

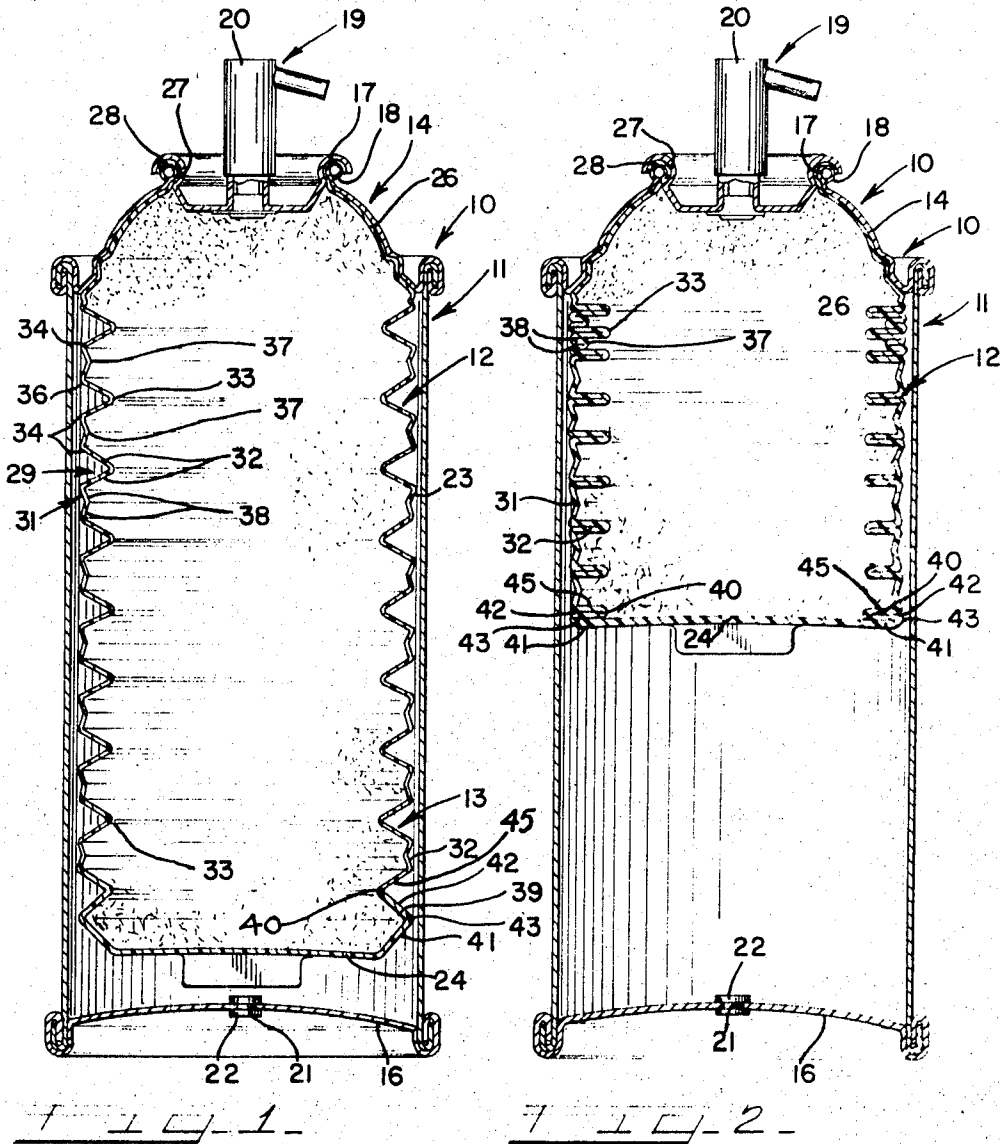
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DISPENSING CONTAINER WITH COLLAPSIBLE COMPARTMENT

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DISPENSING CONTAINER WITH COLLAPSIBLE COMPARTMENT

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ABSTRACT OF THE DISCLOSURE

A product dispensing container of the type including a collapsible product containing bag which is disposed within a rigid container and defines therein a chamber containing a propellant which applies a pressure force on the bag. A valve dispensing means communicates with the bag for discharging the product from the bag under the force of the propellant. The product containing compartment is formed from an integral piece of material and includes axially spaced primary fold sections and secondary fold bands collapsible subsequent to the collapse of the primary fold sections for regulating the collapse of the compartment caused by pressure forces acting radially and axially thereon as the product is dispensed.

The present invention relates to product dispensing containers which include a product containing compartment and a propellant compartment. The compartments are generally separated by a common wall of the product containing compartment. In some instances the common wall of such dispensing containers is defined by a collapsible bag positioned internally of the container body and secured to a top closure of the latter. The top closure generally includes a manually operable valve-actuated dispensing mechanism for dispensing a product packaged within the bag under the influence of a pressurized propellant housed in the propellant chamber between the bag and the container body.

In prior dispensing containers using the product containing bag the side wall thereof has been constructed so that the bag tends to collapse indiscriminately both radially inwardly and axially upwardly due to the forces imposed thereon by the pressurized propellant during the dispensing operation. This indiscriminate collapsing or panelling generally takes place near the center or the top of the product containing bag. The panelling of the side wall results in the formation of one or more restrictions intermediate the ends of the bag which ultimately may block the product flow through the valve orifice of the valve dispensing mechanism. This condition makes it difficult, if not impossible, to discharge the product from the portion of the bag below the restriction with the result that optimum product dispensing is not achieved, even though the valve orifice of the dispensing mechanism itself may not be clogged or blocked.

It is a primary object of the present invention to provide a novel dispensing container including a product dispensing bag which is constructed to eliminate the difficulties encountered heretofore.

In accordance with the present invention, this is accomplished generally by the provision of a dispensing container provided with a novel collapsible product bag which includes primary fold sections axially spaced from each other and secondary fold bands disposed between the primary fold bands and being collapsible subsequent to the collapse of the latter. The collapsed primary fold sections and secondary fold bands rigidify

the bag and maintain a predetermined configuration thereof against the forces acting radially and axially thereupon so that the bag collapses uniformly both radially and axially without the panelling or indiscriminate folding causing the blockage as occurred heretofore.

In the drawings:

FIG. 1 is a longitudinal sectional view of the dispensing container with the parts broken away for clarity and illustrating a collapsible bag or compartment embodying the structure housed internally of a container body prior to the dispensing of the product therefrom; and

FIG. 2 is a longitudinal sectional view similar to FIG. 1 but showing the condition of the bag during the product dispensing from the bag.

Referring now to FIGS. 1 and 2, there is shown a product dispensing container 10 of the general type with which the product dispensing bag 12 of the present invention is adapted to be used. The container 10 comprises generally a container body 11, an inner collapsible bag 12 which carries the product to be dispensed, and a propellant chamber 13 defined between the exterior of the bag 12 and the interior of the container body 11.

The container body 11 includes axially opposed top and bottom closures 14 and 16 respectively. The top closure 14 may be generally dome-shaped and formed with an axial opening 17 bounded by a rolled rim 18. The product is filled through the opening 17 into the collapsible bag 12. After the bag is filled, a product dispensing valve assembly 19 including a valve 20 which may be of well known construction is attached to the rim 18 as shown. The bottom closure plate 16 is formed with an opening 21 in which there is seated a grommet or charging valve 22 through which the propellant is charged into the propellant chamber 13.

The collapsible bag 12 is formed from a plastic material such as polyethylene and preferably by blow molding. The bag 12 is constructed of a sufficient thickness so as to retain its configuration under normal atmospheric pressure and under the propellant pressure forces acting thereon when the bag is completely filled with the product. The collapsible bag 12 is of generally cylindrical configuration, including a side wall 23, a bottom wall or base 24 located in vertically spaced relationship with respect to an upper end portion 26. The upper end portion 26 includes an opening 27 bounded by a curled rim 28 which is attached to the top closure rolled rim 18.

To regulate the collapsing of the bag 12 in a manner to eliminate indiscriminate panelling of the side wall 23, there is provided a plurality of lengthwise spaced primary fold sections 29. Secondary fold panels 31 are formed between each adjacent pair of fold sections 29.

The primary fold sections 29 each comprise a pair of annular panels 32 arranged to form a V-shaped pleat joined along a common inner fold line 33 defining a vortex. The outer ends of the fold panels 32 are integrally joined along fold lines 34 and 36 to the upper and lower edges of the adjacent secondary fold bands 31 respectively. The annular panels 32 are inclined inwardly to provide an acute included angle at the vortex 33 of between about 45° to 60°, preferably 60°.

Preferably, the width of each of the secondary fold bands is equal to the spacing of the fold lines 34 defining the fold sections 29. As shown, each of the secondary fold bands 32 is slightly pleated to define a secondary fold line 37 about which annular wall sections 38 tend to fold. It is to be noted that the band sections 38 form an obtuse included angle at the secondary fold line 37, and the latter is disposed a substantially greater

radial distance from the longitudinal axis of the bag 12 than the fold line 36 of the fold band 29. In this connection it should be mentioned that the fold line 37 is displaced only slightly inwardly from the outer fold lines 34 so as to achieve folding of the secondary fold panels subsequent to the folding of the fold sections 37 while at the same time maintaining the product carrying capacity of the bag 12 at a maximum.

The bag bottom 24 may be connected to the lowermost of the fold sections 29 by a pleated wall section 39. The pleated wall section 39 includes a pair of included annular panels 41 and 42 joined to form an included angle of about 40° along an outer fold line 43. Connecting the pleated wall section to the primary fold section 29 is an inclined annular panel 45 forming an included angle of about 40° with an inner fold line 40 with the panel 42.

When the valve 20 is released so that the product is dispensed therethrough, the pressure forces of the propellant within the propellant chamber 13 are operative to force the bag 12 axially upward. Initially the propellant exerts a pressure force on the base 24 whereupon the inclined panel 42 hinges about the outer fold line 43 and the inner fold line 40 to nest within and be superposed over the inclined panel 41 as shown in FIG. 2. In this condition the pleated wall section 39 imparts radial rigidity to the bottom panel 24. As the bag 12 moves axially upward, the annular panels 32 each fold about the inner fold lines 33 and the outer fold lines 34. As the panels 32 fold during dispensing of the product, the included angle therebetween gradually decreases until the panels 32 of all of the fold sections 29 lie in superposed horizontal relationship. The panels 32 thus form in the nature of rigidifying bands which resist the radial forces acting on the side wall to prevent radial collapse of the bands 31 inwardly.

At the same time the panel 32 also exerts an axial force tending to maintain the base 24 of the bag 12 substantially normal to the side wall of the container 10 whereby the bag collapses uniformly along its length without tilting relative to the longitudinal axis. In this manner the contraction of the product dispensing bag 12 is regulated and controlled.

As the product is further dispensed through the valve 20 after the panels 32 are in superposed relationship, the secondary fold bands 31 fold about the secondary fold lines 36 under the force exerted by the propellant. As shown in FIG. 2, the secondary fold bands 31 progressively collapsed from the top of bag 12 downwardly toward the bottom 24. Thus, upon the application of pressure forces thereon, the fold sections 29 collapse prior to the secondary fold bands 31.

The progressive collapsing of the secondary fold panels 31 continues until it approaches the dome-shaped top closure plate 14, at which time the bag bottom 24 may bulge upwardly to force further product through the valve 20.

In view of the fact that the fold sections 31 are substantially one-half of the length of the panels 32, the secondary fold line 37 is disposed inwardly of the fold line 36. The controlled collapsing of the fold sections 29 and secondary fold panels results in a uniform longitudinal collapse of the bag 12 without tilting so that the

bag does not engage the walls of the container 11. At the same time the collapsed fold sections 29 and secondary fold panels 31 form in the nature of hoops which resist radial collapse of the bag 12.

We claim:

1. In a product dispensing container having a container body including a top closure and a bottom closure, and a valve-actuated dispensing mechanism carried by said top closure; a collapsible product dispensing bag disposable in the interior of said container body and adapted to define within said container body a propellant chamber chargeable with a pressurized propellant, said bag being formed of integral one-piece construction of generally cylindrical configuration including a side wall, a base and an axially opposed open end communicable with said valve-actuating dispensing mechanism, said side wall including a plurality of spaced fold sections, said primary fold sections each including a pair of annular panels forming a V-shaped pleat having an acute included angle and a secondary fold band means formed in said side wall between respective adjacent pairs of said primary fold sections, said secondary fold band means each having a fold line intermediate the length thereof and defining a pair of band panels forming an obtuse included angle at said fold line so that said primary fold sections are each fully collapsed prior to said secondary fold bands under the pressure forces exerted by said pressurized propellant during dispensing of said product.

2. The invention as defined in claim 1 wherein the length of said secondary fold bands is substantially equal to the distance between the outer ends of said V-shaped pleat.

3. The invention as defined in claim 1 wherein said bag includes a pleated wall section disposed adjacent said bottom of said bag including a first inclined panel connected at the inner end thereof to said bottom and a second inclined panel connected at the outer end thereof to the outer end of said first inclined panel, and a third inclined panel extending between said inner end of said first inclined panel and said outer end of the lowermost of said annular panels of said primary fold sections, said first, second and third panels being foldable into superposed relationship in a substantially horizontal plane to impart radial rigidity to said bottom prior to the collapse of said primary fold sections.

4. The invention as defined in claim 3 wherein said first and second inclined panels define a first acute angle and said first and third inclined angles define a second acute angle.

5. The invention as defined in claim 4 wherein said first and second acute angles are less than said acute included angle of said primary fold sections.

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