



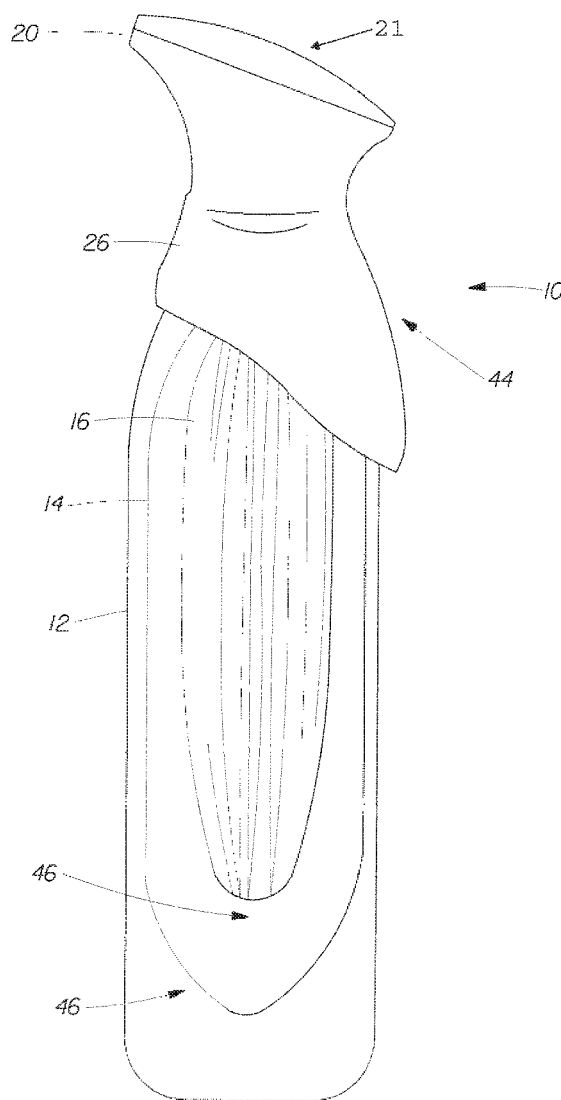
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**Compo et al.**(10) **Pub. No.: US 2017/0050767 A1**(43) **Pub. Date: Feb. 23, 2017**(54) **PRESSURIZED PACKAGE****Publication Classification**(71) Applicant: **The Gillette Company**, Boston, MA  
(US)(72) Inventors: **Elizabeth Ann Compo**, Cincinnati, OH  
(US); **Paul Martin Lipic**, West Chester,  
OH (US); **Amy Dawson Phillips**,  
Cincinnati, OH (US); **Daniel Jerome**  
**Sims**, Cincinnati, OH (US); **David**  
**Thomas Warnke**, Cincinnati, OH (US)(51) **Int. Cl.****B65D 25/54** (2006.01)**B65D 25/20** (2006.01)**B65D 83/38** (2006.01)**B65D 83/00** (2006.01)(52) **U.S. Cl.**CPC ..... **B65D 25/54** (2013.01); **B65D 83/0005**  
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18, 2015.

(57)

**ABSTRACT**

A pressurized package made of plastic comprising an outer container and an inner container with material held therein under pressure. The package has a viewing window to allow users to view the inner container to determine the presence of material, and an illumination region generally opposite said viewing window.



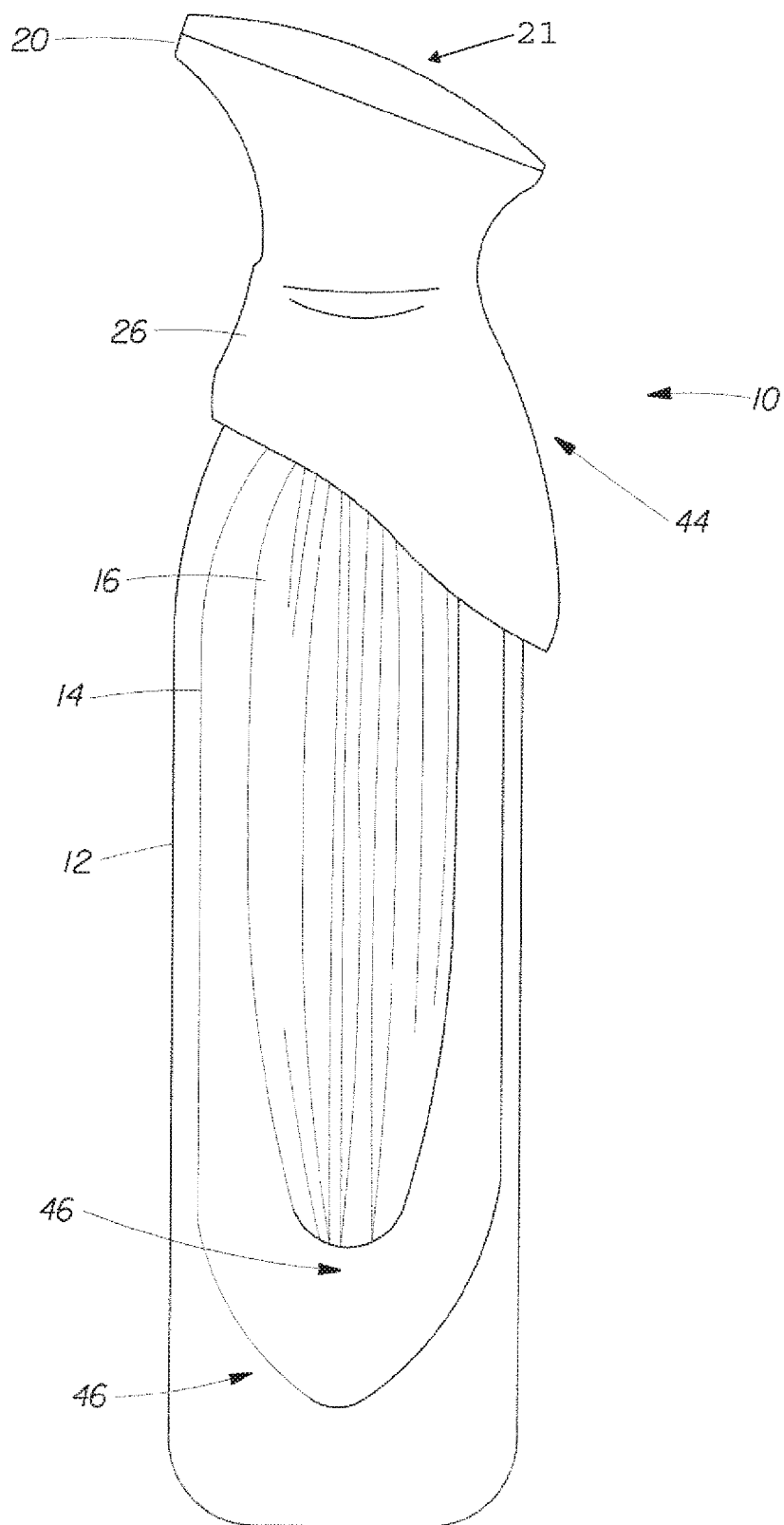


Fig. 1

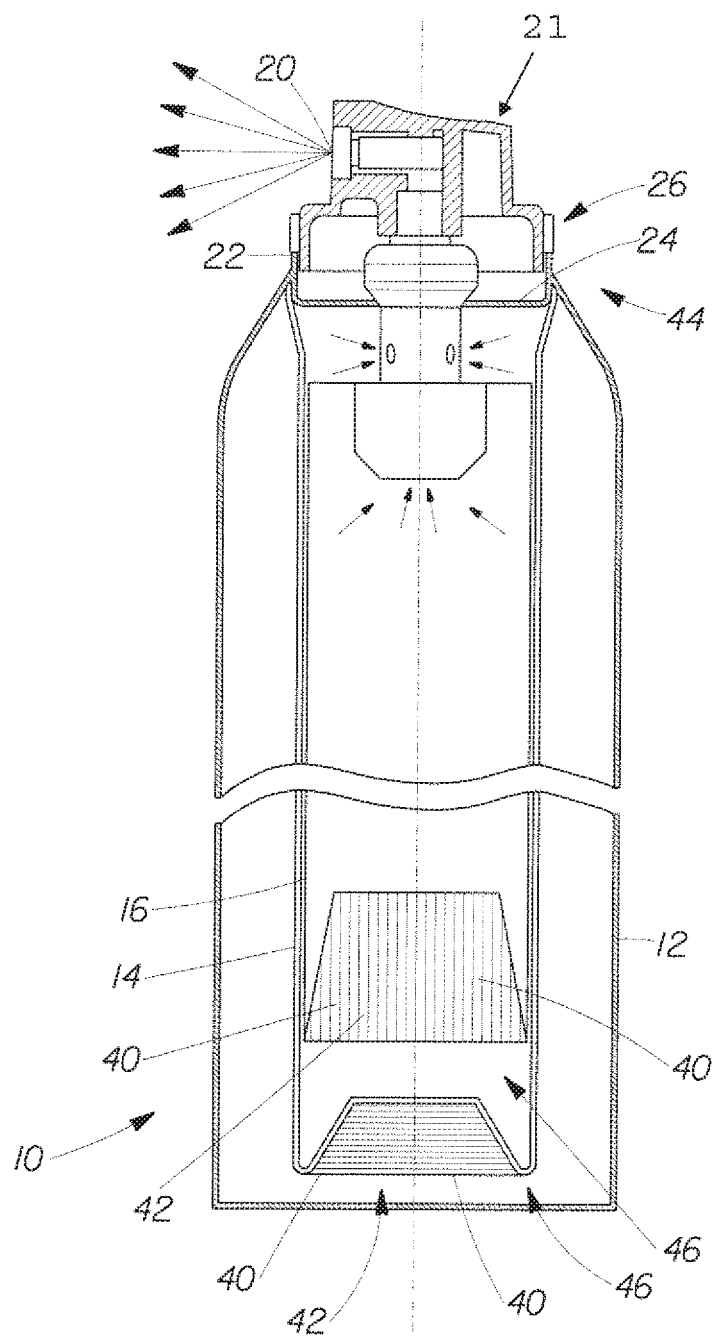


Fig. 2

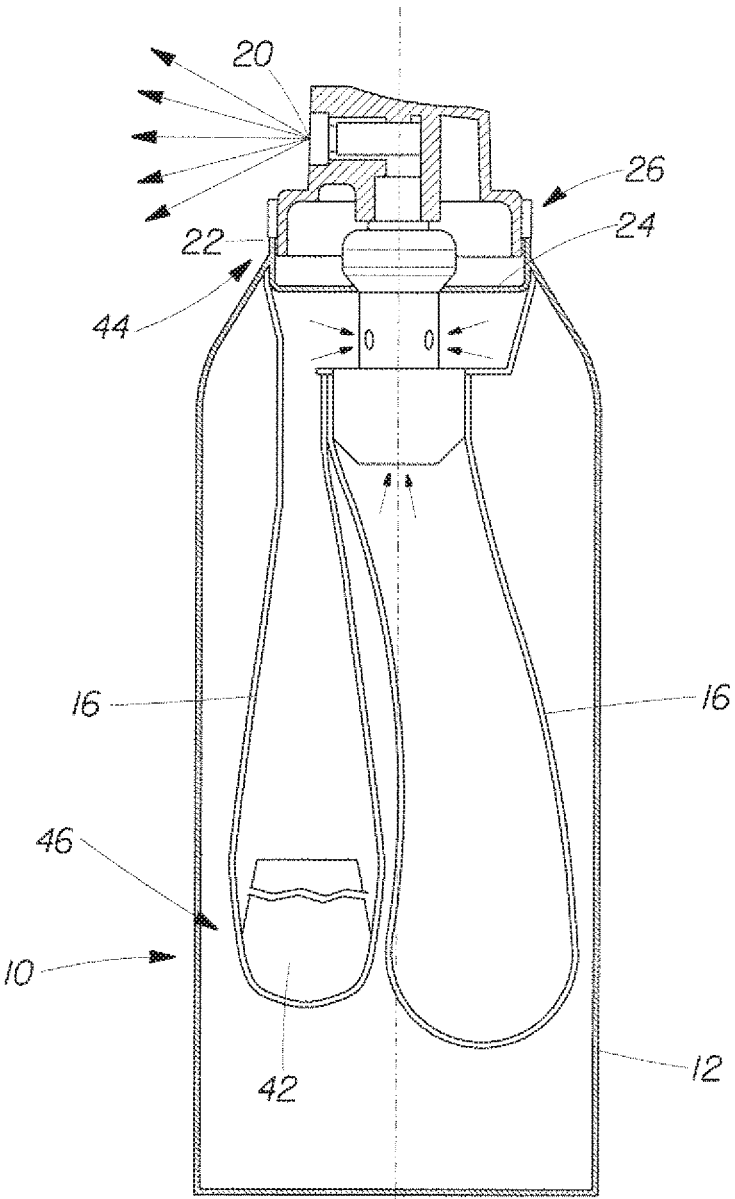


Fig. 3

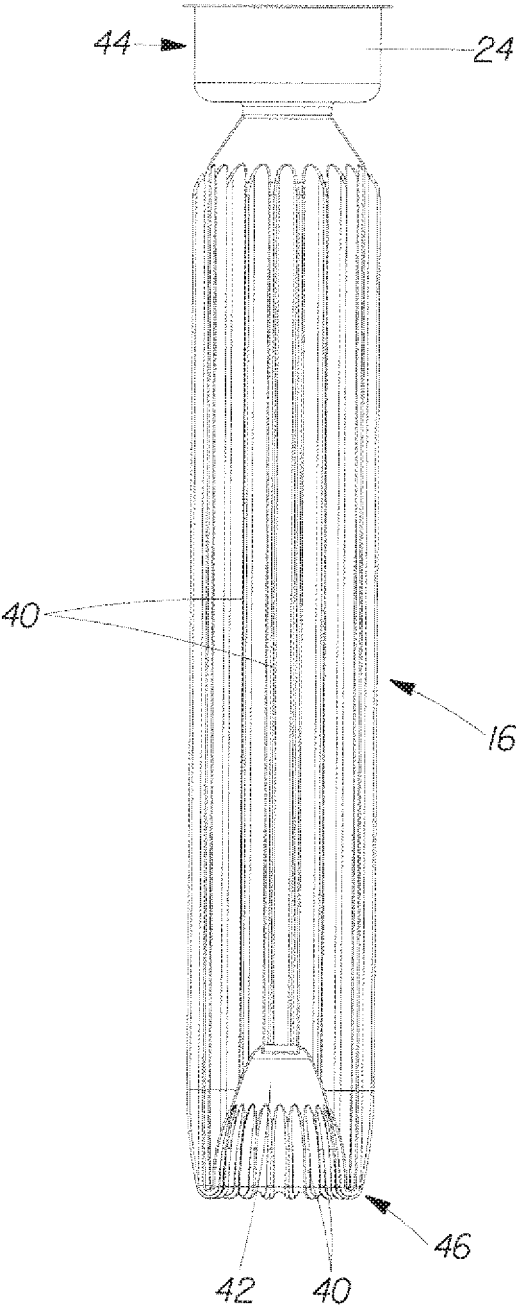


Fig. 4

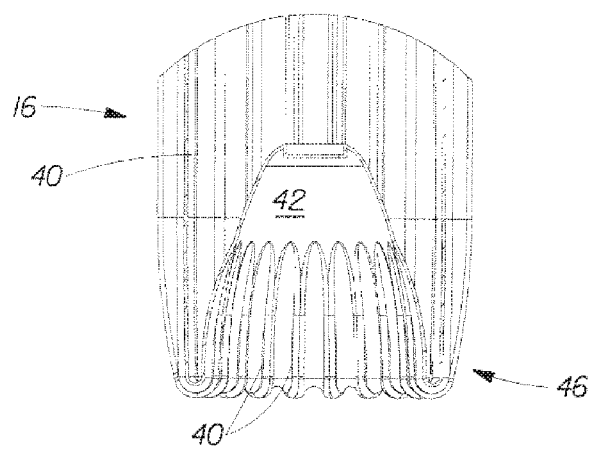


Fig. 5A

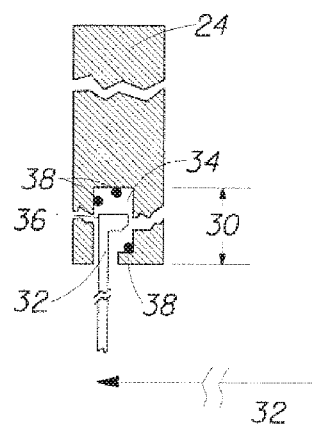


Fig. 6

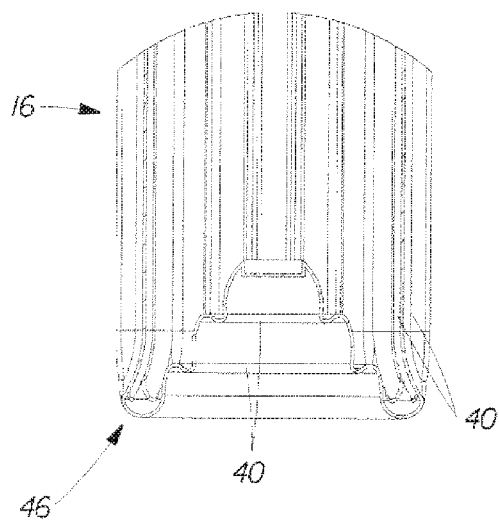


Fig. 5B

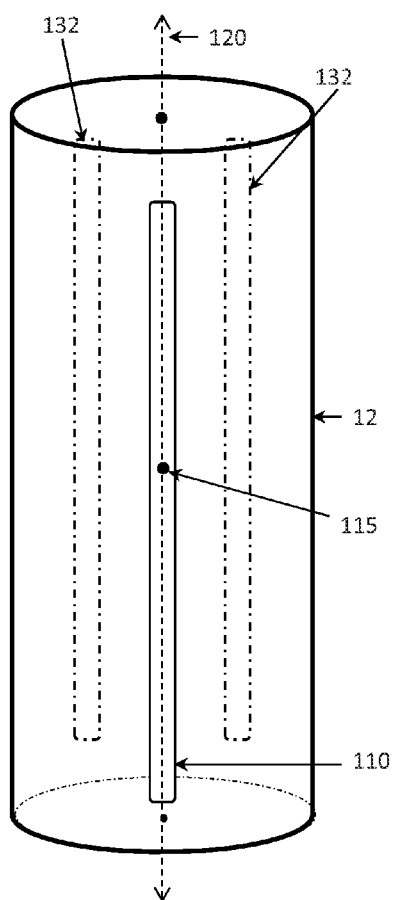


Fig. 7

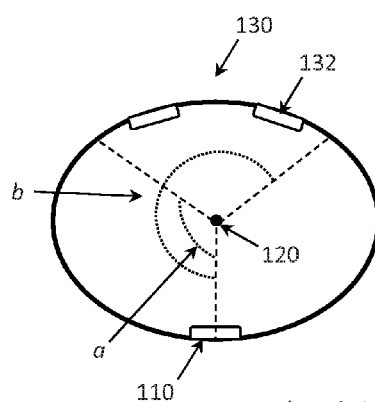


Fig. 8A

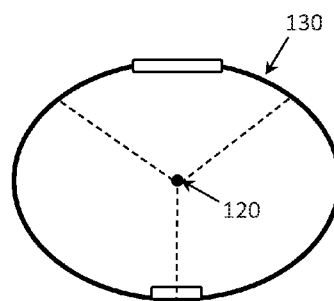


Fig. 8B

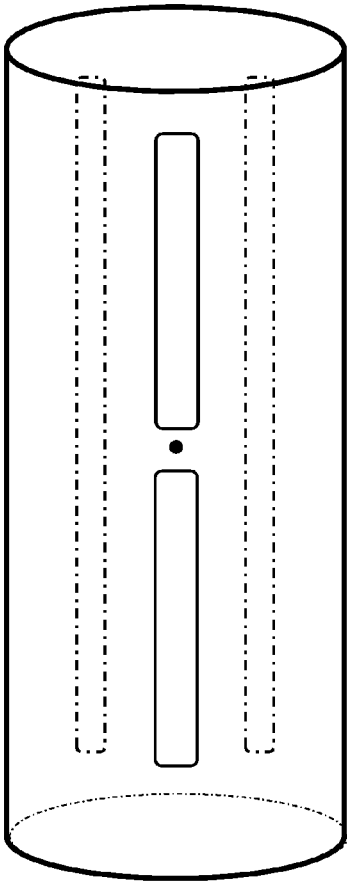


Fig. 9A

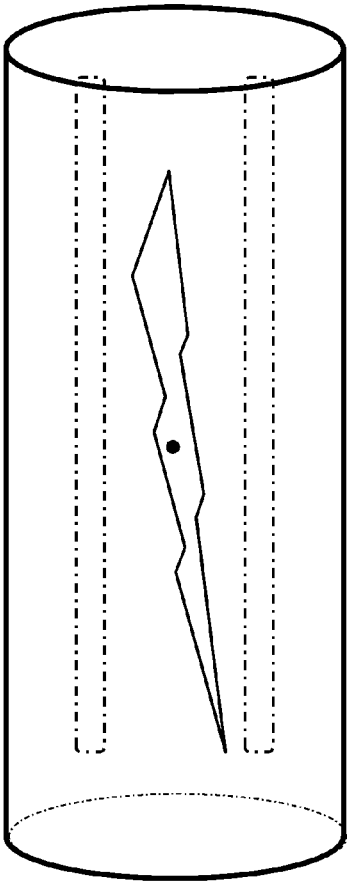


Fig. 9B



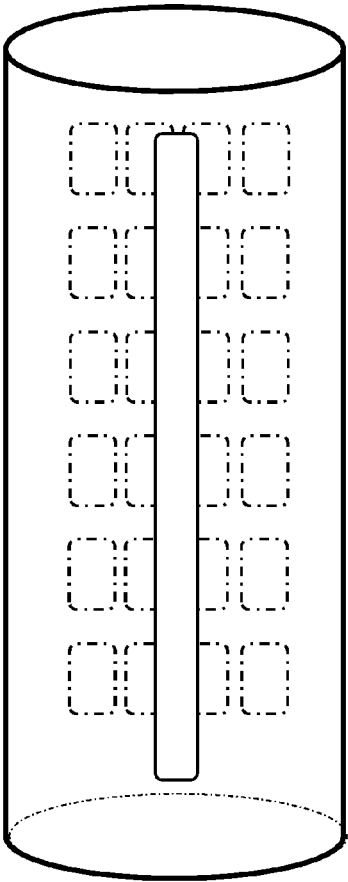


Fig. 10A

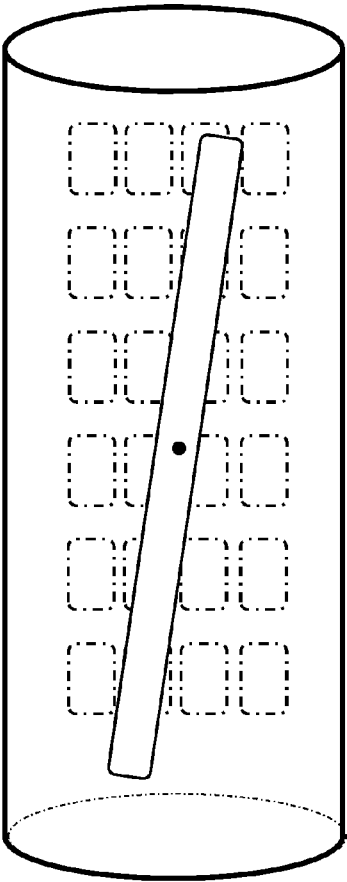


Fig. 10B

## PRESSURIZED PACKAGE

### FIELD OF INVENTION

[0001] The present invention relates to packages for containing a product therein, and more particularly to pressurizable packages for dispensing products therefrom.

### BACKGROUND OF INVENTION

[0002] Packages for containing a product are well known in the art. Such packages may have a dispensing nozzle or dispensing orifice to allow the product to be dispensed from the package. The dispensing nozzle or dispensing orifice may be disposed near the top of the package, although other configurations and locations are also known in the art.

[0003] Motive force for dispensing the product from the package include gaseous propellants, pumps (both manual and electric), gravity feed systems, elastic bladders, etc. Packages using propellants are particularly popular, because such packages allow for continuous dispensing at the touch of a button. Likewise, elastic bags may be filled with product to a pressure greater than atmospheric. In either case, product dispensing occurs due to the pressure differential between the product and the ambient.

[0004] Products to be contained in and dispensed from the package include almost any gaseous, liquid, or farinaceous material, compatible with the package materials and suitable for the intended use. Nonlimiting, exemplary products include, but are not limited to, perfume, medicaments, air treatments, such as air fresheners, insect repellents, cosmetics, cleaners, etc.

[0005] Use of plastic materials for pressurized packages is known. See e.g. U.S. Pat. No. 8,869,842, and US Pub. 20150108163. Packages made of plastic with clear or translucent regions have been disclosed. See e.g. U.S. Pat. No. 8,074,847. However, packaging which allows viewing of the product before dispensing presents challenges. As the product is depleted flexible packaging may assume aesthetically undesirable configurations, leading to a less preferred package. The challenge is compounded for packaging holding plural, but separated, products. The search continues for packages which are functional, aesthetically pleasing and/or economical to manufacture

### SUMMARY OF THE INVENTION

[0006] One aspect of the present invention provides for a package comprises an outer container having a viewing window and an illumination region positioned generally opposite said viewing window, an inner container within said outer container, said inner container containing a material under pressure; a discharge for dispensing material from said package through a valve; and a plastic valve cup intermediate said inner container and said discharge, said valve cup being joined to said inner container in fluid tight or vapor tight relationship, and joined to the outer container in fluid tight or vapor tight relationship.

[0007] Another aspect of the present invention relates to a method of showing the level of material within a pressurized package in accordance with the present invention, comprising the steps of: providing light through an illumination region to illuminate an inner container, exposing a portion of said inner container through a viewing window positioned generally opposite said illumination region.

### BRIEF DESCRIPTION OF THE DRAWINGS

[0008] FIG. 1 is a vertical elevational view of a package according to the present invention.

[0009] FIG. 2 is a vertical sectional view of a variant embodiment of a package similar to that shown in FIG. 1 and having an inner container with an inversion having longitudinal hinge lines and a central container with an inversion having circumferential hinge lines, the inversions having equally spaced hinge lines on the right-hand sides of the inversions and unequally spaced hinge lines on the left-hand sides of the inversions.

[0010] FIG. 3 is a vertical sectional view of an alternative embodiment having two inner containers disposed in parallel, one inner container having an asymmetrical inversion.

[0011] FIG. 4 is a side elevational view of an exemplary inner container or central container, having weakened regions.

[0012] FIG. 5A is an enlarged fragmentary view of the distal end of the container of FIG. 4.

[0013] FIG. 5B is a fragmentary view of an alternative embodiment of a distal end of a container.

[0014] FIG. 6 is an enlarged fragmentary schematic view of an exemplary attachment for the valve cup according to the present invention.

[0015] FIG. 7 is a frontal view of a package in accordance with at least one embodiment of the present invention.

[0016] FIG. 8A is a top view of the package of FIG. 7.

[0017] FIG. 8B is a top view of another package in accordance with the present invention.

[0018] FIG. 9A is a frontal view of a package in accordance with at least one embodiment of the present invention.

[0019] FIG. 9B is a frontal view of a package in accordance with at least one embodiment of the present invention.

[0020] FIG. 10A is a frontal view of a package in accordance with at least one embodiment of the present invention.

[0021] FIG. 10B is a frontal view of a package in accordance with at least one embodiment of the present invention.

### DETAILED DESCRIPTION OF THE INVENTION

[0022] Referring to FIG. 1, the invention is a package 10 comprising plural containers. One or more containers may be disposed inside each other to yield an outer container 12 having one or more containers therein.

[0023] If the package 10 has two containers, this arrangement yields a package 10 having an outer container 12 and an inner container 16 disposed therein. If the package 10 has three containers 12, 14, 16, this arrangement yields a package 10 having an outer container 12 with a central container 14 disposed therein and an inner container 16 disposed in the central container 14. In such an arrangement the central container 14 is disposed between the outer container 12 and the inner container 16.

[0024] The plural containers 12, 14, 16 keep different materials contained therein substantially isolated until the materials are dispensed at the point of use. During or after the dispensing process the materials may be mixed. The materials may include one or more products intended jointly or separately for one or more end uses, one or more propellants, air, water, etc.

[0025] The product(s) may comprise any dispensable substance and includes gaseous, liquid, and farinaceous particulate materials, which may be dispensed using the pack-

age 10 described and claimed herein. It is simply necessary that the product viscosity be low enough for the product to be dispensed from a package 10 having the desired pressure and dispensing characteristics.

[0026] The containers 12, 14, 16, may have a common discharge. The discharge may be a dispensing orifice, drain, aperture or other dispensing device, as is known in the art. A nozzle will be discussed for exemplary and illustrative purposes. The nozzle 20 may be pressed or otherwise displaced from its normally closed position to provide a flow path for material disposed in the container to the environment. For example, one suitable type of nozzle 20 is a normally closed spray orifice. Alternatively a trigger, cam, etc. may be utilized to open the flow path for product disposed inside one container to be dispensed to the environment. Suitable nozzle 20s are disclosed in U.S. Pat. No. 3,690,515 issued to Ewald, U.S. Pat. No. 4,940,170 issued to Popp-Ginsbach, U.S. Pat. No. 4,964,539 issued to Mueller, U.S. Pat. No. 5,497,911 issued to Ellion et al. and U.S. Pat. No. 5,839,623 issued to Losenno et al.

[0027] If desired, one or more of the containers may have a dip tube. The dip tube may be used to transport product from the bottom of that container to the discharge.

[0028] Examining the package 10 in more detail, one or more of the containers 12, 14, 16 may be translucent or clear. By translucent, it is meant that light can pass through the wall of the container, sufficient for a viewer to discern the presence of product therein. By clear it is meant that light can pass through the wall of the container and images discerned on the other side of the wall. In either case, having a clear container 12, 14, 16, or a translucent container 12, 14, 16, a product or container 14, 16 therein is visible from outside the package 10.

[0029] In one embodiment according to the invention the outer container 12 is clear or translucent. This allows a central container 14 or inner container 16 therein to be viewed from outside the package 10. Furthermore, any material disposed in the outer container 12 is likewise viewable from outside the package 10.

[0030] The outer container 12 may be rigid. By rigid, it is meant that the container 12, 14, 16 does not substantially change shape or size in response to normal usage forces or depletion of the contents of the package 10. A rigid outer container 12 allows the package 10 to be conveniently shipped, stored, displayed, placed on a tabletop, etc. Furthermore, a rigid outer container 12 provides protection in the event that the package 10 is dropped, or otherwise disturbed. Suitable materials for the outer container 12 include plastic, glass, combinations thereof, etc. of any wall thickness suitable for the intended pressurization.

[0031] The inner container 16 and/or central container 14, if present, may likewise be clear or translucent. A clear or translucent central container 14 allows product therein, as well as any inner container 16 to be viewed from outside the package 10. Similarly, a clear or translucent inner container 16 allows product therein to be viewed from outside the package 10. Of course, it will be apparent that a dip tube, if present, would be visible inside any clear or translucent container 12, 14, 16, provided that any containers 12, 14 outside of that container 14, 16 are likewise clear or translucent. The dip tube, valve assembly, and/or valve cup 24, if present, may also be clear/translucent.

[0032] Materials suitable for use with the package 10 of the present invention include, but are not limited to: poly-

propylene (PP), polyethylene (PE), polyethylene naphthylate (PEN), polycarbonate (PC), polyamides (PA) and/or polyethylene terephthalate (PET), polyvinylchloride (PVC); and polystyrene (PS).

[0033] A transparent container 12, 14, 16 according to the invention may have a transmittance of more than 25%, more than 30%, more than 40%, or more than 50% in the visible part of the spectrum, approximately 410-800 nm. Alternatively, absorbency of container 12, 14, 16 may be measured as less than 0.6 or by having transmittance greater than 25% wherein percent transmittance equals:  $(1/(10^{\text{exp (absorbency)}})) \times 100\%$ . For purposes of the invention, as long as one wavelength in the visible light range has greater than 25% transmittance, the respective container 12, 14, 16 is considered to be transparent/translucent.

[0034] By clear and translucent, it is meant to include inner containers 16, central containers 14 and/or outer containers 12 which are entirely clear or translucent. The terms clear and translucent also include inner containers 16, central containers 14 and/or outer containers 12 which have clear and/or translucent regions. The clear or translucent regions may be sections of these containers, such as a top half, a bottom segment, may be windows or portals, may be striped with alternating opaque regions, etc.

[0035] In one embodiment, the package comprises an outer container having a viewing window and an illumination region positioned generally opposite said viewing window, an inner container within said outer container, said inner container containing a material under pressure; a discharge for dispensing material from said package through a valve; and a plastic valve cup intermediate said inner container and said discharge, said valve cup being joined to said inner container in fluid tight or vapor tight relationship, and joined to the outer container in fluid tight or vapor tight relationship. Multiple other windows or apertures can also be formed in the outer container. "Generally opposite" as defined herein, means that the viewing window and illumination region are on opposite sides of the package where a plane drawn through the central longitudinal axis of the outer container intersects each of the viewing window and the illumination region.

[0036] The viewing window is preferably clear or translucent and has minimal labeling obscuring the window. The viewing window can have different shapes but a generally rectangular shape can be preferred. In one embodiment, the viewing window comprises two or more portions that are positioned along a line running along the length of the outer container. In one embodiment, said viewing window has a width of from about 2% to about 12% of the circumference of said outer container, preferably from about 4% to about 10%, more preferably from about 5 to about 8%. In one embodiment, the viewing window has an average width of from about 0.5 cm to about 1 cm, preferably from about 0.6 cm to about 0.8 cm.

[0037] A central point of the viewing window can be determined by drawing a plane perpendicular to the central longitudinal axis of the outer container at the point half way along the length of the outer container. Where this plane intersects the window, the central point is the midpoint of that intersecting line. If the window is not present at this half way position, then the central point can be determined by finding the largest viewing window by area, drawing the perpendicular plane half way along the length of the viewing window (taken along the central longitudinal axis of the

outer container), and finding that midpoint. In one embodiment, the illumination region is the portion of the container located between about 120° to about 240° from said central point, preferably from about 150° to about 210°. The illumination region can be any material that allows more light to pass through than the rest of the package. In one embodiment, the entire illumination region is clear or translucent. In another embodiment, the illumination region is opaque but small apertures or windows are formed that allow light to pass through, the surface may seem opaque to the naked eye when viewed directly.

**[0038]** In one embodiment, the outer package forms at least one illumination portal. In one embodiment, at least half of said illumination portal(s) is positioned within said illumination region, preferably at least 75%, more preferably at least 90%, even more preferably the entire illumination portal is positioned within said illumination region. In one embodiment, the illumination portal is clear or translucent. In one embodiment, said illumination portal has an average width that is greater than the average width of said viewing window, preferably at least 1.5 times greater, more preferably at least 2× greater.

**[0039]** In one embodiment, there is no noticeable change in the surface shape of the viewing windows and/or illumination portals compared to the rest of the package—meaning that if the package is generally cylindrical or squared in shape with flatter surfaces, the windows and portals maintain the shape of the surrounding portions of the package. In one embodiment, the exterior surface of the viewing window and/or said illumination portals can also have varying surface shapes, such as flat outer shapes where the rest of the container can be cylindrical, or concave or convex shapes.

**[0040]** In one embodiment, the viewing window has a greatest length which is from about 50% to about 100% of the length of said outer container, preferably from about 65% to about 85%.

**[0041]** In one embodiment, said outer container comprise an reflective interior surface to increase the reflection of light within the package to increase light that is shown on the interior container. In one embodiment, the interior surface of the outer page that is opposite the illumination region is not reflective. The rest of the interior surface could be reflective, at least the half on the side with the viewing window. Without intending to be bound by theory, it is believed that this will increase the light shown on the portion of the inner container that is seen when viewing through the viewing window. In one embodiment, wherein said outer container further comprises a non-reflective interior surface, at least half of said non-reflective interior surface is present within said illumination region.

**[0042]** In one embodiment, an illumination portal can be provided in the top portion of the package. This can be particularly useful where the products are on shelf lined up such that minimal light is passing through the container from side to side. Here, light coming into the container from the top can still help users see the inner container. In one embodiment, an illuminating portal can be formed in the nozzle, the neck, the valve cup, or a combination thereof—such as where a plurality of illumination portals are provided on the upper surface of the package.

**[0043]** Another embodiment of the present invention provides for a method of representing the level of material within a pressurize package in accordance with the present invention, comprising the steps of: providing light through

an illumination region to illuminate an inner container, exposing a portion of said inner container through a viewing window positioned generally opposite said illumination region. Importantly, it is believed that though the display of contents or “fluid levels” is often desired by consumers, it is a difficult challenge to do so with the pressurized multi-container package of the present invention. Further, the pressurized material contained within the package does not flow when shaken, making it even more complex for users to determine how much juice is left. As such, the present invention has arrived at a configuration that should be easily understood by consumers as a way to determine the amount of material in the package without having to resort to weighing the package, trial spraying, or by guessing. In one embodiment, the method of representing the level can be achieved without the user having to handle the package. In another embodiment, the level can be represented without the user having to bring the package to eye level, or bring their eyes to package level.

**[0044]** The package can also include a label applied onto the outer surface of the outer container. The label can be a shrink wrap, a sleeve, a sticker or even print applied directly onto the package. The label can include one or more indicia. Suitable indicia include branding, commercial claims or other disclosures, as well as other types of communication. In one embodiment, the indicia can be a measuring scale running over, across, or alongside the viewing window. In one embodiment, the label can be applied over a portion of said outer package. In one embodiment, a portion of said label covers a portion of said viewing window. In another embodiment, the label can include a clear portion that can cover a portion of the viewing window.

**[0045]** The inner container **16** and/or central container **14** may be rigid or flexible. By flexible it is meant that the container **12**, **14**, **16** changes shape or size during ordinary use, either due to forces exerted by the user or depletion of the contents. For example, a flexible container **12**, **14**, **16** may assume a lesser volume due to contents being dispensed therefrom. If a flexible container **12**, **14**, **16** is desired, suitable materials include elastomers, natural or synthetic rubber, polyolefins, polyesters, nylons, etc., or mixtures/combinations thereof, with the understanding that transparency/translucency will be provided at least in part, as desired.

**[0046]** Referring to FIG. 2, the inner container **16**, outer container **12** and central container **14**, if present, may have a common discharge. The common discharge may include a flange **22**, which is juxtaposed with an opening. The opening may be a generally planar opening and disposed on the outer container **12**, or the opening may be nonplanar and primarily disposed on the inner container **16** and/or central container **14**.

**[0047]** Product may be disposed or inserted into the inner container **16**, central container **14**, and/or outer container **12** using a positive displacement system. One suitable positive displacement system is a volumetric piston. The volumetric piston has a linear displacement. The linear displacement inserts the product from a chamber, displacing the product from that chamber under pressure, into the desired container **14**, **16**, as is known in the art.

**[0048]** The inner container **16** may have a flow path which is coaxially disposed, in whole or in part, within the flow path of the flow path of the central container **14**. The coaxial flow path may extend from the flange **22** to a point juxta-

posed with a swirl chamber and comprise a conduit extending from each respective container. The outer conduit may completely or partially circumscribe the inner conduit along all or part of a common length.

[0049] The swirl chamber is a region disposed upstream of the nozzle 20. The swirl chamber may have a volume sufficient to allow intermixing of materials from the inner and central containers 14. Materials in the swirl chamber may mix and then exit through the nozzle 20 with a circumferential velocity component.

[0050] The discussion below refers to a package 10 having a valve cup 24 used in conjunction with the outer container 12. However, the invention is not so limited. The valve cup 24 may be used in conjunction with the inner container 16 or central container 14. The valve cup 24 may be used to secure a valve assembly to the outer container 12.

[0051] A valve assembly may include a movable stem or plug which opens a flow path for dispensing product from the corresponding container. Typically, metal valve cups 24 are used for pressurized packages 10 and plastic valve cups 24 are used for packages 10 which are not pressurized. However, a metal valve cup 24 is more expensive than a comparable plastic valve cup 24 and requires plastic deformation of the metal flange 22 for attachment to the outer container 12. This process requires specialized assembly machinery and may require undue assembly time and stress on the neck 26 of the outer container 12.

[0052] If a plastic valve cup 24 is utilized, the assembly procedure can be simplified. The valve cup 24 can be inserted into or outside of the neck 26 of the outer container 12. The valve cup 24 may be joined to the container neck 26 in any suitable fluid tight or vapor tight manner, sufficient to withstand internal or external pressurization of the container. A press fit, interference fit, clearance fit may be utilized for joining the neck 26 and valve cup 24. Joining may also be accomplished by friction welding, solvent welding, high frequency welding, adhesive, or a combination thereof. If desired, an intermediate material or component may be disposed between the valve cup 24 and neck 26, so long as such material or component provides an adequate seal.

[0053] Joining may also be accomplished by having protuberances on one of the neck 26 and valve cup 24, to provide a snap fit for holding these components together. In one embodiment, the protuberances may comprise plural flanges 22 disposed in series on the inside surface or outside surface of the container neck 26, valve or a combination thereof. In one embodiment, one or more of the flanges 22 may comprise an annular ring. Plural flanges 22, such as annular rings, may be disposed in series.

[0054] The neck 26 of the container may be of any suitable size, geometry shape and/or cross-section. Thus, while a round cross section is shown the invention is not so limited. The neck 26 may be parallel to the major axis of the package 10, perpendicular thereto, or at any angle therebetween. Further the neck 26 may be concentric or eccentric with respect to the major axis of the package 10. The neck 26 has an opening dimension 32. The opening dimension 32 extends from the center of the package 10 to the center of the wall forming the neck 26.

[0055] Referring to FIG. 6, the container may further have a joining length 30. The joining length 30, is the distance, which may be taken parallel to the neck 26, over which the neck 26 and valve cup 24 may be joined together to form a seal. In one embodiment, the neck 26 may comprise a

protrusion 36 and the valve cup 24 may comprise a channel 34 for receiving such protrusion 36.

[0056] Alternatively, the neck 26 may comprise the channel 34 and the valve cup 24 may comprise the protrusion 36 for being received in the channel 34. In either embodiment, the length over which the protrusion 36 is received in the channel 34 may correspond to the joining length 30. While FIG. 6 shows a particular arrangement of the inner and outer walls of the valve cup 24, channel 34 and protrusion 36, the invention is not so limited. This geometry may be transposed, so that it is inverted with respect to the major axis of the package 10.

[0057] The joining length 30 may be dependent upon the opening dimension 32. If the neck 26 is not circular, the opening dimension 32 is taken as the largest opening dimension 32 in that neck 26 of the package 10. To provide for adequate sealing against the internal and external pressurization of the containers 12, 14, 16, the package 10 may have a ratio of joining length 30 to opening dimension 32 of at least 1, 1.25, 1.5, 1.75, 2 or 2.5.

[0058] This arrangement provides the benefit, when used with a plastic container, and/or plastic valve cup 24 that a less total material may be utilized. For example, utilizing the current system of the prior art required additional material to form the crimp. Since the crimping process utilized a metal outer container 12, forming may be difficult. However, when utilizing the plastic container and/or plastic valve cup 24 of the present invention, the above cited ratios can be advantageous.

[0059] If desired, a gasket 38 may be disposed in the channel 34. The gasket 38 may be attached to the inside surface of the channel 34 or to the inside or outside of the protrusion 36 to be received in the channel 34. The gasket 38 may comprise any soft material, such as rubber, PET, polyethylene, urethane, etc. suitable for sealing against the desired pressurization. Of course, plural gaskets 38 may be utilized in series, and disposed on any combination of surfaces of the protrusion 36 and channel 34.

[0060] If desired, the gasket(s) 38 may be integral with the plastic valve cup 24, or the plastic neck 26 of the container. The gasket(s) 38 may be molded into the valve cup 24 or neck 26 as part of the manufacturing process. Alternatively, the valve cup 24 and/or the neck 26 of the container may be made of a soft, pliable material obviating the need for a gasket 38.

[0061] In yet another embodiment, the inner container 16, or central container 14, if present, may provide the gasket 38, or obviate the need therefor. Such an arrangement may utilize an inner container 16 or central container 14 if present, which is pliable. By pliable it is meant that the material of that container 14, 16 can conform to the shape and surface of the outer container 12. If desired, the inner container 16 or central container 14 may be sealed to the valve cup 24, a valve housing, the dip tube or to the neck 26 of the outer container 12.

[0062] Referring to FIG. 3, if desired, plural inner containers 16 may be disposed in parallel. This arrangement allows generally equivalent volumes, and therefore generally equivalent amounts of materials to be utilized and co-dispensed. However, the plural inner containers 16 disposed in parallel may be of the same or different shape, volume, position within the outer container 12, color, transparency/translucency/opacity, flow rate, and contain the same or different materials and/or propellant. Likewise the

inner container 16 and central container 14 may be of the same or different shape, color, transparency/translucency/opacity, flow rate, and contain the same or different materials and/or propellant.

[0063] Of course, while two inner containers 16 are shown for illustrative purposes, the invention is not so limited. Three or more inner containers 16 may be utilized, as desired. Furthermore, one or more of the inner containers 16 disposed parallel with other inner containers 16 may be disposed inside a central container 14. Such an arrangement yields a compound system of one or more central containers 14 disposed in parallel with other central containers 14 and each having one or more inner containers 16 therein.

[0064] If plural inner containers 16 are disposed in parallel, the inner containers 16 may discharge into a common flow path. The flow path may be annular, as shown, or may be an inverted "T" or "Y" having one leg and two branches in fluid communication with each other. Each branch of the flow path is in fluid communication with one of the inner containers 16. The leg of the flow path is in fluid communication with the swirl chamber or another downstream region of the flow path.

[0065] Referring to FIG. 4, the inner container 16, and/or central container 14 may have weakened regions 40, which provide for preferential collapse of that container upon depletion of its contents. The weakened regions 40 may comprise regions of the container having a lesser/greater wall thickness, hinge lines, different materials having a lesser/greater stiffness and/or regions having a geometry which promotes the desired collapse. Such preferential collapse helps to obtain complete depletion of the contents of that container, and also can provide an aesthetically desirable appearance as the volume of that container shrinks.

[0066] The weakened regions 40 may comprise ribs, which act as hinge lines. The ribs may be generally longitudinally oriented, and disposed substantially parallel to the major axis of the package 10. This arrangement allows the diameter or other cross-sectional area of the inner container 16 and/or central container 14 to diminish as material is dispensed therefrom. Alternatively, the ribs/hinge lines may be oriented generally parallel to the cross-section of the container and a generally perpendicular to the major axis of the package 10. Alternatively, the ribs/hinge lines may be oriented on a diagonal. Of course combination of the foregoing geometries may be utilized as well. Of course, the weakened regions 40 may be of plural orientations, extending in different directions. The weakened regions 40 may be equally or unequally circumferentially spaced around the container, and of the same or different weakness, size, longitudinal position, radial position, circumferential position, etc. Any configuration which provides for the desired collapse of the container may be suitable.

[0067] Referring to FIGS. 5A-5B, the inner container 16 and/or central container 14, if present, may define a major axis. The major axis is the direction, generally longitudinally oriented, along at the major dimension of the inner container 16, central container 14, outer container 12, or package 10. The inner container 16, central container 14, and/or outer container 12, may each define a proximal end 44 juxtaposed with the discharge and a distal end 46 remote therefrom.

[0068] The distal end 46 of the inner container 16 and/or central container 14, maybe inverted upon itself to provide an inversion 42. The inversion 42 reentrantly extends back towards the proximal end 44 of the respective container. The

inversion 42 may be of generally lesser stiffness, particularly in the direction parallel the major axis, than the balance of that container 14, 16.

[0069] In another embodiment, the central container 14 and/or inner container 16 may be telescoping upon pressurization and/or filling. This provides expansion of that container 14, 16 in the longitudinal directions, as desired.

[0070] When material is disposed in a container having an inversion 42, the inversion 42 may expand away from the proximal end 44, parallel to the major axis. After expanding parallel to the major axis, the container may expand radially relative to the major axis. Upon removal of material therefrom, the container may collapse in the opposite order. Such expansion allows material with sufficient barrier properties to be utilized for the inner container 16, and or central container 14 and expansion/collapse of such container to occur upon insertion and removal of material therefrom, respectively.

[0071] This arrangement may provide the benefit that the distal end 46 of the inner container 16, or central container 14, if present, may contact the inner surface of the outer container 12. Such contact may occur at the distal end 46 of the outer container 12, the periphery (taken in the circumferential direction), or both. Such contact provides the benefit that if the package 10 is dropped, dynamic load is transferred from the outer container 12 through the contact to the inner and/or central container(s) 14, 16. This may reduce the chance of accidental rupture of the package 10 upon dropping.

[0072] If desired, the inner container 16 and/or central container 14 may be stiffer or otherwise more resistant to pressure at the proximal end 44 of that container 14, 16. This provides the benefit that a more uniform collapse of that container 14, 16 may occur as contents are dispensed therefrom. Such increased resistance to pressure, including external pressure may be accomplished by having a stiffer material, increased section modulus, increased wall thickness, etc. The increased resistance to collapse may be provided as a gradient, increasing as the proximal end 44 of that container 14, 16 is approached or as one or more step functions.

[0073] Referring back to FIG. 1, the outer container 12 and/or central container 14 may contain a propellant. The propellant may be used to dispense or otherwise discharge contents from one or more central containers 14 and inner containers 16. Suitable propellants include compressible propellants, including but not limited to nitrogen, carbon dioxide, air, nitrous oxide, argon etc. and having the benefit of being inert. Suitable propellants include condensable propellants, including but not limited to fluorocarbons, hydrocarbons, hydrofluorocarbons, etc. and having the benefit of constant pressure during dispensing.

[0074] If a condensable propellant is desired, one may apply a vacuum to the volume of the outer container 12. This vacuum minimizes the pressure from the condensable propellant, preventing the pressure from becoming too great during a use of the package 10.

[0075] If a condensable or compressible propellant is desired, the propellant may be disposed in the container as a solid state of matter, such as a capsule, granules etc. The solid may rupture upon dispensing of material from the package 10, due to the decrease of the pressure which occurs during dispensing.

[0076] Additionally or alternatively, the propellant may sublimate to provide the desired pressure in the outer container 12. Illustrative propellants include dry ice and acid/base combinations which generate gas. Generally cryogenic filling of the propellant may be utilized. If cryogenic filling is desired, the bottom of the respective container 12, 14, 16 may be reinforced, as necessary. If desired, the cryogenic propellant may be contained in a cup, for aesthetic purposes.

[0077] The package 10 may be charged with product as follows, although one of skill will recognize there is flexibility in the order that the illustrative steps are performed. First, the outer container 12 is provided. The outer container 12 may be filled with propellant at atmospheric pressure. The central container 14, if desired, is inserted in the outer container 12. The central container 14 is joined to the outer container 12 in fluid tight relationship, sufficient to withstand the expected pressurization of the package 10 prior to dispensing and during storage, shipment and handling.

[0078] A charge of product to be dispensed, and/or propellant, may then be inserted into the central container 14. The charge may be inserted into the central container 14 under pressure, causing it to expand. Expansion of the central container 14 decreases the available volume between the central container 14 and the outer container 12. Such decrease in the available volume pressurizes in the propellant within the outer container 12. The propellant may be held at, above or even below atmospheric pressure. Such pressurization of the propellant allows it to be useful for dispensing product from the central container 14. This operation allows for filling of the containers without the necessity of a bung hole, as is common in the art.

[0079] If desired, this process may be repeated for the inner container 16. Of course, one will recognize that product and/or propellant may be contained in any viable combination of the inner container 16, outer container 12 and the central container 14. Thus, the outer container 12 may contain the product and inner container 16 and/or central container 14 may contain product and/or propellant. Conversely, the central container 14 may contain the product and the inner and/or outer containers 12 may contain product and/or propellant.

[0080] While, a round cross-section package 10 having a generally vertically oriented major axis is illustrated, the invention is not so limited. The package 10 may be horizontally oriented, of any desired cross-section or orientation and size. The cross section may be constant or variable. The size and geometry must simply be suitable for the intended use of the material contained in the package 10. Likewise, the illustrated package 10 has the dispensing opening juxtaposed with the top of the package 10. Again, the invention is not so limited. The dispensing opening may be juxtaposed with the bottom of the package 10, as, for example, would be convenient for a gravity drain system or may be disposed at any intermediate position.

[0081] FIG. 7 is a frontal view of a package having an outer container 12 in accordance with at least one embodiment of the present invention. The outer container has a viewing window 110 that is shown extending for the majority of the length of the outer container. Generally opposite the viewing window is two illuminating portals 132 (shown in dashed lines). A central longitudinal axis 120 is shown passing through the midpoint of the outer container. Viewing window 110 is shown with a central point 115 which is

determined at the half way point along the length of the outer package. Illuminating portals are shown here running a similar length to the viewing window but other embodiments can also be used.

[0082] FIG. 8A is a top view of the package of FIG. 7. Illumination region 130 is shown as defined by the two lines forming angle a and angle b from the central point 114 and the central longitudinal axis 120. In one embodiment, angle a is from 120° to about 150° while b is from about 240° to about 210°. Where less light may be desired a tighter illuminating region can be used, such as where the angles are from 150° to 210°. Where more light may be desired, or where the material forming the region lets less light pass, a larger region may be desired, such as a region going from 120° to 240°. In this embodiment, both illuminating portals 132 are present within the illuminating region. FIG. 8B shows an embodiment with just one illuminating portal. The illuminating portal is preferably clear or translucent such that lets light pass through. In some embodiments, no illuminating portal is used, or at least none that are clearly visible to the naked eye. Smaller light passing features or a less opaque region can be used that appears to be opaque to the naked eye but lets in relatively more light to illuminate the interior contents can be used.

[0083] FIG. 9A and 9B show two different viewing window designs. Similarly, FIG. 10A and 10B show two other viewing window designs, but this time with a plurality of illuminating portals positioned generally opposite said viewing window, within the illuminating region. Other portals that are outside the illuminating region can also be used. Furthermore, other light passing features can be added in other areas of the outer container. What's more, there is no requirement that the entire illuminating region allow visible light to pass through.

[0084] It should be understood that every maximum numerical limitation given throughout this specification includes every lower numerical limitation, as if such lower numerical limitations were expressly written herein. Every minimum numerical limitation given throughout this specification includes every higher numerical limitation, as if such higher numerical limitations were expressly written herein. Every numerical range given throughout this specification includes every narrower numerical range that falls within such broader numerical range, as if such narrower numerical ranges were all expressly written herein.

[0085] All parts, ratios, and percentages herein, in the Specification, Examples, and Claims, are by weight and all numerical limits are used with the normal degree of accuracy afforded by the art, unless otherwise specified. Further, as used herein, where a group is described to be "comprising of" a list of group members, that group may also "consist essentially of" or "consist of" that same list of group members.

[0086] The dimensions and values disclosed herein are not to be understood as being strictly limited to the exact numerical values recited. Instead, unless otherwise specified, each such dimension is intended to mean both the recited value and a functionally equivalent range surrounding that value. For example, a dimension disclosed as "40 mm" is intended to mean "about 40 mm."

[0087] Every document cited herein, including any cross referenced or related patent or application, is hereby incorporated herein by reference in its entirety unless expressly excluded or otherwise limited. The citation of any document

is not an admission that it is prior art with respect to any invention disclosed or claimed herein or that it alone, or in any combination with any other reference or references, teaches, suggests or discloses any such invention. Further, to the extent that any meaning or definition of a term in this document conflicts with any meaning or definition of the same term in a document incorporated by reference, the meaning or definition assigned to that term in this document shall govern.

**[0088]** While particular embodiments of the present invention have been illustrated and described, it would be obvious to those skilled in the art that various other changes and modifications can be made without departing from the spirit and scope of the invention. It is therefore intended to cover in the appended claims all such changes and modifications that are within the scope of this invention.

What is claimed is:

1. A pressurized package for dispensing a material therefrom, said package comprising:

an outer container having a viewing window and an illumination region positioned generally opposite said viewing window,

an inner container within said outer container, said inner container containing a material under pressure;

a discharge for dispensing material from said package through a valve; and

a plastic valve cup intermediate said inner container and said discharge, said valve cup being joined to said inner container in fluid tight or vapor tight relationship, and joined to the outer container in fluid tight or vapor tight relationship.

2. The pressurized package of claim 1, wherein said viewing window is clear or translucent.

3. The pressurized package of claim 2, wherein said viewing window has a width of from about 2% to about 12% of the circumference of said outer container, preferably from about 4% to about 10%, more preferably from about 5 to about 8%.

4. The pressurized package of claim 2, wherein said viewing window has a central point, and said illumination region spans from 120° to about 240° from said central point, preferably from about 150° to about 210°.

5. The pressurized package of claim 4, wherein said outer package forms at least one illumination portal.

6. The pressurized package of claim 5, wherein at least half of said illumination portal is positioned within said illumination region, preferably at least 75%, more preferably at least 90%, even more preferably the entire illumination portal is positioned within said illumination region.

7. The pressurized package of claim 5, wherein said illumination portal is clear or translucent.

8. The pressurized package of claim 7, wherein said viewing window has an average width of from about 0.5 cm to about 1 cm, preferably from about 0.6 cm to about 0.8 cm.

9. The pressurized package of claim 8, wherein said illumination portal has an average width that is greater than the average width of said viewing window, preferably at least 1.5 times greater, more preferably at least 2× greater.

10. The pressurized package of claim 5, wherein at least one of said viewing window and said illumination portals has a flat outer surface.

11. The pressurized package of claim 1, wherein said viewing window has a greatest length which is from about 50% to about 100% of the length of said outer container, preferably from about 65% to about 85%.

12. The pressurized package of claim 1, wherein said outer container comprise an reflective interior surface.

13. The pressurized package of claim 12, wherein reflective interior surface does not cover the entirety of the interior of the outer container.

14. The pressurized package of claim 13, wherein said outer container further comprises a non-reflective interior surface, wherein at least half of said non-reflective interior surface is present within said illumination region.

15. The pressurized package of claim 1, further comprising a nozzle wherein actuation of said nozzle causes material to pass through said dispenser, wherein said outer container forms a neck and said nozzle is attached to said container atop said neck, and said pressurized package further comprising at least one overhead illumination portal formed in said nozzle, said neck, said valve cup, or a combination thereof.

16. The pressurized package of claim 1, wherein said inner container is clear or translucent.

17. The pressurized package of claim 16, wherein said material is opaque.

18. The pressurized package of claim 1, wherein said inner container is opaque.

19. The pressurized package of claim 1, further comprising a label having at least one indicia applied over a portion of said outer package, wherein at least a portion of said label covers a portion of said viewing window.

20. A method of method of representing the level of material within a pressurize package of claim 1, comprising the steps of:

- a. providing light through said illumination region to illuminate said inner container; and
- b. exposing a portion of said inner container through said viewing window.

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