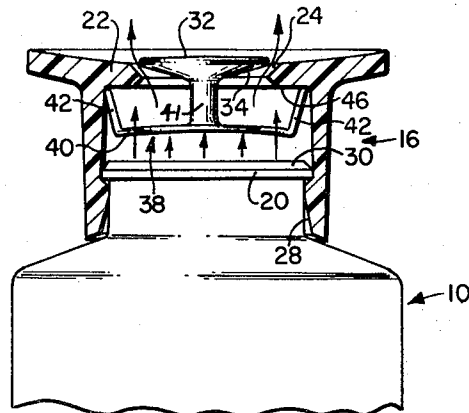


FIG. 3.

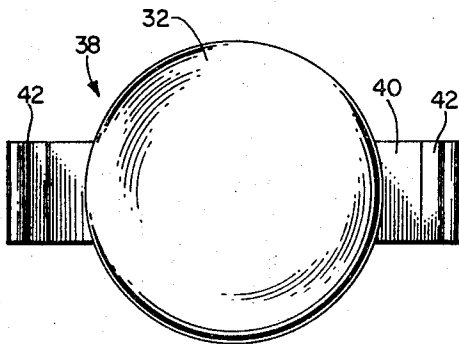


FIG. 5.

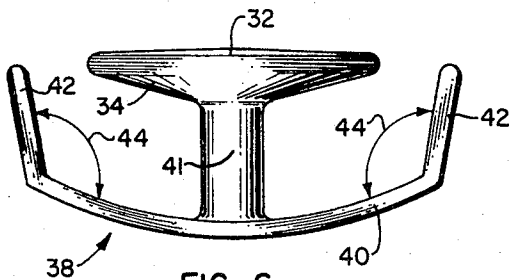


FIG. 6.

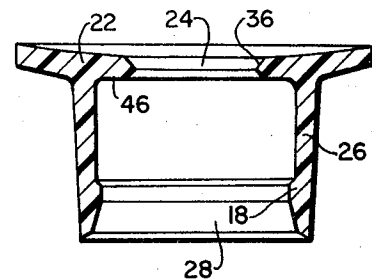


FIG. 4.

FLEXIBLE CONTAINER WITH DISPENSING CAP

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to flexible-wall, plastic containers particularly adapted for dispensing viscous materials.

2. Description of the Prior Art

Flexible-wall, plastic containers, i.e., squeezable plastic tubes have been in use for some time for dispensing viscous materials such as lotions, shampoos, cosmetics, etc. These containers have utilized a number of different closures, e.g., screw-on cap, friction fit dispensing plug with a screw-on cap, and push-pull type closure assemblies with separate caps. To dispense the material the closure cap had to be either unscrewed or pulled open, thus, requiring the use of both hands with the possibility of losing the cap. After the material had been dispensed and the pressured released, air was able to enter the container before it could be closed which is not desirable for some products.

Thus, there is a need for a flexible container with a dispensing cap that requires no twisting, pulling, pushing or swiveling of the closure to dispense the product and one that can be easily operated with only one hand. There is also a need for a dispensing cap having the ability to close immediately after pressure application has been removed to avoid pulling air into the container.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a flexible-wall dispensing container from which viscous material may be readily dispensed.

It is also an object of the present invention to provide a flexible-wall dispensing container with a dispensing cap which can be easily operated with one hand.

It is also an object of the present invention to provide a flexible-wall dispensing container with a dispensing cap which will automatically close the dispensing port when pressure on the sides of the container is released.

It is a further object of the present invention to provide a flexible-wall, plastic, dispensing container which utilizes a closure having only two components of simple design.

It is also another object of the present invention to provide a flexible-wall dispensing container wherein the closure assembly is adapted to serve as the base for the container.

The foregoing and other objects are provided for in the flexible-wall plastic container of the present invention, which container has an upstanding, generally cylindrical neck portion surrounding an opening. The dispensing cap includes a spring-loaded, integrally formed valve carried by a snap-on cap having a cylindrical outer skirt frictionally fitted over the neck of the container. The cap is also provided with a top wall joined to the outer skirt having a central opening therein so dimensioned as to be sealingly engaged by an upstanding boss carried on the upper end of the valve body. The lower end of the valve body is attached to a bowed leaf spring having its outer ends in contact with the underside of the top wall. When pressure is applied to the container by squeezing, the spring flexes to allow the boss to be lifted out of engagement with the cap adjacent the central opening to allow the product to be dispensed.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view of a flexible-wall, plastic container embodying the present invention;

FIG. 2 is an elevational, sectional view of the dispensing cap assembly in the closed position fitted onto the neck of the container;

FIG. 3 is a view similar to FIG. 2 showing the dispensing cap assembly in the open position;

FIG. 4 is an elevational, sectional view of the cap portion of the dispensing assembly;

FIG. 5 is a top view of the valve structure; and

FIG. 6 is a side view of the valve structure of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, the dispensing container of the present invention includes a plastic container, designated generally by the numeral 10. The container is preferably made from a plastic material having sufficient flexibility such that the walls may be readily squeezed by hand. Suitable materials for forming the container of the present invention include low or medium density polyethylene; polypropylene; plasticized polyvinyl chloride and copolymers of polyvinyl chloride; flexible compositions of polystyrene, nylon and other suitable thermoplastic materials. While the container illustrated is in the form of a flexible tube having its lower end sealed, it is understood that plastic bottles having flexible sidewalls and either round or flat bottoms may be used as the containers.

The container is provided with a generally cylindrical upstanding neck 12 which provides a neck opening to the interior of the container. A dispensing cap, designated generally by the numeral 16, is snap fitted over the outside of the neck 12. The cap 16 has an annular ledge 18 extending radially inward from the inner wall of the depending cylindrical skirt 26. Outwardly extending annular ledge 20 is provided on the outer wall of the neck 12. Ledge 18 tightly engages the neck 12 and abuts the underside of ledge 20. This prevents movement of the cap 16 in the axial direction. Ledges 18 and 20 have beveled faces 28 and 30, respectively, to allow the cap to be press fitted over the neck 12 for easy assembly. The top wall 22 of the cap 16 is integrally formed with the skirt 26 and contains a central opening 24. The wall 22 should have a diameter substantially equal to or greater than the diameter of the container 10 in order to provide a firm base to support the container in the inverted position as seen in FIG. 1. When the container is stored in the inverted position, the viscous product in the container will always fill the lower end of the container facilitating the immediate dispensing of the product from the container. When a squeeze tube is stored on its side, a delay is normally encountered before the product will flow into the dispensing end of the container where it can be expressed by squeezing the container.

The central opening 24 is so dimensioned as to be sealingly engageable with an internally spring-loaded, integral valve member designated generally by the numeral 38. This valve member 38, shown in FIGS. 5 and 6, includes an upstanding, truncated, inverted, conical boss 32 attached to the upper end of a cylindrical shaft 41. The shaft 41 is attached at its lower end to a U-shaped leaf spring 40. The boss 32 is dimensioned so that in the closed position the inwardly inclined surface

3

34 of the boss 32 seats on the upper beveled surface 36 of the top wall 22 which surrounds the central opening 24. The spring 40 is terminated at its ends by upwardly and outwardly turned fingers 42. The angle 44 between the spring base and the fingers 42—42 is an obtuse angle. The ends of the fingers 42—42 seat against the bottom surface 46 of the top wall 22 to keep the valve in the closed position when pressure is not being applied.

In operation, when the tube is squeezed, as seen in FIG. 3, the material contained in the tube presses against the inclined surface 34 of the boss thereby moving the boss 32 upwardly. This opens the central opening 24 allowing material to flow out of the tube. As soon as the pressure is released, the spring 40 pulls the boss 32 into sealing engagement with the beveled surface 36 surrounding central opening 24. This movement automatically stops the flow of material and prevents air from flowing into the tube through the opening 24.

It will be apparent to those skilled in the art that various modifications and changes may be made without departing from the essence of the invention. It is intended to cover herein all such modifications and changes as come within the scope of the following claims.

I claim:

1. In a flexible-wall, plastic dispensing container the combination comprising:

- a. a flexible-wall plastic container having a generally cylindrical neck with an opening therein;
- b. a cap having a top wall providing a central opening

4

therein and an integral depending annular skirt frictionally fitted over the neck of said container; and

c. an integral, one-piece, plastic, spring-loaded valve member including,

- i. an upper boss portion having the form of an inverted, truncated cone, said boss extending through said central opening in said cap to seal said opening,
- ii. a cylindrical shaft central portion joined to said boss portion,
- iii. a single, leaf spring portion joined at its midpoint to the bottom of said cylindrical portion, said spring terminating on its ends by outturned and upturned fingers having their ends in abutment with the bottom surface of said top wall of said cap.

2. The combination of claim 1 in which the dispensing cap annular skirt is provided with an inwardly and upwardly sloping, inner, conical wall adjacent its lower end, an inwardly projecting shoulder at the upper end of said inner, conical wall, and said container neck being provided with an outwardly extending annular ring at its upper end adapted to engage said shoulder on said cap to retain said cap on said container neck.

3. The combination of claim 1 in which the portion of said cap top wall defining said opening is provided with a beveled surface of substantially the same angle as the conical wall of said boss portion of said valve member.

* * * * *

35

40

45

50

55

60

65