

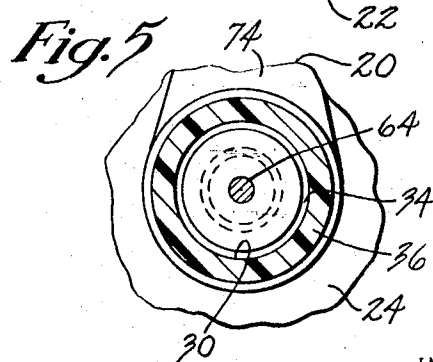
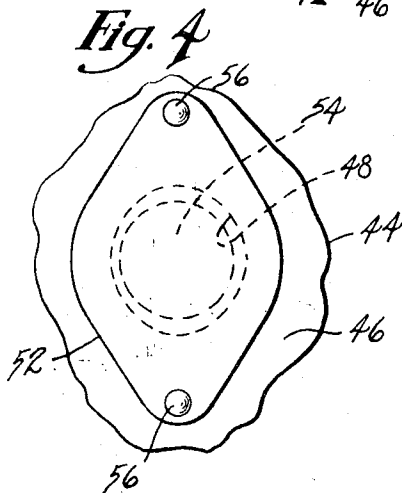
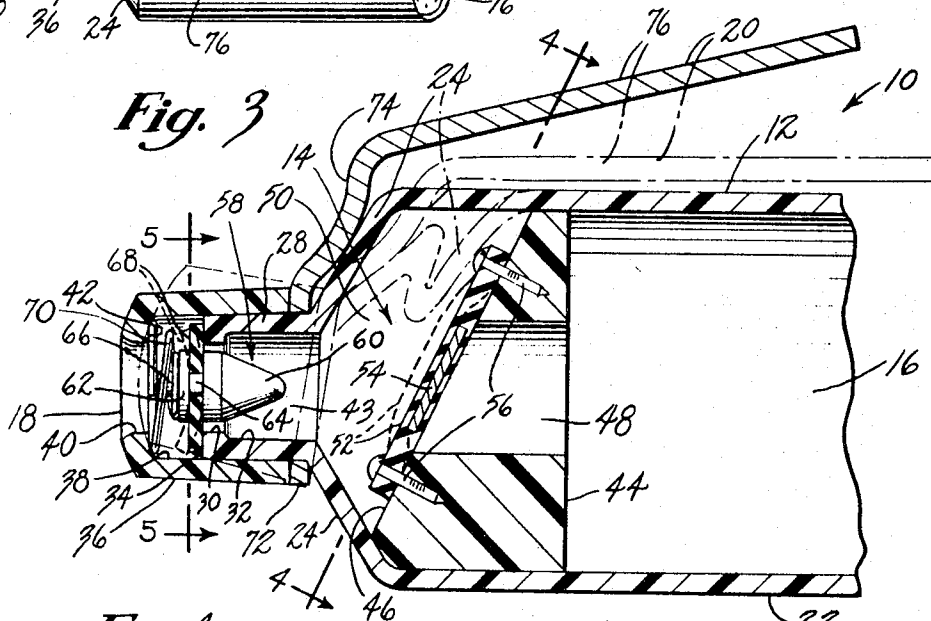
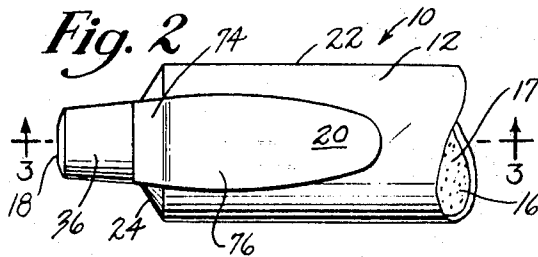
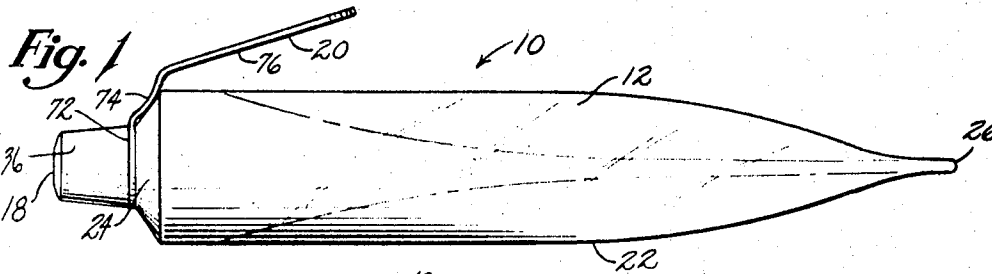
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3,451,597

CONTAINER-DISPENSER WITH INTEGRAL PUMP

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CONTAINER-DISPENSER WITH INTEGRAL PUMP

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7 Claims

ABSTRACT OF THE DISCLOSURE

A disposable container-dispenser has a resilient collapsible tubular body containing a lever operated suction pump and a storage compartment for holding a quantity of fluent material to be dispensed by the pump. Check valves associated with the pump cooperate to prevent the retrograde flow of material and air through the pump and to the storage compartment so that the latter compartment is progressively collapsed as material is dispensed therefrom.

Background of invention

This invention relates in general to collapsible dispensing containers for fluent materials such as creams and viscous liquids and deals more particularly with an improved container-dispenser of the resilient collapsible type.

Container-dispensers of the aforescribed type, often used for packaging cosmetic preparations such as shampoos, lotions and the like, are generally made from resilient plastic or a like material which collapses readily upon direct application of relatively light squeezing pressure. Because of the inherent resilience of the material from which it is made such a container has a tendency to return to its original shape upon release of squeezing pressure. A container of this type will retain its original attractive appearance even after its contents have been partially discharged, however, air must enter the container to replace material discharged therefrom thereby rendering it generally unsuitable for packaging some materials. Furthermore, unless the container is stored in a prescribed manner after each use so that the material remaining therein is accumulated in the vicinity of its discharge point difficulty is encountered in dispensing further material therefrom. It may for example be necessary to at least partially collapse the container to expel air therefrom before material begins to flow, so that some delay will be encountered before material will be dispensed. Accordingly, it is the general aim of this invention to provide an improved resilient, collapsible container for dispensing an immediate flow of fluent material regardless of the quantity of material remaining in the container and the position in which the container has been stored. A further aim of the invention is to provide a container-dispenser of the aforescribed type which avoids or at least substantially reduces the possibility of air entering the container to cause interruption in the flow of material dispensed therefrom or to hasten solidification or deterioration of material contained therein.

Summary of invention

In accordance with the present invention, a disposable, resilient collapsible container is provided which includes a manually operable integral pump mechanism for effecting the immediate flow of fluent material therefrom. Check valves associated with the pump prevent the retrograde flow of material and air to and through the pump and to the material stored in the container.

Brief description of the drawing

FIG. 1 is a side elevational view of a full container-

dispenser embodying the present invention, the container in a partially empty condition being indicated by broken lines.

FIG. 2 is a fragmentary plan view of the container-dispenser of FIG. 1.

FIG. 3 is a somewhat enlarged fragmentary sectional view taken along the line 3—3 of FIG. 2.

FIG. 4 is a fragmentary sectional view taken along the line 4—4 of FIG. 3.

FIG. 5 is a fragmentary sectional view taken along the line 5—5 of FIG. 3.

Detailed description of preferred embodiment

Referring now to the drawing and first considering particularly FIGS. 1-3, a container dispenser embodying the present invention and indicated generally at 10 comprises a hollow resilient collapsible body 12 containing a suction pump indicated generally at 14 and having a storage compartment 16 for holding a quantity of fluent material 17 to be dispensed. Material is caused to flow from the storage compartment to and through the pump 14 and through a discharge opening 18 by a manually operable lever or handle 20 supported on the body 12.

Various resilient materials may be used to make the body which may take various forms, but preferably and as shown the body 12 is a hollow elongated relatively thin walled shell formed from plastic or like material and is generally similar in outward appearance to a collapsible tube of the type often used to package and dispense toothpaste, shaving cream or like materials. It is or may be made from transparent material and may be wholly transparent or only partially transparent so that the material contained in the storage compartment is visible and the pump mechanism is concealed. The body has an axially elongated generally cylindrical side wall 22 joining a co-axially forwardly diverging conical front wall 24. At its other end the side wall 22 is flattened or crimped and sealed as indicated at 26.

Projecting forwardly from the front wall 24 is a nozzle 28 having a central bore therethrough including adjacent cylindrical portions 30 and 32. At its forward end the nozzle has a substantially flat forwardly facing annular seating surface 34. To facilitate assembly of the pump and retain the pump handle in assembly with the body as will be hereinafter evident a generally cylindrical cap 36 is received on the nozzle and is adhesively attached or otherwise suitably secured thereto. The cap has a central bore therethrough which includes adjacent cylindrical portions 38 and 40 and an annular shoulder 42 therebetween, the latter bore portion defining the discharge opening 18. The bore portions of the nozzle 28 and the cap 36 cooperate to define a passage 43 providing a path of material flow from the pump to the discharge opening.

A dividing wall or partition for separating the storage compartment and the pump may be molded or otherwise formed on the body when the body is made but preferably a generally cylindrical plug 44 received within the body near the forward end thereof forms this dividing wall. The plug 44 is adhesively bonded or otherwise suitably secured to the body 12 and includes a forwardly facing axially inclined surface 46 which extends rearwardly and upwardly from an associated portion of the front wall 24 to the side wall 22 referring to the container-dispenser 10 oriented as shown in FIG. 3. A passageway 48 extends coaxially through the plug 44 and communicates with the storage compartment 16 to provide a path of material flow from the later compartment to the pump.

Considering now the pump in further detail and referring particularly to FIGS. 3-5, the pump 14 includes a pump chamber 50 generally defined by the front wall 24, the plug surface 46 and an associated portion of the side wall 22 therebetween. Seated on the plug surface 46

and covering the forward end of the passageway 48 is a check valve 52 made from a thin strip or sheet of resilient material such as rubber. Preferably, the central portion of the valve 52 is relatively rigid and for this reason a thin relatively rigid disk 54 is molded into or otherwise suitably attached to the strip of material from which the valve was made. Two headed fasteners or pins 56, 56 received in the plug on opposite sides of the passageway 48 retain the valve in the aforesaid position as best shown in FIG. 4. The marginal edge portion of the resilient valve 52 is free for flexure in a forwardly direction only, a forwardly flexed or open position of the valve being indicated by broken lines in FIG. 3. Thus, material is permitted to flow from the storage compartment through the passageway 48 and around the marginal edge of the valve to reach to pump chamber 50, however, flow in the opposite direction is prevented. The relatively rigid central portion of the valve aids in effecting tight sealing engagement between the valve and the surface 46 to prevent retrograde flow.

Received within the nozzle bore is a second check valve generally indicated at 58 and including a body having a rearwardly diverging conical portion 60 and a generally cylindrical forward portion 62 spaced axially therefrom and connected thereto by a cylindrical stem 64. Another stem 66 projects coaxially forwardly from the forward portion 62 and an annular ring 68 of resilient material such as rubber surrounds the stem 64 and extends radially outwardly beyond the body of the valve and seats on the nozzle surface 34. Seated on the annular surface 42 and bearing against the forward portion 62 is a compression spring 70 for biasing the valve 58 in tight sealing engagement with the nozzle surface 34. The stem 66 is received within one or more convolutions of the spring and serves to maintain the valve 58 in proper axial alignment therewith. It will be evident from the foregoing description of the valve 58 that this valve permits material to flow from the pump chamber through the passageway 43 and to the discharge opening 18 while preventing flow in the opposite direction. The conical shape of the valve body portion 60 aids in directing a uniform flow of material around the valve and also aids in centering the valve within the passageway 43.

The pump 14 is operated by alternate collapsing and expanding of the pump chamber 50 which may be accomplished by alternately applying the releasing pressure on the pump chamber defining portion of the body 12. In FIG. 3 the pump chamber 50 is shown in its expanded or full line position a collapsed position of pump chamber being indicated by broken lines. Squeezing pressure may be applied directly to body 12 but preferably, the operating handle 20 is provided for this purpose. The handle is supported on the body for oscillatory movement about an axis extending generally transversely of the body axis and is made from any suitable relatively rigid material. It includes an end portion 72 apertured to receive the nozzle 28 therethrough, and is retained in position on the nozzle by the cap 36. An arcuate intermediate portion 74 extends upwardly from the end portion and bears against an associated upper portion of the body front wall 24 as shown with reference to the container-dispenser oriented as in FIG. 3. An elongated lever or handle portion 76 extends generally axially rearwardly from the intermediate portion in spaced relation to the side wall 32.

The container-dispenser 10 is normally provided with fluent material in both the storage compartment 16 and the pump chamber 50 and in this condition it is ready for immediate operation. That is to say operation of the pump will cause an immediate flow of material from the discharge opening 18.

Depressing the pump handle 20 or moving it toward the body 12 causes an associated portion of the body front wall 24 to collapse or move generally toward the plug surface 46. This movement of the front wall is also

accompanied by some associated movement of the cap 36 as indicated in FIG. 3, the approximate position of the handle in its depressed condition and of the body 12 and cap 36 being indicated by broken lines. During this movement the valve 52 is retained in its closed position by the pressure of material in the pump chamber thereby preventing retrograde flow of material from the pump chamber to the storage compartment. As the volume of the pump chamber 50 decreases material in the chamber exerts a forward pressure upon the valve 58 causing the latter valve to open and permitting material to flow to and through the passageway 43 to and through the discharge opening 18.

When the handle is released from its depressed position, at the end of each stroke, the resilient walls of the pump chamber return to their expanded or non-collapsed condition and exert bias force on the handle intermediate portion 74 to return the handle to its initial position thereby preparing the pump for the next successive stroke. As the pump chamber 50 moves towards its expanded or non-collapsed position the check valve 58 assumes a closed position and a vacuum is created in the pump chamber as its volume increases. This reduction in pressure within the pump chamber causes material to be sucked from the storage compartment through the passageway 48 and past check valve 52. Material continues to flow from the storage compartment until the pump chamber is substantially filled. With each successive stroke of the handle, the aforesaid cycle is repeated and the quantity of material is dispensed through the discharge opening 18. Thus, it will be apparent that as material is dispensed from the container-dispenser 10 the portion of the container sidewall which defines the storage compartment will become progressively collapsed or attain the general flattened condition indicated by broken lines in FIG. 1.

The drawing shows a preferred embodiment of the invention and such embodiment has been described, but it will be understood that various changes may be made from the construction disclosed and that the drawings and description are not to be construed as defining or limiting the scope of the invention, the claims forming a part of this specification being relied upon for that purpose.

I claim:

1. A container-dispenser for fluent materials comprising a resilient collapsible axially elongated tubular body having a discharge opening therethrough at the forward end thereof and including a forward portion defining a pump chamber, said body including a storage compartment for holding a quantity of fluent material and having a first passageway communicating with said pump chamber and said storage compartment and a second passageway communicating with said pump chamber and said discharge opening, said first and second passageways providing a path of flow from said storage compartment to and through said pump chamber and to said discharge opening, a first check valve associated with said first passageway for permitting to flow therethrough from said storage compartment to said pump chamber and for preventing material from flowing therethrough in the opposite direction, a second check valve associated with said second passageway for permitting material to flow therethrough from said pump chamber to said discharge opening and for preventing material from flowing therethrough in the opposite direction, and a manually operable handle supported on said body at the forward end thereof for oscillatory movement about an axis extending generally transversely of said body axis between released and depressed positions respectively corresponding to expanded and collapsed conditions of said pump chamber, said handle including one portion for engaging said forward portion to collapse said pump chamber and a free end portion extending generally axially rearwardly from said one portion for moving said one portion generally toward said forward portion.

5

2. A container-dispenser for fluent material as set forth in claim 1 further characterized by a plug received in said tube and separating said pump chamber and said storage compartment, said plug defining said first passageway.

3. A container-dispenser as set forth in claim 1 further characterized by said body being made from a plastic material.

4. A container-dispenser as set forth in claim 1 wherein said forward portion includes a generally conical coaxially forwardly diverging front wall, said one portion engaging said front wall.

5. A container-dispenser as set forth in claim 1 wherein said body includes a discharge nozzle projecting coaxially forwardly from said forward portion, said handle being supported on said nozzle.

6. A container-dispenser as set forth in claim 5 wherein said handle includes another end portion having an aperture receiving said nozzle therethrough and said container-dispenser includes a cap secured to said nozzle and defining said discharge opening, said cap and said forward portion cooperating to retain said handle on said nozzle, said cap cooperating with said nozzle to retain said second check valve.

7. A container-dispenser for fluent material comprising a relatively thin walled tubular body having a storage compartment for holding a quantity of fluent material and including an axially elongated generally cylindrical side wall and a generally conical forwardly diverging front wall having a discharge nozzle projecting forwardly therefrom and including a discharge opening, said body being closed at its rearward end and having a generally radially disposed dividing wall near the forward end thereof including a forwardly facing surface, said front wall, said forwardly facing surface and an associated portion of said side wall therebetween defining a pump chamber forwardly of said storage compartment, a first passageway defined by said dividing wall and communicating with said

6

storage compartment and said pump chamber, a second passageway defined by said discharge nozzle and communicating with said pump chamber and said discharge opening, said first and second passageways providing a path of flow from said storage compartment to and through said pump chamber and to said discharge opening, a first check valve associated with said first passageway for permitting material to flow therethrough from said storage compartment to said pump chamber and for preventing material from flowing therethrough in the opposite direction, a second check valve associated with said second passageway for permitting material to flow therethrough from said pump chamber to said discharge opening and for preventing material from flowing therethrough in the opposite direction, and a manually operable handle supported on said body for oscillatory movement generally about an axis extending generally transversely of said body axis, said handle including one portion engaging said conical front wall and a free end portion extending generally axially rearwardly from said one portion for moving said one portion generally toward said forwardly facing surface.

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