United States Patent

Marchant

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[54] FLEXIBLE WALL DISPENSER WITH VALVE FOR AIR VENT

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[52] **U.S. Cl.** **222/212,** 222/477, 239/327

[51] **Int. Cl.** **B65d 37/00**

[58] **Field of Search** 239/327; 222/211, 212, 213, 222/215, 464, 493, 477, 59

[56] **References Cited**

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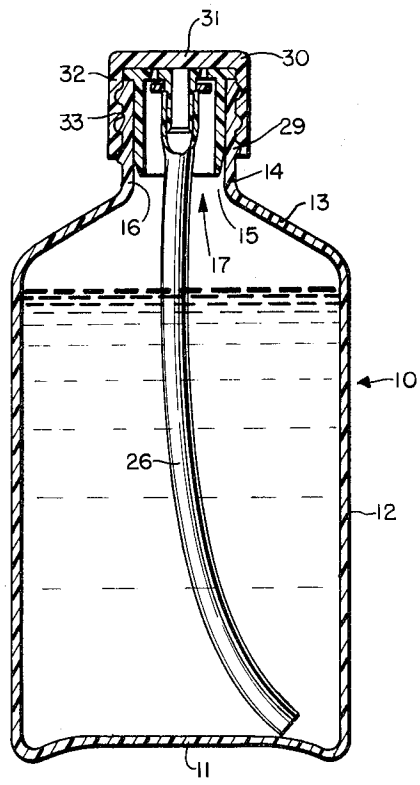
[57] **ABSTRACT**

A plastic container having flexible sidewalls adapted for dispensing viscous, fluid materials. The container is provided with a generally cylindrical neck which receives a dispenser plug having a cylindrical skirt frictionally engaging the inner wall of the neck. The plug has a top wall with a central opening and a central downwardly projecting inner skirt depending from the underside of the top wall. A flexible tube is attached to the lower portion of the inner skirt and extends into the bottle. The top wall of the plug is provided with air inlet openings which are closed by a slidable check valve carried by the inner skirt. When pressure is applied to the flexible sidewalls, air flow moves the check valve into the closed position and forces the contents of the containers through the dip tube and out the central opening in the plug.

6 Claims, 6 Drawing Figures



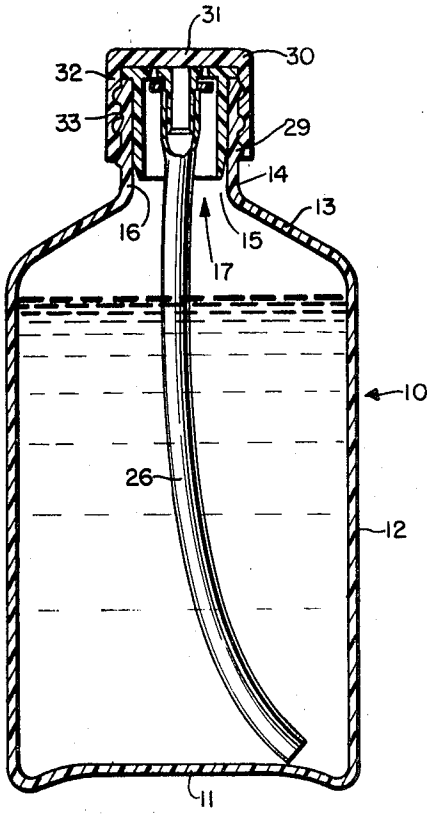


FIG. 1.

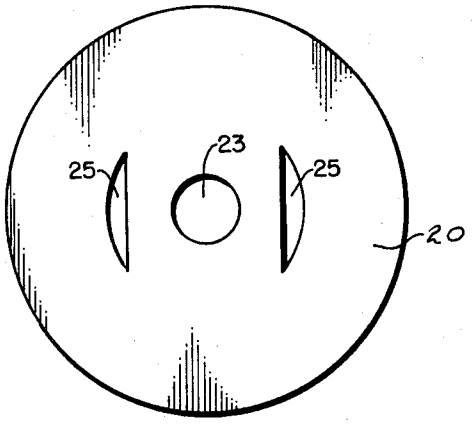


FIG. 2.

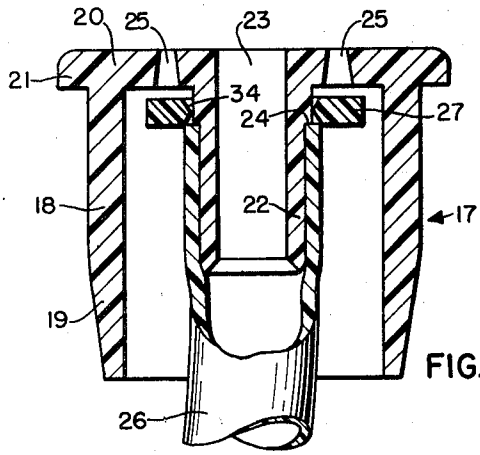


FIG. 3.

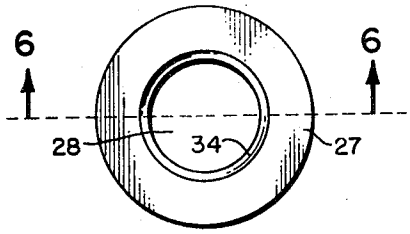


FIG. 5.

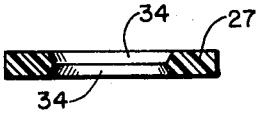


FIG. 6.

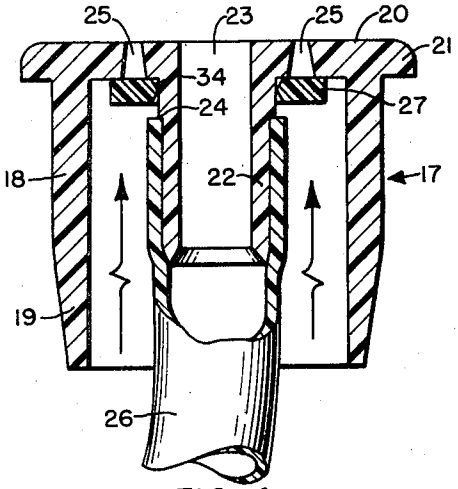


FIG. 4.

FLEXIBLE WALL DISPENSER WITH VALVE FOR AIR VENT

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to flexible wall plastic containers for dispensing viscous fluids.

2. Description of the Prior Art

Some flexible wall plastic containers used heretofore for dispensing viscous fluids, such as body lotions, hand lotions, cosmetic preparations, condiments, etc., have utilized a frictional fit dispenser plug with a central opening therein in the neck of the container. This necessitated inverting the container and squeezing the sidewalls to force the viscous fluid from the container. Depending upon the viscosity of the material in the container, it is not uncommon for considerable time to elapse before the viscous fluid reaches the inverted neck of the container. As the container is gradually emptied, a longer time period is necessary in order for the contents to reach the opening in the dispenser plug. While manually actuated pump devices have been utilized with rigid wall containers for the dispensing of viscous materials, these pumps are not satisfactory for use with flexible wall containers because of the tendency to collapse the container when depressing the plunger on the pump.

Thus, there is a need for a dispensing container which provides quick dispensing action for viscous fluids.

SUMMARY OF THE INVENTION

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

It is also an object of the present invention to provide a flexible wall dispensing container utilizing a minimum number of components.

It is a further object of the present invention to provide a flexible wall plastic dispensing container which utilizes components readily manufactured by conventional techniques.

The foregoing and other objects are provided for in the flexible wall plastic dispensing container of the present invention, which container has a generally cylindrical neck with an opening therein. A dispenser plug having a cylindrical outer skirt is frictionally fitted into the neck opening. The plug is provided with a top wall joined to the outer skirt, a central opening in the top wall, and an axially aligned integral inner cylindrical skirt surrounding said opening and depending from the top wall. At least one additional opening is provided between the outer skirt and the inner skirt. A rigid annular check valve is slidably received on the inner skirt and is normally in the open position below the additional openings in the top wall. The check valve is adapted to be forced upward by air pressure when the sidewalls are compressed to close the additional openings in the top wall. Means are provided for retaining the check valve immediately below the openings in the top wall. A dip tube having its upper end portion received on the inner skirt and its lower end portion extending into the container is provided.

BRIEF DESCRIPTION OF THE DRAWING

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

FIG. 2 is a top plan view of the dispenser plug portion of the present invention;

FIG. 3 is an enlarged sectional view of the dispenser plug and associated components showing the check valve in the open position;

FIG. 4 is a view similar to FIG. 3 showing the check valve in the closed position;

FIG. 5 is a plan view of the check valve utilized in the present invention; and

FIG. 6 is a sectional view of FIG. 5 taken along line 6—6.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to FIG. 1, the dispensing container of the present invention includes a plastic container designated generally by the reference numeral **10**. The container includes a bottom wall **11**, sidewall **12**, top wall **13** and a neck **14**. While the container is depicted as being cylindrical, it is understood that any shape may be utilized for the container, such as square, rectangular, or any other suitable shape. The container is preferably made from a plastic material having sufficient flexibility such that the sidewall **12** may be readily compressed by hand. Suitable materials for forming the container of the present invention include low, medium, or high density polyethylene, polypropylene, plasticized polyvinyl chloride and copolymers of polyvinyl chloride, flexible compositions of polystyrene, nylon and other suitable thermoplastic materials.

The container is provided with a generally cylindrical upstanding neck **14** which provides a neck opening **15** to the interior of the container. The interior sidewall **16** is generally cylindrical in shape. A dispenser plug, designated generally by the reference numeral **17**, is press fitted into the neck opening **15** of the container making tight frictional engagement with the interior sidewall **16** of the neck. As seen more clearly in FIGS. **2**, **3** and **4**, the dispenser plug **17** includes a generally cylindrical outer skirt portion **18** providing an inwardly beveled surface **19** on the lower portion thereof to facilitate entry of the plug into the neck opening of the container. The upper end of the outer skirt **18** terminates in a top wall portion **20** of the plug. An annular shoulder **21** is provided on the top wall portion of the plug which abuts the top of the neck **14** to prevent the plug from being pushed into the neck opening **15**. Integrally formed with the top wall and projecting downwardly from the under surface thereof is an inner skirt **22**. The top wall **20** is provided with a central, generally cylindrical opening **23** surrounded by the inner skirt **22**. The outer wall of the inner skirt is provided with an annular shoulder **24** adjacent its upper end. One or more openings **25** are provided in the top wall **20** intermediate the inner and outer skirts to allow air to enter the container.

A flexible dip tube **26** has its upper end received on inner skirt **62** and has its upper end in abutment with the shoulder **24** provided thereon. A rigid annular check valve **27** is slidably received on the inner skirt **22** and is held thereon by engagement with the upper end of the dip tube **26**. In the normally open position, as seen in FIG. **4**, the check valve is spaced from the underside of the top wall **20** to permit air passage into the container through the openings **25** provided in the top wall. As seen more clearly in FIG. **5**, the check valve is provided with a central opening **28** which has a diameter slightly larger than the outside wall diameter of the upper portion of the skirt **22** to permit slidable movement of the check valve on the inner skirt. The check valve is provided with inwardly sloping inner walls **34—34** in order to prevent cocking and misalignment of the check valve on the inner skirt. The check valve is dimensioned such that the valve will completely close the openings **25** in the top wall of the plug when the sidewalls **12** of the container are compressed to dispense materials from the container as shown in the position for the check valve in FIG. **4**.

Additionally, the container neck **14** may be provided with projecting helical threads **29** on the outer wall surface thereof. The container is closed by screw cap **30**. The cap has a solid top wall **31** and a depending integrally formed annular sidewall **32**. The interior of the sidewall **32** of the cap may be provided with matching helical recesses **33** which engage the helical threads **29** provided on the neck **14**. The dispenser plug **17** and the check valve **27** are conveniently formed by injection molding a semirigid thermoplastic such as polyethylene or polypropylene into the desired shape.

In operation the container is filled with the viscous fluid commodity desired to be dispensed therefrom, the check

valve **27** is placed over the inner skirt **22** and the upper end of the dip tube **26** is placed over the lower portion of the annular skirt **22** and pushed into abutment with the shoulder **24**. The plug **17** and assembled components are then press fitted into the neck **14** of the container so that the bottom of the dip tube **26** extends into the lower portion of the container **10**. To dispense the contents the container is grasped in the hand and pressure applied to the flexible sidewalls **12** forcing air within the container to raise check valve **27** into engagement with the underside of the top wall **20** thereby sealing openings **25**. The trapped air in the top of the container then forces the fluid commodity up through dispenser tube **26** and out the openings **23** into the hand of the user.

While there has been described what is at present considered to be a preferred embodiment of the invention, it will be apparent that other embodiments may be utilized. For example, instead of terminating the inner skirt **22** at the top surface of the top wall **20** of the plug, the inner skirt may extend upwardly in a spout, which terminates in a sidewardly directed opening if desired, whereby the material may be dispensed from the container in a direction transverse to the axis of the container. While the components of the dispensing container of the present invention have been shown in the drawing as plastic, it is understood that many of the components, other than the flexible container **12**, can be made from other materials such as metal. However, for economies and simplicity of assembly, generally the components will all be made from plastic material.

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.

What is claimed is:

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

a. a plastic container having flexible sidewalls and a generally cylindrical neck with a neck opening therein;

b. a dispenser plug having a cylindrical outer skirt frictionally fitted in said neck opening, said plug having a top wall joined to said outer skirt, a cylindrical opening in said top wall, and an axially aligned integral inner cylindrical skirt surrounding said cylindrical opening and depending from said top wall, and at least one additional opening provided in said top wall between said outer skirt and said inner skirt;

c. a rigid annular check valve slidably received on said inner skirt and normally in the open position below said additional opening in said top wall, said check valve adapted to be forced upward by air pressure when said sidewalls are compressed to close said additional opening in the top wall; and

d. a dip tube having its upper end portion received over the lower portion of said inner skirt and supporting said check valve when in the normally open position, and its lower end portion extending into said container.

2. The dispensing container of claim **1** wherein said inner skirt is provided with a shoulder intermediate its ends, which shoulder abuts the upper end of said dip tube.

3. The dispensing container of claim **1** wherein said check valve is provided with a central opening having a diameter slightly larger than the outside diameter of said inner cylindrical skirt.

4. The dispensing container of claim **3** wherein said annular check valve is provided with an inwardly inclined wall surface adjacent said central opening.

5. The dispensing container of claim **1** wherein said neck is provided with helical threads on the outer wall of said neck.

6. The dispensing container of claim **5** including a closure cap having thread-engaging means on its inner wall engaging said helical threads on said outer wall of said neck.

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