July 22, 1969 G. SCHWARTZMAN 3,456,650

BLOWBACK ELIMINATOR FOR COLLAPSIBLE TUBE

Filed Nov. 29, 1966 2 Sheets-Sheet 1

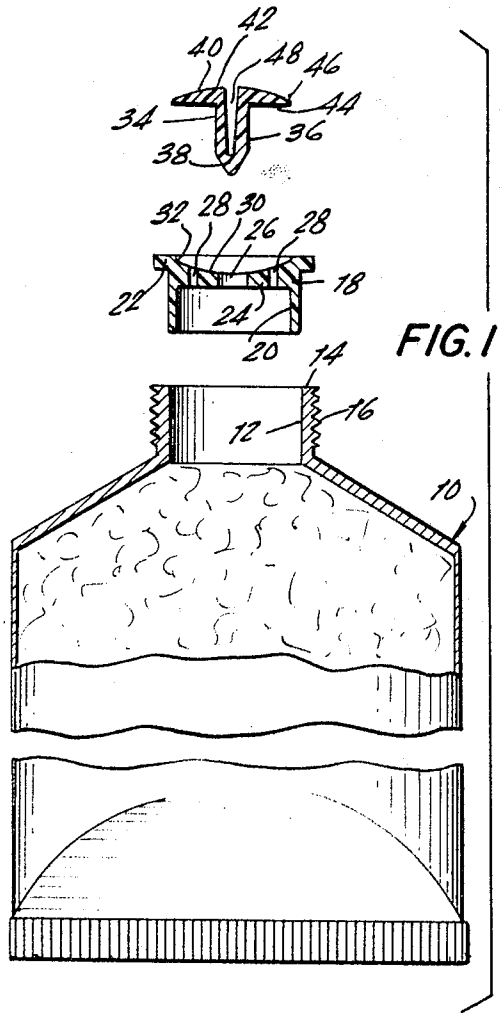


FIG. 1

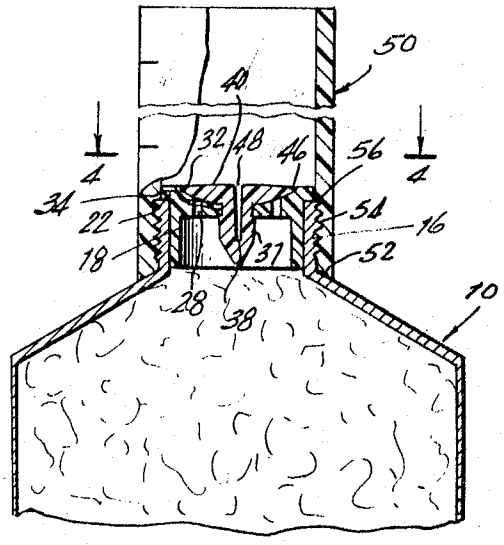


FIG. 2

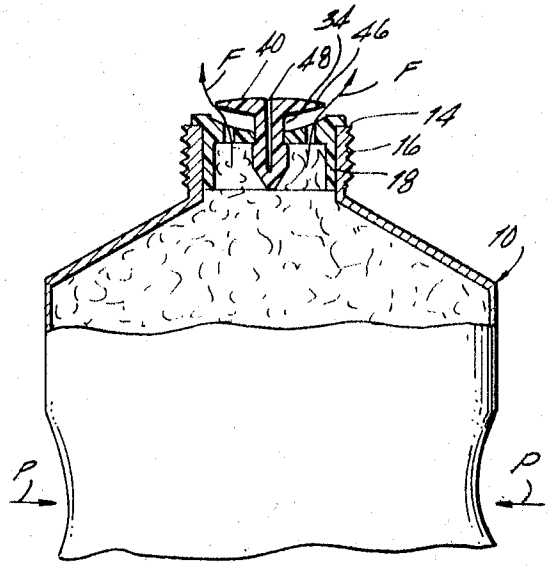


FIG. 3

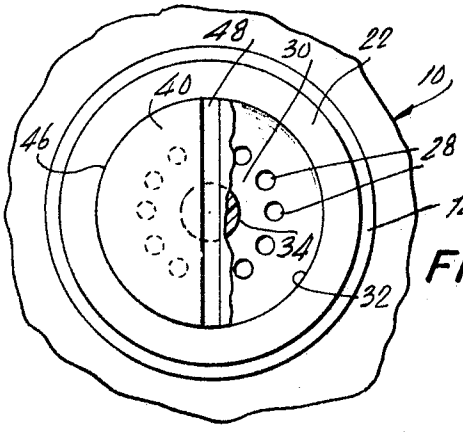


FIG. 4

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FIG. 5

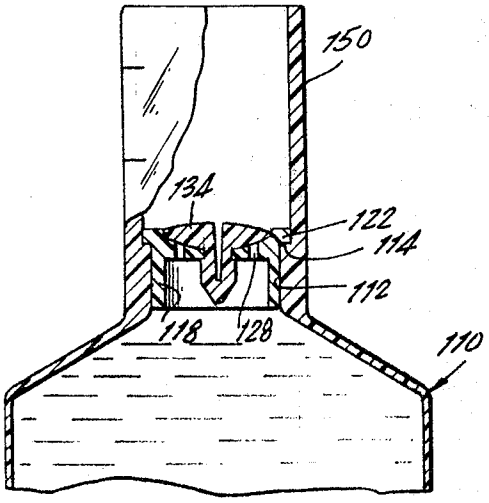


FIG. 6

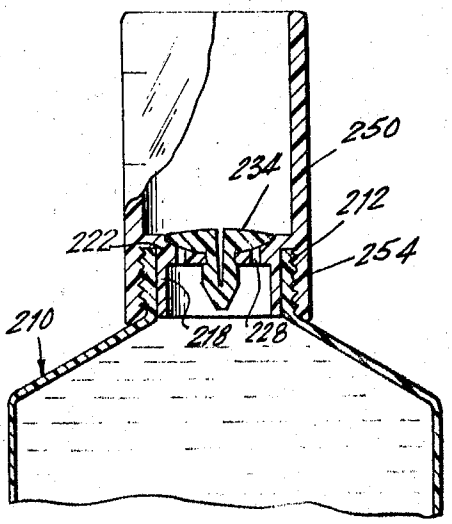


FIG. 7

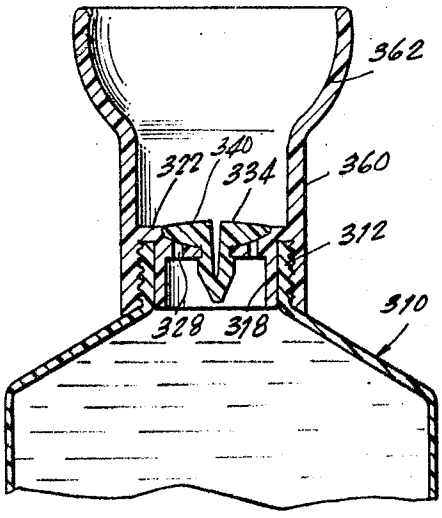
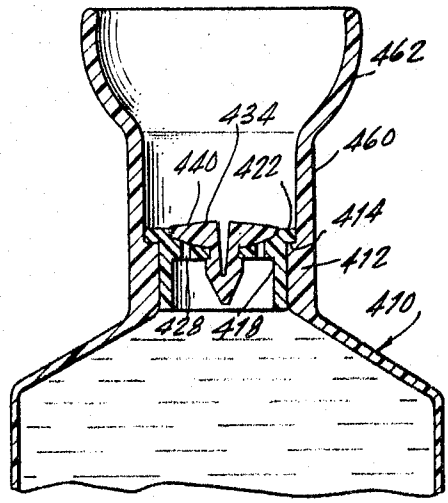


FIG. 8



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BLOWBACK ELIMINATOR FOR COLLAPSIBLE TUBE

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U.S. Cl. 128—249 6 Claims

ABSTRACT OF THE DISCLOSURE

A closure device for controlling the flow of fluid so arranged so that the harder the container is squeezed, the more fluid is permitted to flow through the valve. Means are provided for preventing feedback of air into the tube and include a valve member movable with respect to a transverse web, the valve member having a tapered solt opening into the upper surface thereof and extending into the stem of the valve member.

This invention relates to a closure for a fluid applicator and more particularly to a device for use in applying cosmetics or medications on the person of the user or for application of oils, lubricants, polishes, waxes, soaps, or the like, on any suitable surface.

An object of this invention resides in the provision of means facilitating the application of cosmetics or medications on the person of the user, and wherein the user can see from the shape of the tube how much has been used.

A further object of the invention resides in the provision of means controlling the flow of fluid through a captive closure device so that the harder the container is squeezed, the more fluid is permitted to flow through the valve utilized therein, and feedback of air into the tube is prevented thus preserving the contents against rancidity, spoilage, etc.

A further object of the invention resides in the provision of a dauber employing a novel valve structure in which a captive valve member having an applicator head provides a seal.

Yet another object of the invention resides in the provision of means affording protection for the surface of the body of the user applying the applicator by providing a rather large area contact for the applicator head, yet providing better control for the flow of fluid from the applicator by employing a squeeze operated mechanical valve structure.

An additional object of the invention is to provide a device for facilitating the application of an eyewash or medication through an eyecup to the eye of the user while controlling the flow of fluid to the eye.

A further object of the present invention resides in the provision of a novel closure having a measuring cylinder associated therewith.

The construction of this invention features a closure device for use with a squeeze container having a neck terminating in an open end. The invention includes a retainer ring disposed in the neck and having a transverse web provided with a bore therethrough. The web has at least one fluid delivery aperture therethrough and the web has a concave upper surface. A valve member including a stem and an applicator head is provided with the stem being resiliently engaged in the bore. The applicator head is provided with a flexible peripheral edge and is engageable with the web to overlie and close the aperture when in a closed position. The valve member is movable with respect to said web to permit fluid flow out of the aperture and between the web and the peripheral edge. It is the concept of the invention to employ noval arrangements of measuring cylinders and eye cups in the invention.

Still further objects and features of the invention reside in the provision of a novel captive closure for a squeeze container that is simple in construction, has only two parts, and may be formed out of various readily available materials.

These, together with the various ancillary objects and features of the invention, which will become apparent as the following description proceeds, are attained by this device, preferred embodiments of which have been illustrated in the accompanying drawings, by way of example only, wherein:

FIG. 1 is an exploded vertical sectional view of an embodiment of the device;

FIG. 2 is an assembled view of the device illustrated with a measuring cylinder threadedly secured thereto, with the valve member in a closed position;

FIG. 3 is a vertical sectional view showing the device with the valve in an open position;

FIG. 4 is an enlarged vertical sectional view taken along the plane of line 4—4 in FIG. 2;

FIG. 5 is a vertical sectional view of a modified form of the invention wherein a measuring cylinder is integrally formed with the container;

FIG. 6 is a vertical sectional view of an alternative form of the invention wherein a measuring cylinder is integrally formed with the retaining ring;

FIG. 7 is a vertical sectional view of a further modification of the invention including an eye cup integral with the retaining ring; and

FIG. 8 is a vertical sectional view of a yet further form of the invention employing an eye cup integrally formed with the container.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral **10** generally designates a squeeze container such as a toothpaste tube, squeeze type bottle of resilient flexible synthetic plastic material, or the like. The container **10** is provided with a neck **12** having an open end **14**. The neck is externally threaded at **16**.

A retainer ring **18** has a cylindrical projecting portion **20** which seats in the neck **12** and is provided with a peripheral flange **22** which seats on the open end **14**. Integrally formed with the retainer ring is a web **24** having a central bore **26** therethrough as well as a plurality of apertures **28** therethrough which are spaced about the bore **26**.

The upper surface **30** of the web is concave and is recessed below the flange **22** forming a vertical shoulder **32**.

A captive valve member **34** includes a stem **36** having a tapered conical end portion **38**, the balance of the stem **36** being cylindrical. The valve member **34** includes an applicator head **40** having a convex upper surface **42** and a flat under surface **44** cooperating to form a relatively thin and flexible peripheral edge **46** which is resiliently engageable with shoulder **32** and surface **30** to form a seal. When the valve member is inserted through the bore **26** into the position shown in FIG. 2 and then pressed down tight against the concave surface **30**, it will assume the arcuate shape shown in FIG. 2. A tapered V-shaped slot **48** is formed in the applicator head **40** and extends through the major depth of the stem.

In use, the valve member **34** is force fitted in the bore **26**. Because of the slot **48**, the valve member will be securely grasped by the web forming a depression at the web and an enlargement **37** making the cap become captive. The seal formed by the peripheral edge **46** and the shoulder **32** will prevent fluid flow to the outer surface

of the applicator head **40**. Application of pressure on the squeeze container **10** in the direction of arrows P will raise the valve member and permit fluid flow in the direction of arrows F. The fluid flow will urge the under surface **44** to assume the arcuate shape shown in FIG. 3. The suction resulting from the release of the tube will return the valve member **34** to a sealed position with its lower surface being drawn flush against the concave surface **30**. The valve member **34** remains captive to the tube because of the tapering shape of the slot **48** causing the effective enlargement **37** of the lower end of stem **36**. Air is prevented from entering the tube allowing the tube to remain in its squeezed condition, giving a visual indication of the contents thereof.

The curved convex outer surface **42** of the valve member **34** provides for a relatively large applicator surface when applying fluids.

As shown in FIG. 2, a transparent plastic measuring cylinder generally designated at **50** is provided with a contoured lower end **52** adapted to seat on container **10** and internal threads **54** threadedly secured over threads **16** with shoulder **56** engaging the open end **14** of the neck **12**.

The measuring cylinder **50** is provided with indicia for marking the contents or amounts of material therein delivered upon squeezing container **10** through apertures **28**.

Referring now to the embodiment of the invention as shown in FIG. 5, it will be noted that the squeeze container **110** has a measuring cylinder **150** integral therewith. The flange **122** of the retaining ring **118** seats on shoulder **114** of neck **112**. The valve member **134** is similar to valve member **34**.

Illustrated in FIG. 6 is a modified arrangement of parts wherein a squeeze container **210**, similar to container **10**, is provided with an externally threaded neck **212**. The retaining ring **218** has a flange **222** integral therewith. Integrally formed with the flange **222** is a measuring cylinder which is internally threaded at **254** for threaded engagement on the neck **212**. The valve member **234** is similar to valve member **34**.

In FIG. 7 there is shown a modification of the invention for use in applying an eye wash or eye medication wherein a container **310** is provided with a threaded neck **312**. The flange **322** integrally connects the retaining ring **318** with a cylindrical member **360** which terminates in an eye cup **362**. The valve member **334** seats in the retainer ring **318**.

The eye cup **462** is formed at the free open end of the container **410** which has retainer ring **418** seated therein. The flange **422** rests on shoulder **412** and the valve member **434** is fitted in the retainer ring **418**.

I claim:

1. A closure device comprising a squeeze container having a neck terminating in an open end, a retainer ring having means for mounting said retainer ring in said neck, said retainer ring having a transverse web provided with a bore therethrough, said web having at least one fluid delivery aperture therethrough, said web having a concave upper surface, a valve member including a stem and an applicator head, said stem being resiliently engaged in said bore, said applicator head being provided with a flexible peripheral edge and being engageable with said web to overlie and close said aperture when in a closed position, said valve member being movable with respect to said web to permit fluid flow out of said aperture and between said web and said peripheral edge, said retainer ring including a peripheral flange forming a shoulder surrounding said concave upper surface, said peripheral edge being resiliently engageable with said shoulder to form a seal, said valve member having a tapered slot opening into the upper surface of said applicator head and extending into said stem.

2. A closure device according to claim **1**, wherein said stem has a conical lower end having a portion of larger diameter than the upper part of said stem to capture said valve member to said retainer ring.

3. A closure device according to claim **1**, wherein said applicator head has a convex upper surface.

4. A closure device according to said **1**, wherein said open end of said neck extends above said flange and is provided with an eye cup.

5. A closure device according to claim **1**, wherein said neck is externally threaded, and a transparent measuring cylinder threadedly secured to said neck and extending beyond said applicator head.

6. A closure device according to claim **1**, including a transparent measuring cylinder forming an integral extension of said neck.

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128—232, 260; 215—74; 222—205, 212, 495; 401—186