

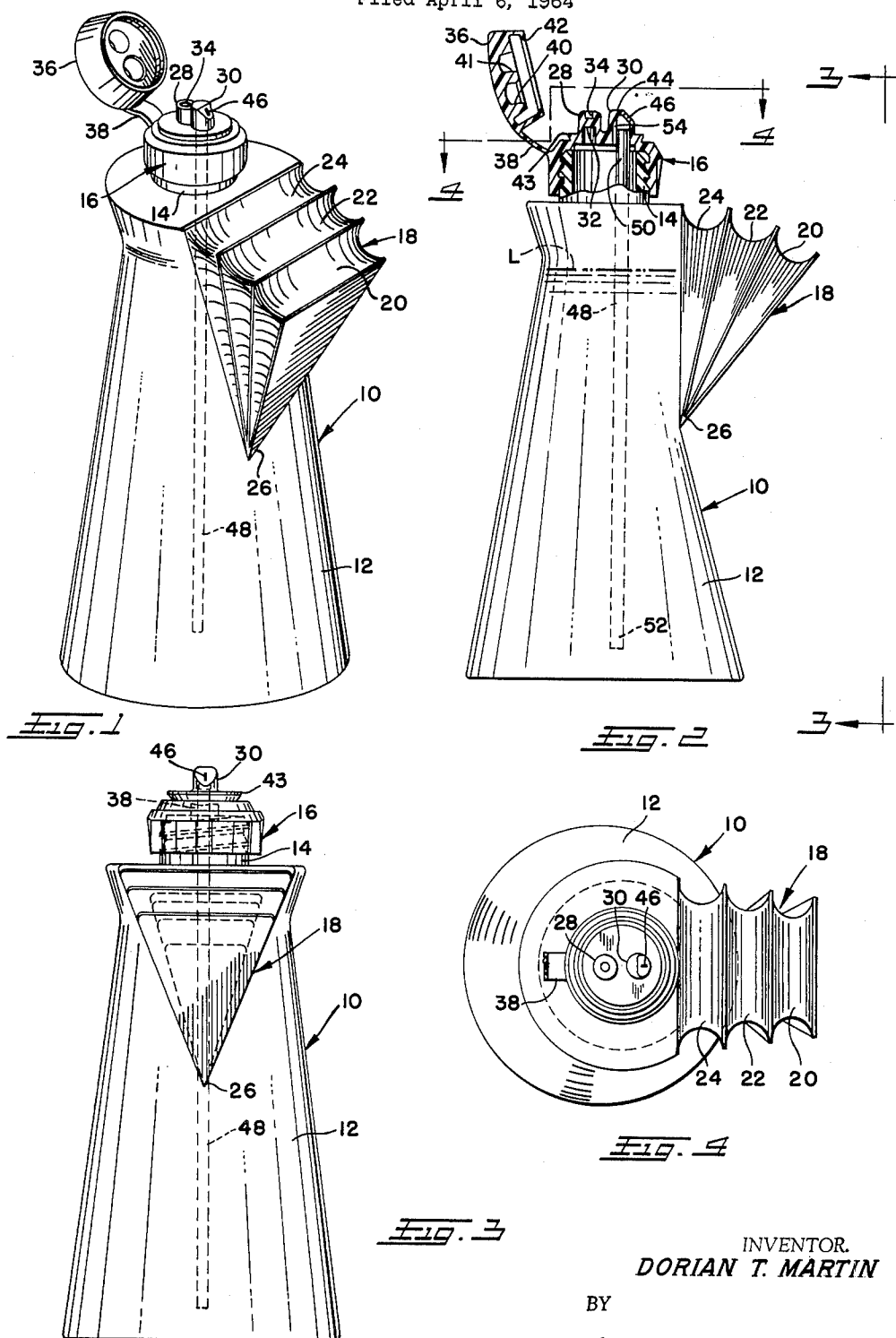
June 14, 1966

D. T. MARTIN

3,255,933

DISPENSING CONTAINER WITH BELLOWS

Filed April 6, 1964



INVENTOR.
DORIAN T. MARTIN

BY

Oberlin, Maky & Donnelly
ATTORNEYS

1

2

3,255,933

DISPENSING CONTAINER WITH BELLOWS

Dorian T. Martin, Lakewood, Ohio, assignor to Kilburn Chemical Company, Rocky River, Ohio, a corporation of Ohio

Filed Apr. 6, 1964, Ser. No. 357,619

8 Claims. (Cl. 222-209)

The present invention relates as indicated to a dispensing container and relates more particularly to a dispensing container which provides controlled dispensing of liquid from the container in the form of a fine spray.

Present commercially available dispensing containers are of varying types, one common type being the conventional squeeze bottle which is formed with the entire wall portion being resiliently deformable, collapse of such wall portion by squeezing affecting pressurization of the interior of the bottle to effect the dispensing operation, all in a well-known manner. The squeeze bottle is characterized by the inability to control the magnitude of the deformation, or the depth of squeeze, as the problem is commonly referred to, with the result being that the user cannot accurately regulate the dispensing operation. For example, when the bottle is near full, a relatively deep squeeze causes the liquid to emanate from the container in a stream rather than in the intended spray. Even if a stream for some reason is desirable, there is still no regulation of the degree of deformation of the squeeze bottle and hence the amount of liquid dispensed in stream form. Further, when the liquid level in the bottle becomes relatively low, the spray may be satisfactory, but the resiliently deformable bottle wall is relatively slow in returning to its original position thereby resulting in a required wait between successive dispensing operations.

Other dispensing containers, e.g. the aerosol type or the container having a separate atomizing bulb, similarly are not entirely satisfactory, a principal reason being their relatively high manufacturing costs and, in the case of the aerosol type, the inability to re-use the same when the contents thereof have been dispensed.

With the above in mind, a primary object of the present invention is to provide a dispensing container having improved means for pressurizing the container interior and for controlling the dispensing of liquid in spray form from the container.

A more specific object of the invention is to provide a dispensing container having a relatively rigid body portion and a resiliently deformable pressurizing portion integrally formed therewith, the deformation of the latter regulating the pressurization of the container and the liquid emanating in spray form from the container.

A further object of the present invention is to provide a dispensing container which is highly simplified in construction, economical to manufacture and capable of long life.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawing setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

FIG. 1 is a perspective view of the dispensing container of the present invention, with the cap lid being shown lifted to condition the container for operative use;

FIG. 2 is a partly sectioned side elevational view of the dispensing container;

FIG. 3 is an end view taken from the right of FIG. 2 as indicated by section line 3-3 of FIG. 2, with the lid being removed more clearly to illustrate the closure cap; and

FIG. 4 is a top plan view taken on section line 4-4 of FIG. 2.

Referring now in more detail to the drawing, wherein like reference numerals designate like parts, the dispensing container of the present invention is generally indicated at 10 and comprises a substantially rigid body portion 12 having an externally threaded neck portion 14 at the upper end thereof which is adapted to receive an internally threaded closure cap generally indicated at 16. The body 12 is one-piece and can be molded from any suitable plastic such as, for example, extruded polyethylene. The closure cap 16 is of the atomizing or spray type, i.e., one in which the contents of the container, commonly a liquid, are expelled through the closure cap in the form of a fine spray, in a manner to be hereinafter described. The cap 16 as indicated is also preferably made from a suitable plastic material, and is, of course, readily removable for refilling the container.

Integrally formed with the body 12 and extending laterally therefrom adjacent the top thereof is a bellows generally indicated at 18 which comprises in the form shown a plurality of accordion pleat or fold sections 20, 22 and 24. The fold sections converge downwardly into an apex section 26 which merges with the main body 12. In accordance with conventional molding practices which form no part of the present invention, the wall thickness of the bellows 18 is made substantially less than the wall thickness of the main body portion 12 whereby the bellows is highly resiliently deformable for readily effecting the dispensing operation and the subsequent return of the bellows to its expanded condition.

The closure cap 16 is provided with a pair of upwardly extending integral projections 28 and 30, the former being provided with a solid intermediate portion 32 for preventing communication from the interior of the container to the exterior thereof. The projection 28 is recessed at the top thereof as indicated at 34 permitting slight deformation of the projection when the lid 36 is moved to a closed position. The latter is integrally formed with the cap portion through a connecting section 38, and the lid is formed with a pair of openings 40 and 41. Opening 40 is adapted to receive projection 28 and is slightly smaller in dimension whereby the projection 28 is slightly deformed when the lid is closed for aiding in the maintaining of the lid in the closed position thereof illustrated in FIG. 3. The opening 41 is provided to receive the projection 30 when the lid is moved to its closed position. The lid 36 is further formed with a relatively small inwardly directed annular shoulder 42 adjacent the bottom thereof which is adapted to snap over an annular bead 43 formed on the cap 16 for maintaining the lid in a closed position.

The projection 30 is formed with an inclined wall portion 44 having a relatively narrow discharge orifice opening 46 through which the container contents are expelled, with the direction of the spray thus being directed away from the user, who normally grasps the container with the bellows adjacently disposed. A preferably plastic, flexible tube 48 is disposed within the container, having an end portion 50 frictionally engageable in the opening formed by the projection 30, with the opposite end 52, of the tube 48, terminating relatively adjacent the bottom of the container in the usual manner. A relatively narrow slot 54 is formed in the projection 30 adjacent the bottom thereof to provide an air passage through which the air under pressure can move for mixing with the liquid forced upwardly through the tube 48 during the dispensing operation. Such mixing functions

3

in a manner well known in the art to expel the contents of the container through the orifice 46 in the form of an atomized spray. To insure the expulsion of the liquid in the form of a spray, a space is preferably maintained above the liquid during filling of the container at least equal to the volume of the bellows 18.

The manner of operation of the dispensing container of the present invention should be apparent from the above description. To dispense, the lid 36 is moved from a closed position as indicated in FIG. 3 to its FIG. 2 position thus exposing the orifice 46. At this time, and before the bellows 18 is collapsed, the air within the container above the liquid level of the contents and within the bellows is at ambient pressure. When the bellows 18 is collapsed, the air within the container will increase in pressure, forcing the liquid upwardly through the tube 48, with the liquid mixing with the pressurized air passing through slot 54 relatively adjacent the upper end of the tube 48 and emanating from the closure cap 16 through the orifice 46 in the form of an atomized spray. When the bellows 18 is released, the accordion fold construction thereof ensures quick movement of the bellows to its expanded condition.

It will be noted that the pressurizing of the air within the container above the liquid therein is thus directly dependent and in fact limited to the volume of the bellows 18, thus providing a regulated dispensing operation. Since the walls of the bellows 18 are made relatively thin, the bellows can be quickly collapsed and by virtue of its resiliency and its construction will quickly expand when released to its normal condition illustrated in FIGS. 1 and 2. The container is thus quickly conditioned for subsequent dispensing operations. When the dispensing is completed, the lid 36 is moved to a closed position preventing further dispensing operations until the same is moved to a position exposing the orifice 46. When the receptacle is to be used in this manner as a spray dispenser, the initial liquid level should desirably be about as indicated in dotted line at L in FIG. 2 to provide adequate air volume for this purpose. While a relatively deformable plastic will normally be employed, the walls of the receptacle will be relatively thick to afford substantial rigidity whereas the extensible walls of the bellows will be relatively thin to facilitate preferential flexure thereof under externally applied operating pressure. Such extensible pleated walls of the bellows portion will, of course, normally be in extended condition.

The new container may be molded in a vertically divided two-piece mold in which the parting line passes through the vertical center line of the bellows extension, utilizing tubular extruded polyethylene plastic material or the like, and blowing in well-known manner as through a hollow vertical mandrel or through a hollow lateral needle. In this manner, the desired relatively thin pleat wall portions may be produced. Other known techniques using tubular extrusions of variable wall thickness may also be employed. Thermoplastics are ordinarily preferred. The outer end wall of the bellows will, of course, desirably be of sufficient thickness to be substantially rigid.

It will thus be seen that the dispensing container of the present invention possesses distinct advantages when compared with presently available dispensing containers. The one-piece container construction can be economically manufactured and integrally incorporates the means for pressurizing the interior thereof, thus eliminating the need for separate pressurizing means such as, e.g., separate atomizing bulbs and the attachments therefor. Furthermore, since there are no separate moving parts, the container can be used substantially indefinitely without requiring replacement, and can be quickly refilled merely by unscrewing the closure cap 16. The use of a relatively thin-walled bellows member and a substantially rigid body portion permits the container interior to be pressurized within predetermined limits thereby regu-

4

lating the dispensing operation. The thin-walled bellows construction also permits the bellows to quickly expand when released thereby conditioning the container for subsequent operations.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A dispensing container comprising a body portion having a top adapted to receive cap means having an opening through which the contents of the container can be expelled, tube means having an end portion associated with said cap means and an opposite end portion extending downwardly into the container, a resilient, collapsible bellows associated with said body portion relatively adjacent the top thereof and extending laterally therefrom, said bellows when collapsed pressurizing the interior of said container thereby forcing the contents thereof outwardly through said tube and said cap means, said bellows when released returning to an expanded position thereby to condition said container for subsequent dispensing operations.

2. A dispensing container comprising a substantially rigid body portion having an upper neck adapted to receive cap means through which the contents of the container can be expelled, tube means having an end portion associated with said cap means and an opposite end portion extending downwardly into said container, a resilient, collapsible bellows integrally formed with said body portion relatively adjacent the top thereof and extending laterally therefrom, said bellows when collapsed pressurizing the interior of said container above the contents therein thereby forcing the contents outwardly through said tube and said cap means, said bellows when released returning to an expanded position thereby to condition said container for subsequent dispensing operations.

3. A liquid dispensing container for dispensing liquid in spray form comprising a substantially rigid body portion having an upper threaded neck adapted to receive a closure cap having a discharge orifice through which the liquid can be expelled, tube means having an end portion mounted on said closure cap and an opposite end portion terminating relatively adjacent the bottom of said container, a resilient, collapsible bellows integrally formed with said body portion relatively adjacent the top thereof and extending laterally therefrom, said bellows when collapsed pressurizing the interior of said container to an extent dependent upon the volume of said bellows thereby forcing said liquid upwardly through said tube and outwardly through said discharge orifice in spray form, said bellows when released returning to an expanded position thereby to condition said container for subsequent dispensing operations.

4. The combination of claim 3 wherein said closure cap includes an integral lid portion which, when closed, covers said discharge orifice to prevent dispensing from said container.

5. The combination of claim 3 wherein said closure cap is formed with an upwardly extending projection having an inclined wall portion in which is formed said discharge opening, said tube being frictionally mounted to said projection adjacent the bottom thereof, said projection being further formed with air passage means through which pressurized air can pass for mixing with liquid emanating from said tube to form the atomized spray.

6. A liquid dispensing container comprising a substantially rigid molded plastic body portion providing a receptacle for such liquid, said receptacle having a dispensing opening therein, and a collapsible, resilient plastic bellows integrally molded with said body portion, said bellows comprising a lateral extension of the upper por-

5

tion of said receptacle and being formed with a plurality of pleat sections for flexure thereof under externally applied operating pressure, application of such pressure thereby being effective to collapse said bellows and expel the container contents outwardly through said dispensing opening without effecting appreciable deformation of the remainder of said bottle, the resilience of said bellows returning the same to expanded condition following cessation of application of such pressure.

7. A liquid dispensing container comprising a molded plastic body portion providing a receptacle for such liquid, said body portion at least in the upper region thereof being relatively thick-walled and substantially rigid, means mounted on said receptacle having a dispensing opening therein through which the contents of said container can be dispensed, and a resilient, collapsible plastic bellows integrally molded with said body portion, said bellows comprising a lateral extension of said upper portion of said receptacle and being formed with a plurality of pleat sections for flexure thereof under externally applied operating pressure, application of such pressure thereby being effective to collapse said bellows and expel the container contents outwardly through said dispensing opening without effecting appreciable deformation of the remainder of said bottle, the resiliency of said bellows returning the same to expanded condition following cessation of application of such pressure.

8. A liquid dispensing container comprising a molded plastic body portion providing a receptacle for such liquid, said body portion at least in the upper region thereof

6

being relatively thick-walled and substantially rigid, means mounted at the top of said receptacle having a dispensing opening therein, and a collapsible bellows integrally molded with said body portion and of the same plastic material, said bellows comprising a lateral extension of said upper portion of said receptacle and being relatively thin to facilitate preferential flexure thereof under externally applied operating pressure, application of such pressure collapsing said bellows and forcing the container contents outwardly through said dispensing opening without effecting appreciable deformation of the remainder of said bottle.

References Cited by the Examiner

UNITED STATES PATENTS

2,571,504	10/1951	Vuilleminot	-----	222—211	X
2,609,235	9/1952	Reimann	-----	222—211	X
2,784,882	3/1957	Du Bois	-----	222—211	X
3,122,285	2/1964	Pluess	-----	222—464	
3,171,446	3/1965	Koch	-----	222—209	X

FOREIGN PATENTS

1,212,991	3/1960	France.
471,466	5/1952	Italy.

M. HENSON WOOD, JR., *Primary Examiner.*

LOUIS J. DEMBO, A. N. KNOWLES,
Assistant Examiners.