

[54] **TELESCOPING MANDREL FOR
EXPANSIBLE BLADDER CONTAINER**

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[51] Int. Cl. **B05b 11/00**

[58] Field of Search... **222/94 X, 386.5 X, 211-214;
141/25, 26, 312, 316**

[56] **References Cited**
UNITED STATES PATENTS

3,672,543	6/1972	Roper	222/386.5
3,674,179	7/1972	Galloway	222/94

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[57] **ABSTRACT**

A container of the expansible bladder-type wherein prestressing of the bladder is obtained by means of a telescopic extensible mandrel which imparts pressure to the bladder at the time of filling of same with the product to be stored. By inducing the prestress in the expansible membrane at the last possible moment, it is possible to ease assembly procedures because non-tensioned members are being assembled and additionally, since it is the filling operation that positions the mandrel into the pretensioning position, the expansible membrane does not take a set to thereby curtail the elastic memory thereof.

9 Claims, 3 Drawing Figures

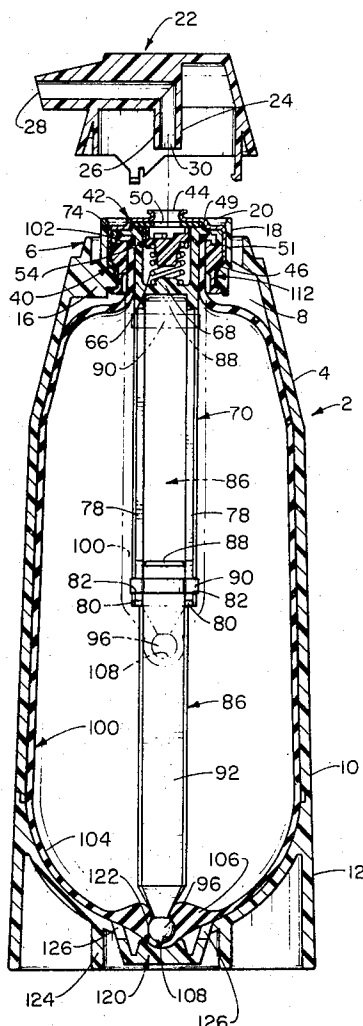


Fig. 1.

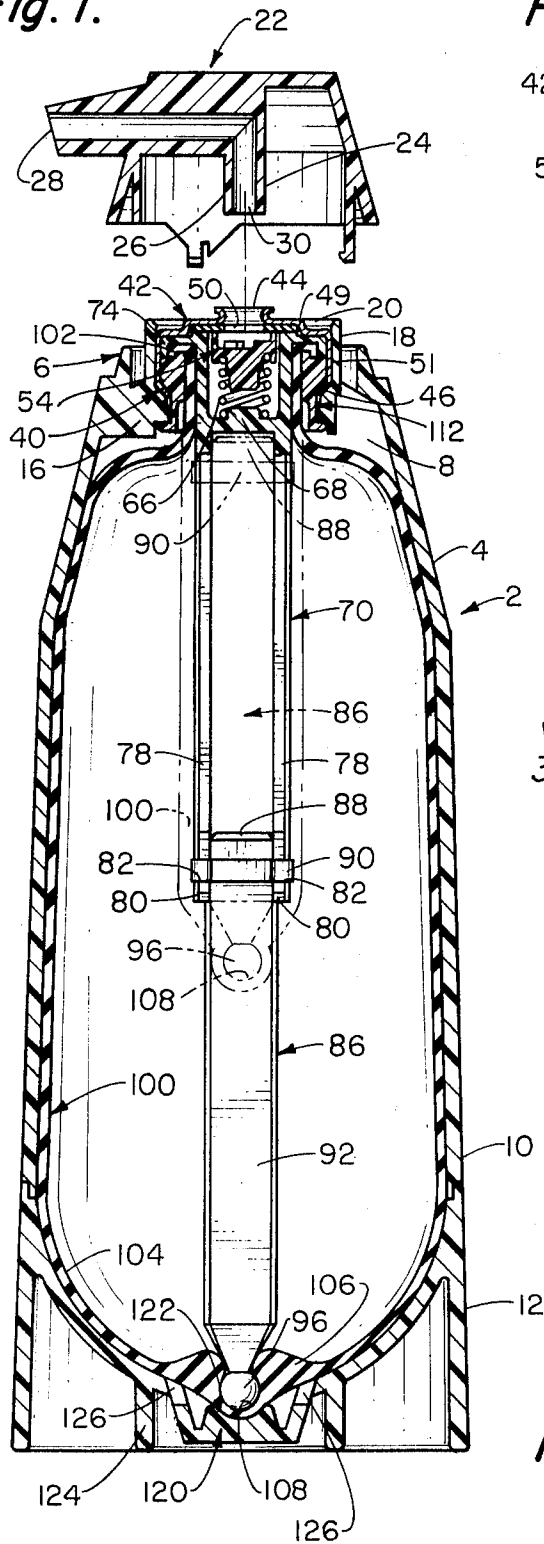


Fig. 2.

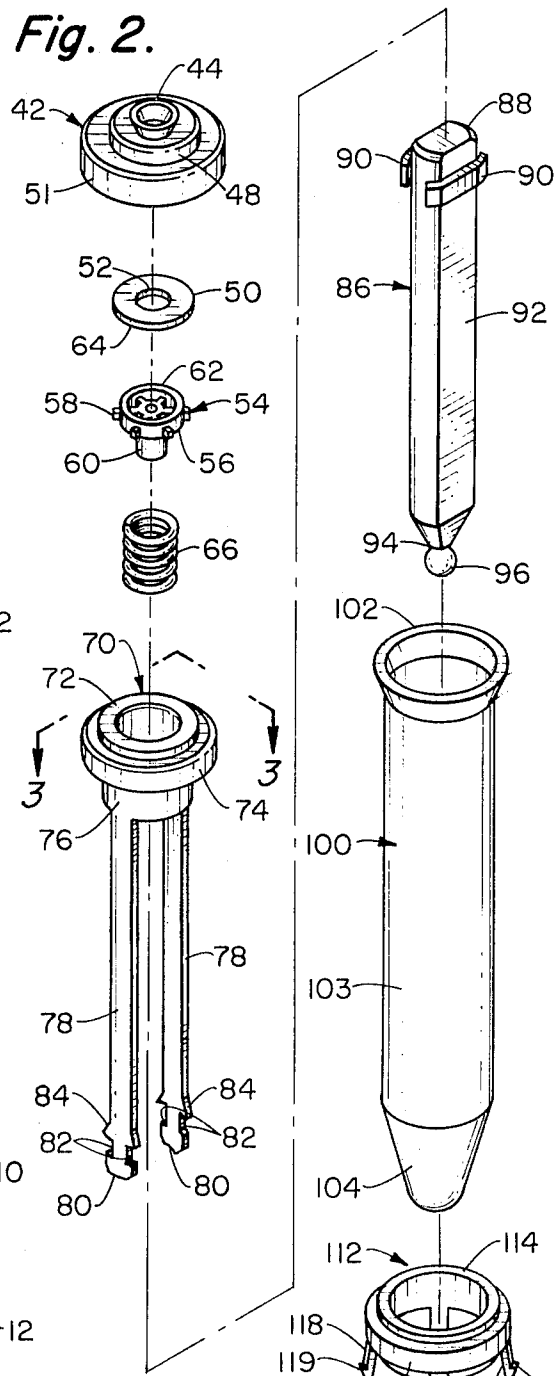
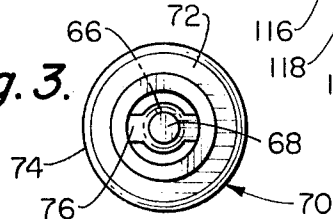


Fig. 3.



TELESCOPING MANDREL FOR EXPANSIBLE BLADDER CONTAINER

BACKGROUND OF THE INVENTION

As an alternative to the aerosol-type of containers utilizing propellant gases, such as the halogenated hydrocarbons it has been proposed to use an expansible member or membrane, either singly or doubly (where permeation problems exist). In such an arrangement, the elastic memory of one or more of the bladders is depended upon to expel or dispense the stored material within the container.

In this type of arrangement, it is frequently desirable to impart some prestress to the expansible membrane so as to promote a condition whereby substantially all of the contained product will eventually be dispensed. The means of imparting the pretensioning has taken various forms and the most common form utilizes an elongate mandrel which is inserted into the expansible membrane or membranes and positioned so as to distend the membrane or membranes and thus impart the pretensioning thereto. Unfortunately, most materials, particularly the polymeric and elastomeric ones, will take a permanent set when stressed over a period of time. The resultant will be a reduction in available energy and a lowering of the restoring forces that allows the expansible member or bladder to return to its initial shape.

Additionally, where prestressing prior to product filling is utilized, the assemblage of components for the container, herein under discussion, is complicated since the mandrel must be inserted and properly positioned to exert pretensioning to the bladder or expansible members. When this occurs, certain undesirable assembly problems arise, since one is now dealing with pretensioned members seeking the return to the unstressed or normal condition, as opposed to dealing with components upon which no external forces are acting (except for proper assembly of the components themselves).

The containers of this invention alleviate most, if not all, of the above shortcomings in the sense that a telescopic, extending mandrel member is utilized which does not exert pretensioning on the expansible member or bladder until such time as the container is to receive the fluids it is to store.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of the invention to provide a container of the expansible membrane or bladder type.

It is another object of the invention to provide a container of the expansible member or bladder type wherein pretensioning of the bladder or bladders used in the assemblage is postponed until product filling.

It is another more important object of the invention to provide a container of the expansible bladder or bladder membrane-type wherein a telescopic extending mandrel is utilized.

It is a further, more important object of the invention to provide a container utilizing one or more expansible bladders or membranes wherein the pretensioning of same does not occur until such time as the container is filled with product.

It is another still further, more important object of the invention to provide a container of the expansible bladder or bladders-type wherein a telescopic mandrel

member is utilized in the assembly, and filling of the bladder with product extends the mandrel into a locked position to thereby impart desired pretensioning forces to the bladder or bladders.

It is another still further more important object of the invention to provide a container utilizing an expansible member with a telescopic mandrel, which is so configured as to be received by a lower portion of the expansible bladder in captive relationship therewith.

It is another still further, more specific object of the invention to provide a container of the expansible member-type utilizing a telescopic mandrel which is extended during the filling operation or just prior thereto, and is locked in the extended position for the life of the container.

It is another important, and even further specific object of the invention to provide a container utilizing expansible membrane or membranes wherein pretensioning is imparted at a preselected time, not detracting from the elasticity or elastic memory of the bladder, and wherein vent holes to the ambient atmosphere are provided in the container bottom so as to protect the expansible membrane or bladder from inadvertent contact with a sharp object or the like that could result in rupturing thereof.

Basically, the invention pertains to a fluid dispenser having a container body and cover therefor, including a fluid passageway communicating the exterior thereof to a valve member supported within the container body. A valve member and at least one expansible member having an open end and enclosed end, and being adapted to be retained within the container body and store fluid therein are also provided. A valve seating member is disposed in axially shiftable relationship within the valve member and is adapted to open and close the communication between the fluid passageway and the interior of at least one expansible member. A telescopic, extensible means is also provided to impart longitudinal and radial stress to the walls of said at least one expansible member, either at the time of the container assemblage, or at a subsequent time just prior to product filling or at the time of the product filling of the container.

These and other objects of the invention will become apparent from the hereinafter following commentary taken in conjunction with the drawing.

BRIEF DESCRIPTION OF THE DRAWING:

FIG. 1 is a side view partially in cross section showing a container of this invention with the cap member exploded for purposes of clarity;

FIG. 2 is a perspective, exploded view of the interior components of the container depicted in FIG. 1; and

FIG. 3 is a view taken along the line 3—3 of FIG. 2.

DESCRIPTION OF THE BEST EMBODIMENTS CONTEMPLATED

Referring to the figures of drawing wherein like numerals of reference designate like elements throughout, it will be seen that the dispenser 2 is shown as comprising a container body 4, in the preferred form of moldable plastic, wherein the walls thereof form a neck portion 6 and an interior cavity or chamber 8 with the lower portion 10 of body 4 being configured to receive base member 12, which for purposes of illustration and as shown, is a separate member secured to the lower

portion 10 as by adhesive, electronic welding or similar such methods, especially where the base member 12 is of a plastic material as shown.

Supported from the neck 6 as by connection ribs 16, is innerset collar 18 integrally molded with the body 4 and forming a mouth opening 20, which receives the valve assembly, as will be described, in nestled relationship as shown in FIG. 1.

Cover member 22 is of the usual type having a fluid passageway 24 formed by the walls 26 thereof communicating the exterior 28 to the inlet 30, which is in communication with the valve assemblage received within the mouth 20, as will be described.

The cover 22 is also of molded plastic. The cover 22 fits onto collar 18 and is rotatable with respect to collar 18 to a locked position to prevent discharge of the flowable substances contained within the dispenser 2, as will become apparent. At this juncture, suffice to say that to obtain operability of the dispenser 2, and more specifically, actuation of the valve mechanism, the lock position prevents depression of cap 22, and more specifically the communication of inlet 30 with the valve assembly received in nestled relationship within the mouth 20.

The valve assembly 40 received within the mouth 20 of dispenser 2 comprises (in the order of assembly shown in FIG. 2) ferrule member 42 of thin wall deformable metal, aluminum for example, of generally cylindrical design having an orifice portion 44 communicating to the inlet 30 of passage 24 of cover member 22. Ferrule 42 may be within the thickness of about 0.020 of an inch so that the lower portion may be crimped or bent as shown at 46 (FIG. 1) after assembly of the valve assembly 40, as will become apparent.

Upper cylindrical portion 48 of ferrule 42 provides an interior recess 49 to receive the valve seat 50, in this instance, an annular disc of conformable rubber having a central aperture 52 to accommodate the inlet 30 of passageway 24. Ferrule 42 has a depending exterior wall 51 which as indicated earlier, becomes crimped as at 46 in later assembly. The interior configuration of ferrule 42 is adapted to receive in nestled, substantially tight relationship the remaining members of the assemblage, as can be seen in FIG. 1, and as will now be described.

A valve seating member 54 having an annular portion 56 with spaced protuberances 58 and depending portion 60 provides the manipulable component of the valve assembly, 40 to allow dispensing of flowable substances contained within the expansible member, as will be described.

The upper surface 62 of member 54, which member is axially shiftable, as will become apparent, into and out of fluid-tight relationship with the under surface 64 of valve seat 50, permits fluid or flowable substances to flow between the space projections or protuberances 58 peripherally spaced on the peripheral surface of annular portion 56. The under surface of annular portion 56 and depending portion 60 are adapted to receive coil spring 66 which coil spring acts against interior shoulder 68 of valve body member 70. It is obvious that the coil spring 66 normally positions and biases seating member 54 into the seated or closed position thereby effectively blocking fluid flow to passageway 30.

Valve body member 70 is of general cylindrical configuration having a first annular portion 72 of a size and

shape to be accommodated within the interior of ferrule member 42, and more specifically to form a rest for valve seat 50 so that it is securely positioned between annular portion 72 and the interior of ferrule member 42.

A depending, collar-like portion 74 is of appropriate size and configuration to be received within the cylindrical portion 51 of ferrule member 42. A lower, depending inner set portion 76 is also of a tubular design being provided with interior shoulder 68 which forms an abutment surface or rest against which the coil spring 66 may react. It will be noted that extending from lower portion 76 are two opposed guide or tract members 78 integrally molded with the valve body member 70 (where the valve body member is of plastic as is preferred) and that the opposed ends 80 are provided with notches 82 in opposed relationship for purposes, as will become apparent. It will also be noted that the tract member 78 adjacent the notches 82 are slightly enlarged as at 84.

The next member in the assemblage is mandrel member 86 having an upper portion 88 with opposed spring fingers 90 thereon. The mandrel 86 is of molded plastic, as are the fingers 90, but because of the material construction and their design, the fingers 90 are somewhat yieldable and spring-like. The elongate portion 92 of mandrel 86 terminates in a terminus 94 having a spherical end 96.

The mandrel component 86 is intended to be assembled into engaging relationship with the valve body member 72, and more specifically, the extending guides 78 thereof in the telescoped state. It will be noted that because of the flexibility of the spring-like fingers 90, that the mandrel 86 will be telescopically received, so as to speak, with the guide members 78, the external edges thereof forming a track-like surface against which the interior surface of fingers 90 may bear and ride along. It will be noted that because of the fingers 90, that the telescopically received mandrel 86 is not rotatable with respect to member 72, but is only longitudinally or vertically shiftable along the tracks formed by the guides 78.

The next member in the assemblage is expansible member or bladder 100 within which the fluids or flowable substances are to be contained within the chamber 8. The bladder 100 is provided with an upper flanged portion 102 forming a collar-like configuration to be received in nestled relationship within the annular portion 74 of valve body member 70. It will be noted that the general exterior configuration of the elongate portion 103 of expansible bladder 100 is uniform, having a lower portion 104 of somewhat tapered design having a thickened portion 106 formed into a receptacle-like configuration 108 to provide a snap, friction-fitting fit for the spherical end 96 of mandrel member 86. The length of the elongate portion 103 of bladder 100 will depend upon the volume of the fluid or flowable substance to be contained therein, but the general proportion as seen in FIG. 1 will generally suffice for most applications.

The expansible member or bladder 100 is preferably made of elastomeric type of material, which is impermeable to and chemically compatible with the substance to be packaged. Material such as, for example, natural latex silicone rubber, butyl, nitrile and similar such materials will be useful. The thickness of the expansible member or bladder 100 may be within the

range of about 10 to 80 thousandths of an inch, and in some instances, may be more. Preferably the membrane should be a suitable thickness depending upon end result desired, and one which has an exceedingly high memory or resilient capability to permit the membrane or member from which it is made, after distortion as by the introduction of fluid to be contained, to exert substantially high forces upon the fluid contained therein in order to aid in the dispensing of same therefrom. However, in some instances, the single bladder may be much less elastic and the utilization made of another exterior power bladder. Inasmuch as no claim is laid hereto to such an arrangement, further detail thereof will not be delved into.

The remaining component of the assemblage is snap ring member 112, which is adapted for coaction with the interior of collar 18 and being made of moldable plastic, has a first collar portion 114, which is adapted to be received in snug, nestled relationship within annular cylindrical portions 74 of valve body member 70 with the flanged end 102 of bladder 100 therebetween. The lower annular portion 116 of snap ring or collar 112 is also adapted to be received in snug engagement within ferrule member 42 and more particularly, the depending walls 51 thereof as is apparent.

Snap ring 112 has a plurality of spaced locking legs 118 integrally connected to annular portion 116 and being spaced from one another and providing a flexing or springing force to retain the components of the assemblage in secure relationship as seen in FIG. 1. To aid in this retention, each of the legs 118 is provided with an exteriorly directed flange 119 adapted to abut the lowermost edge of collar 18 of dispenser 2 as seen in FIG. 1.

Referring now to the base 12 of the container 2, it will be seen that a central portion 120 forms an interior surface 122, which is configured to act as a centering land for mandrel 86 and the lower extremity 106 of bladder 100. It will be noted that the central portion 120 has a depending, protective, annular skirt-like portion 124 spaced from the walls forming central portion 120. Central portion 120 is provided with air vents 126 which communicate the ambient atmosphere to the interior chamber 8 formed by the container body 4 and base 12. It will be noted that because the vents 126 are horizontally rather than vertically disposed, that the bladder 100 is protected from accidental rupture or the like by inadvertent contact with a sharp surface.

In assembling the container, and more specifically the components thereof, the mandrel 86 is first positioned on the guides 78 and thereafter the bladder 100 pushed into engagement so that the spherical end 96 is securely retained within the bladder portion 106 in friction-fit relationship.

Thereafter, in the preferred form, the remainder of the assemblage is made substantially as shown in FIG. 2 with the interior components all assembled in retained relationship by means of the bending or crimping of ferrule 42 and thereafter positioned within the body 4, and more specifically, the collar 18. It will be noted at this juncture that the bladder and mandrel will be in the phantom line position shown in FIG. 1.

After assemblage of the base (which incidentally may take place prior to the disposition of the assembly 40 within the body 4), the container may now be readied for filling with the product which is to be contained. As those of ordinary skill in the art will recognize, a filling

nozzle may be introduced into the orifice 44 formed by ferrule member 42 to depress valve member 54 and to allow communication into the interior of flexible bladder 100.

As product is introduced under pressure into the flexible member 100, the bladder 100 distends and billows in both horizontal and vertical direction. Continued expansion in the vertical direction will cause the telescoped mandrel 86 to be extended along the tracks 78 until such time as continued filling forces the fingers 90 over the enlarged portions 84 of the terminals 80 of guides 78 at which time they snap into locking engagement within notches 82. Obviously, where it is desired not to have the product effect extension of the mandrel 86, it may be done manually just prior to filling by leaving the base 12 off the body 4, extending the mandrel 86, and thereafter positioning the base 12 in secure fashion and then proceeding with the filling operation as would be the ordinary case. Additionally, where the base is already assembled, the mandrel may be fully extended by filling the bladder with air. Thereafter, the air is released and the bladder readied to receive the product to be stored.

There are many variations and modifications that will make themselves apparent to those of ordinary skill in the container art. All such variations and modifications will not detract from the spirit of the invention as disclosed herein, and all such deviations are intended to be covered by the appended claims.

I claim:

1. A fluid dispenser comprising the combination of: a container body and cover therefor including a fluid passageway communicating the exterior thereof to a valve member supported within said container body; at least one expansible member having an open end and a closed end and being adapted to be retained within said container body and store fluid therein; a valve sealing member disposed in axially shiftable relationship within said valve member and adapted to open and close the communication between said fluid passageway and the interior of said at least one expansible member; and telescopic, extensible means to impart longitudinal and radial stress to the walls of said at least one expansible member, said telescopic, extensible means comprising an elongate member mounted in a guide member comprising two opposed depending track-like members having opposed notches at the terminal portions thereof for longitudinal movement with respect thereto, said elongate member being provided with retaining means on one end to retain said member on said guide member and having a spherically-shaped opposed end opposite said one end adapted to be retained within said at least one expansible member, the interior extremity of said at least one expansible member being provided with a retaining means to retain said opposed end of said elongate member therein, the interior extremity of said at least one expansible member being provided with a retaining pocket to receive said spherically-shaped opposed end of said elongate member in a tight friction-fit manner, the lower portion of said guide member being provided with locking means to lock said elongate member in the extreme, extended position, and locking means comprising opposed yieldably mounted fingers, said fingers of said elongate member being biased into engagement with said opposed, depending, track-like members, locking of said elongate member in the extreme, extended position

being obtained by the coaction of said fingers being received within said notches in abutting relationship.

2. A fluid dispenser in accordance with claim 1 wherein said elongate member is adapted to extend substantially the entire interior length of said container body at the time of filling said at least one expansible member with the fluid to be stored therein.

3. A fluid dispenser in accordance with claim 2 wherein said valve member includes a valve body member having a spring receiving shoulder and said valve seating member acts thereagainst.

4. A fluid dispenser in accordance with claim 3 wherein said guide member is integral with said valve body member and depends therefrom.

5. A fluid dispenser in accordance with claim 4 wherein the bottom wall of said container body is formed by a base member.

6. A fluid dispenser in accordance with claim 5

wherein the central portion of said base member is provided with an annular receiving pocket to receive said opposed end of said elongate member with the extremity of said bladder therebetween.

7. A fluid dispenser in accordance with claim 6 wherein said base member is provided with spaced apertures communicating the interior of said container to the ambient atmosphere.

8. A fluid dispenser in accordance with claim 7 wherein said apertures are provided in an inner portion of said base member having a protective, skirt-like member therearound.

9. A fluid dispenser in accordance with claim 8 wherein said skirt-like member is integral with said base member and is formed from the bottom wall thereof.

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