United States Patent [19]

Venus, Jr. et al.

[11] **3,876,115**

[45] **Apr. 8, 1975**

[54] **DOUBLE EXPANSIBLE BLADDER CONTAINER**

[75] Inventors: **Frank Venus, Jr.**, Watertown, Conn.; **Richard E. Ruhe**, Bedford, N.H.

[73] Assignee: **Plant Industries, Inc.**, Anaheim, Calif.

[22] Filed: **Apr. 27, 1972**

[21] Appl. No.: **248,212**

[52] **U.S. Cl.** **222/183**; 222/212; 222/386.5

[51] **Int. Cl.** **B67d 5/06**

[58] **Field of Search** 222/92, 94, 95, 105, 212, 222/183, 213, 214, 386.5, 387

[56] **References Cited**

UNITED STATES PATENTS

2,109,549	3/1938	Piquerez	222/95
3,067,810	12/1962	Mozic	222/95
3,225,967	12/1965	Heimgartner	222/95 X
3,240,399	3/1966	Frandeen	222/212 X
3,361,303	1/1968	Vacuzzi	222/212
3,672,543	6/1972	Roper et al.	222/386.5 X
3,738,538	6/1973	Roper et al.	222/386.5
3,791,537	2/1974	Venus	222/105

Primary Examiner—Stanley H. Tollberg
Assistant Examiner—Larry H. Martin
Attorney, Agent, or Firm—Mahoney, Schick & Cislo

[57] **ABSTRACT**

A fluid container especially adapted for the fluid storage and dispensing of a fluid without the use of a propellant or the like. The container utilizes a first expansible bladder which is substantially compatible with the material or fluid to be stored therein and which in most instances, is fluid impervious or material impermeable. The first bladder does not materially contribute to exerting an expelling force on the material stored within and consequently, a second expansible bladder substantially coextensive with the first one is provided wherein the material from which the second bladder is constructed has a high-elastic memory so that upon the filling of a first bladder with a stored fluid, the expansion of the first bladder causes equal expansion of the second bladder to thereby exert a dispensing force upon the material or fluid stored within the first expansible bladder. A novel container utilizing the double bladder concept is also disclosed. Applications of the invention other than containers are also disclosed.

38 Claims, 6 Drawing Figures

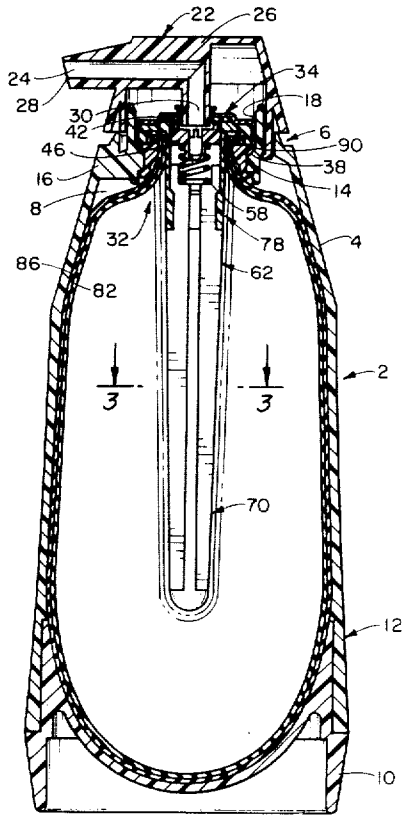


Fig. 1.

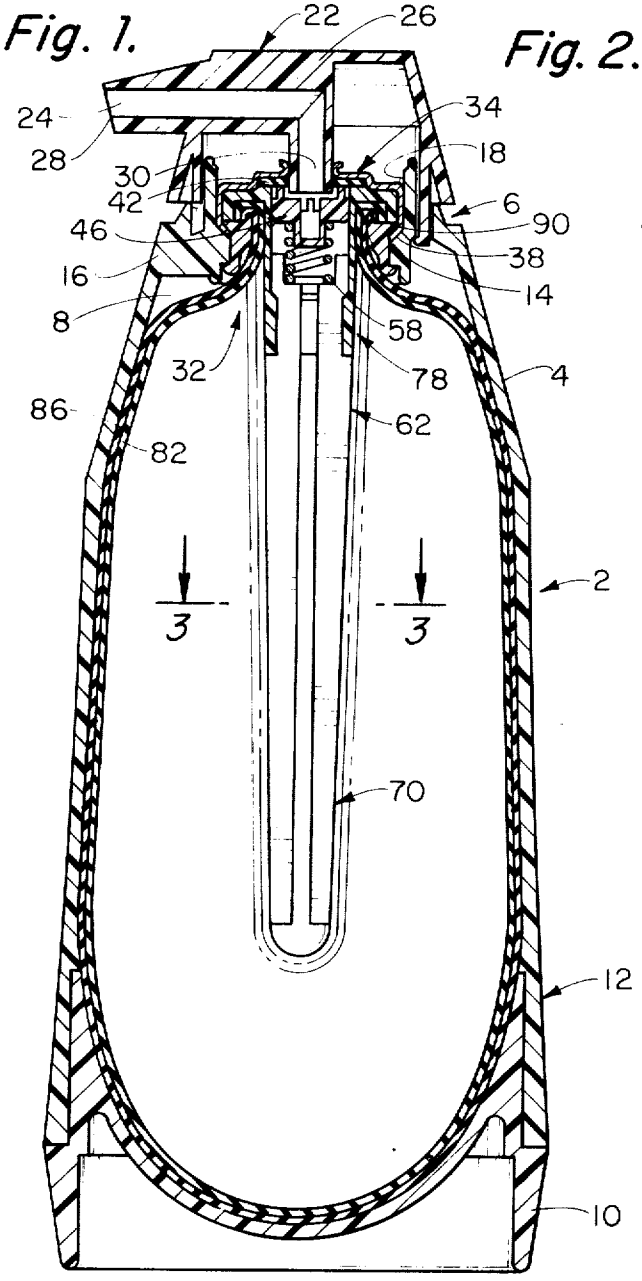
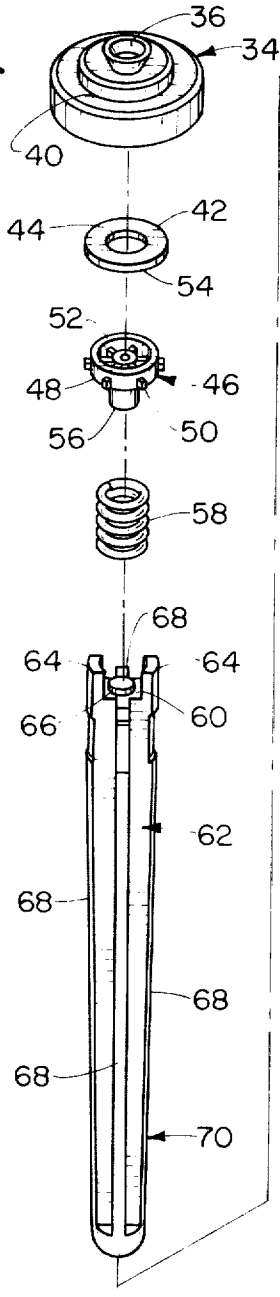


Fig. 2.



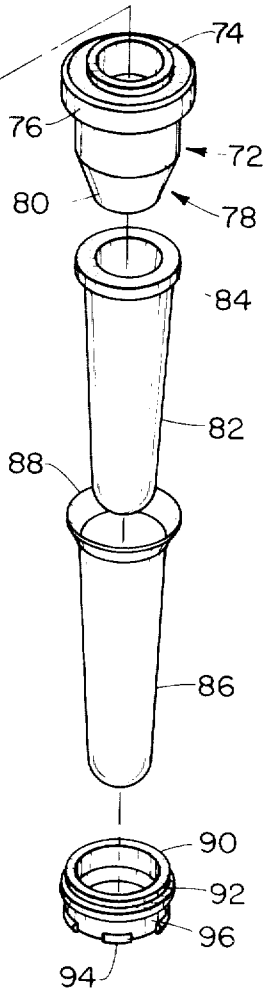


Fig. 3.

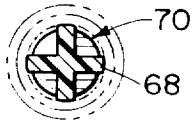


Fig. 4.

Fig. 5.

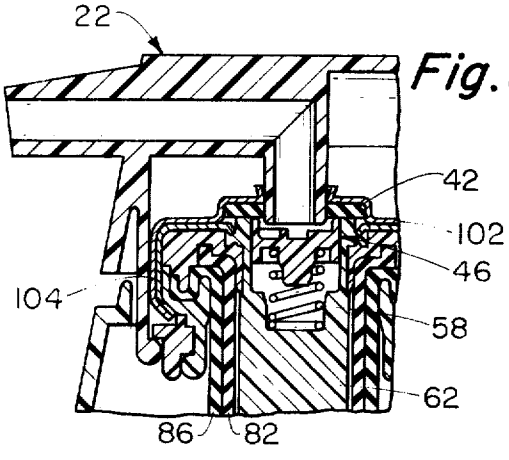
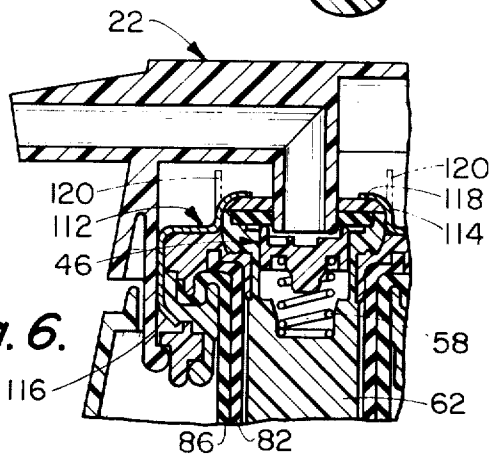


Fig. 6.



DOUBLE EXPANSIBLE BLADDER CONTAINER

BACKGROUND OF THE INVENTION

The use of expansible membranesor bladders for the storage and dispensing of fluids, especially viscous ones, has been suggested hereinbefore in order to replace the ubiquitous aerosol container. The reason for wanting to replace the aerosol-type dispenser is because of the health hazard that these containers present. Firstly, there is some medical evidence to indicate that a number of people are afflicted with serious asthmatic or other traumatic attacks from the inhalation of the fluoro hydrocarbons normally utilized as propellants.

Secondly, the high pressures under which the aerosol containers are put present safety hazards, especially once the consumer product contained within the containers has been expelled. Thus, heating or incineration of the aerosol containers have resulted in mishaps due to the resultant explosions.

However, in some of the containers that have been proposed that obviate the use of a propellant such as the fluorinated hydrocarbons, it has not always been possible to store a fluid for a prolonged period of time without the deleterious results to the effective functioning of the dispenser. It has been difficult to match the material or fluid to be contained with the particular bladder or expansible membrane which was to contain the fluid or material. In many instances, it was possible to obtain compatibility with the product to be stored but the compatibility was short-lived or did not provide the necessary expelling force to the fluid or material contained in the dispenser.

In the storage of fluids, it is necessary for obtaining an effective dispenser to not only provide an impermeable boundary or barriers for the fluid to be stored, but also to provide a force acting upon the fluid which will effectively dispense it from the container over the life of the product.

Hence, in dealing with containers of the expansible bladder type, the most important parameters to be considered are permeability of the product and elasticity or elastic memory of the bladder sufficient to be able to provide an expelling or dispensing force even after the expansible bladder has contained the fluid to be stored over a prolonged period of time. In most instances, where the bladder would satisfactorily retain the fluid therein, it was found that after a short period of time, the bladder took a set and could no longer exert the necessary force upon the stored fluid to exert a dispensing force thereon. In other instances, where the bladder had high-elastic memory and thus would not take an undue set, it was found that its resistance to permeability was not effective for many products or components thereof.

With the herein-disclosed dispensers of this invention, many of the above-described shortcomings have been overcome and there is provided a dispensing container wherein a double bladder combination is utilized wherein the first bladder to contain the fluid is highly compatible with and is substantially impervious to the material or fluid to be stored and the second bladder substantially coextensive with the first bladder, has high-elastic memory not subject to taking a physical set which would impair its ability to exert a dispensing force on the fluid stored within the first expansible bladder.

Additionally, a container is provided which is easily assembled and which utilizes a valve and a container construction which permits sub-assembly of many of the components of the containers of this invention, prior to the complete assemblage of the total dispenser.

OBJECTS AND SUMMARY OF THE INVENTION

It is an object of this invention to provide a fluid dispenser of the expansible member type.

It is another object of this invention to provide a fluid dispenser of the expansible member type wherein substantially long shelf life is given to the product to be stored.

It is still another object of the invention to provide a fluid dispenser of the expansible member type utilizing an unique assemblage of valve components.

It is still a further more specific object of the invention to provide a fluid dispenser of the expansible member type utilizing a first expansible member of substantially impermeable character and a second expansible member having a high degree of elastic memory.

It is still another and further specific object of the invention to provide a fluid dispenser of the expansible member type utilizing a double bladder construction wherein a first bladder, within which the fluid or material is to be stored has high compatibility therewith.

It is still another and further more specific object of the invention to provide a fluid dispenser of the expansible member type wherein a double bladder or expansible membrane construction is utilized, the second membrane being substantially coextensive with the first membrance and having a high degree of elastic memory but a high permeability to most fluids and materials

It is still a further and specific object of the invention to provide a fluid dispenser of the expansible member type utilizing a double bladder construction wherein the first bladder, which stores the fluid, is of a butyl-type elastomer and the second member which exerts dispelling forces upon the stored fluid in the first bladder, is of a latex-type elastomer.

It is still an even further more specific object of the invention to provide a container to store fluids utilizing a double bladder construction wherein the bladders are chosen for specific end functions and cooperation with one another to effectively store and dispense fluids having a myriad of properties.

It is still another and even further specific object of the invention to provide a container to store fluids which permits sub-assembly of several of the major components thereof to be readied for complete assembly into an assembled container.

These and further objects of the invention will become apparent from the disclosure and the drawings contained herein.

Generally, in an exemplary embodiment, the dispenser of this invention pertains to a container to store fluids having a first conformable member adapted to hold fluids therein and having the ability to resist molecular or other fluid migration therethrough. A second conformable member is juxtapositioned to and substantially co-extensive with said first member and has an elasticity thereof sufficient to exert an expelling force on the stored fluid and to drive same from said first member.

In a more specific exemplary embodiment, a fluid dispenser is contemplated 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. A valve member; a first expansible member of fluid impermeable character having an open end and a closed end, the diameter approximate said open end being larger than the diameter of said closed end with said first expansible member being adapted to be retained within said container body and store fluid therein. A second expansible member, coextensive with and exteriorly disposed to said first member in juxta relationship, is also provided. A valve seating member is disposed in axially shiftable relationship within said valve member and is adapted to open and close the communication between said fluid passageway and the interior of said first expansible member. A mandrel is provided within said first expansible member forming dispensing flow paths for fluid to be stored within said first expansible member and exerting pretensioning upon said first and second expansible members. The second expansible member overlying said first expansible member has a high elastic memory and is conformable with said first expansible member when same is filled with a fluid and exerts a dispensing force thereon to expel said fluid when said valve seating member is unseated.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is a side view, in partial cross-section, of one of the fluid dispensers of this invention;

FIG. 2 is an exploded view of the essential interior components of the fluid dispenser shown in FIG. 1 illustrating their order of assembly;

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a partial, cross-sectional view of another mandrel member that may be utilized in lieu of that shown in FIGS. 1 and 3 and as would be taken along the line 3—3;

FIG. 5 is a fragmented view, in cross-section, of another embodiment of a container of this invention; and

FIG. 6 is a fragmented,cross-sectional view of still another embodiment of a container of this invention.

DESCRIPTION OF THE BEST EMBODIMENTS CONTEMPLATED:

Referring to the drawings wherein like numerals of reference designate like elements throughout and referring specifically to FIG. 1, a dispenser 2, one of the several embodiments of the invention, 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 bottom interior wall thereof being formed by a base 10 thereby forming an enclosed physical barrier or container 12 for purposes which will become apparent as the description proceeds herein.

Supported on neck 6 is collar member 14 integrally molded and connected as by connection ribs 16 and forming a mouth opening 18 which receives a 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 18 as will be described.

The cover 22 is of molded plastic and fits onto the collar 16 and is rotatable with respect thereto into a locked position and oppositely rotatable to an open position. Suffice to say that in order to obtain operability of the dispenser 2, and more specifically actuation of the valve mechanism, the locked position prevents depression of the cap 22 and more specifically the communication of inlet 30 with the valve assembly received in nestled relationship within the mouth 18. Other forms of cover members are also contemplated.

The valve assembly 32 received within the mouth 18 of the dispenser 2 comprises, (in the order of assembly shown in FIG.2) ferrule member 34 of thin wall deformable metal, aluminum for example, of generally cylindrical design having an orifice portion 36 communicating to the inlet 30 of passage 24 of cover member 22. Ferrule member 34 may be within the thickness of about 0.020 of an inch so that the lower portion thereof may be crimped or bent as shown at 38 (FIG. 1) after assemblage of the valve assembly 32 as will become apparent.

An upper portion 40 of cylindrical configuration provides an interior recess to receive the valve seat 42 in this instance, an annular disc of conformable rubber, having a central aperture 44 to accommodate inlet 30 of passage 24. Ferrule 34 has a depending exterior wall which as indicated earlier, becomes crimped as at 38 in later assembly. The interior configuration of ferrule 34 is adapted to receive in nestled, substantially tight relationship, the remaining components of the assemblage as can be seen in FIG. 1 and as will now be described.

A valve seating member 46 having an annular portion 48 with spaced protuberances 50 provides the manipulable component of the valve assemblage 32 to allow dispensing of flowable substances contained within the dispenser 2 as will become apparent. The upper surface 52 of member 46, which member is axially shiftable as will become apparent, into and out of fluid-tight relationship with the under surface 54 of valve seat 42 permits fluid or flowable substances, to flow between the spaced protuberances or projections 50 peripherally spaced on the exterior surface of annular portion 48.

The under surface of annular portion 48 and depending portion 56 are adapted to receive in cooperation, coil spring 58 which coil spring acts against the upper surface 60 of the mandrel 62 having upstanding opposed projections 64 at the upper portion thereof to captively hold coil spring 58.

To effect proper positioning of coil spring 58, a button protuberance 66 may be provided on the surface 60 of mandrel 62. It should be obvious that the coil spring 58 normally positions and biases seating member 46 into the seating or closed position with respect to valve seat 42 thereby effectively blocking fluid flow to passageway 30.

Mandrel member 62, in this instance, may be of molded plastic and is cruciform in cross-section (FIG. 3) having the ribs 68 symmetrically arranged thereby forming flow paths 70 therebetween to allow for fluid or material flow into (during the filling operation) and from within the expansible member through the valve assemblage 32 into the inlet 30 and ultimately through the outlet 24 formed by cap member 22. The mandrel 62 is just slightly longer than the expansible members making up the containers of this invention, but not so long as to extend the entire length of the chamber 8 formed by body 4 and base 10 of the dispenser 2. Other lengths may be useful.

The next component valve body member **72** is of general cylindrical configuration having a first annular portion **74** providing an abutment or stop upon which valve seat member **42** is supported. A next cylindrical but larger portion **76** is of depending skirt configuration having a tubular depending extension **78** with a tapered end portion **80.** It will be noted that the valve body member **72** is of a size to be received within the interior of ferrule member **34** and forms with the depending collar portion **76,** a means to receive the open upper ends of the expansible members in fluid-tight relationship as shown in FIG. **1.**

The first expansible bladder or membrane **82** is of a material which is compatible with the fluid or material to be stored therein and generally will be of butyl-like elastomer which is highly impervious to the materials to be stored therein. It will be noted that the upper flange portion **84** is substantially square in cross-section and is tightly received within the depending collar **76** of valve body member **72.** The second expansible bladder or membrane **86** is generally slightly larger than the first expansible member **82** and has an upper flanged portion **88** which is slightly larger than the flanged portion **84** and is of a different shape. That is, the upper flange **88** is of frusto-conical configuration so as to be received within the sinuosity formed between the valve body member **72** and the locking ring **90.** Other fluid-tight arrangements are possible.

The locking ring **90** also of molded plastic, is generally collar-like in configuration having a first collar portion **92** adapted to be received in snug, nestled relationship within the collar **14** of dispenser **2** in a snap-action fitting manner. It will be noted that the upper portion **92** of snap ring member **90** is adapted to retain the flanged portions **88** and **84** of expansible membranes **86** and **82** respectively and to do so while being received in snug engagement within ferrule member **34** and more particularly the depending walls of which are eventually crimped to form a rigid assemblage as shown in FIG. **1.**

Snap or locking ring **90** has a plurality of spaced locking legs **94** on the lower collar portion **96** which member is formed of a deformable plastic and which is received as earlier indicated, within the collar **14** in friction-fit, snug relationship.

There are other embodiments of the invention which will now be described which provide for an effective fluid dispenser as functional as the one just described. For example, the mandrel member previously described need not be cruci-form in cross-section but may be oval in cross-section as illustrated in FIG. **4.** It has been found that ribs or grooves or other such means, are not necessary to form fluid paths for the materials to be dispensed within the confines of the first bladder **82.** Thus, the elasticity or resilience of the second bladder **86** substantially coextensive with the first expandible bladder **82,** will create a dispensing force tending to drive the fluid along the extent of the oval mandrel.

Another embodiment is as illustrated in FIGS. **5,** and **6** utilizing slightly different construction. For example, referring now to FIG. **5** it will be seen that a secondary ferrule member **102** is utilized in the structure wherein there is permitted the assemblage of sub-assemblies prior to assembly into the final assembly of the dispenser. In this instance, the order of assembly, as for example shown in FIG. **2,** is somewhat different. The outer or second bladder **86** is assembled with the snap ring **90** to comprise one sub-assembly and the first bladder **82** is combined with the valve body member **72.** The snap ring with the positioned second or outer bladder is then joined in cooperative relationship with the valve body member **72** by means of secondary ferrule **102** which is crimped at the lower portion **104** thereof to provide the sub-assembly. Thereafter, when complete assembly is contemplated, the mandrel **62** is driven into the bore of the valve member and assumes the locked relationship shown thereby pretensioning and extending the first and second bladders **82** and **86** respectively, and thereafter the coil spring **58,** valve actuator **46** and valve seat **42** are positioned within the ferrule **34** and the outer ferrule crimped over at the lower portion thereof as shown in FIG. **5** to securely position and join all of the elements in cooperative relationship.

Referring now to FIG. **6** there is shown a construction which does not utilize a secondary ferrule member but instead a ferrule member **112** is utilized which has an open upper portion **114** shown in dotted line with a lower portion configured substantially as earlier described for ferrule **34.** In this instance, however, the order of assembly is that the mandrel **62** is snapped into a temporary locked position after the first and second bladders, locking ring and valve body are assembled and held together with the ferrule **112** being thereafter crimped as at **116.** The valve spring **58,** valve actuator **46** and valve seat **42** are thereafter positioned in place along with a plastic annular cap member **118** which forms the upper abutment surface for valve seat **42** and thereafter the upper portions **120** of ferrule **112** are bent over and crimped as shown in full line of FIG. **6.**

It should be understood that the specific structures described hereinabove, may be varied considerably with respect to individual components utilized and their specific design and configuration modified as those of ordinary skill in the art will recognize without departing from the spirit of the invention. Thus, many alternatives and modifications will suggest themselves and indeed all are contemplated so long as the essence of the invention is adhered to. The particularly important aspects of the invention will now be considered in some detail.

THE FIRST OR INNER BLADDER

While there are a great many chemical formulations from which this member may be made, it is not only important to consider the impermeability of the material with respect to fluids or other substances which it will eventually contain, but also its overall compatability. By compatability is meant the ability of the formed membrane or bladder to store fluid for an acceptable shelf-life period without permitting migration or permeation of the fluid therethrough and to remain inert and substantially unaffected by the contained fluid. Additionally, it is important that the end material be capable of functioning in a manner to produce an effective overall container.

For example, the first or inner membrane must not only be impermeable, it must also meet certain other criteria for effective use in a container of the type embraced by this invention. The material must be able to have a substantial ability to expand and contract without bursting; must be able to have some degree of elasticity and generally must meet the criteria necessary to

satisfactorily perform in the manner as disclosed herein.

While a butyl-type elastomer, polymer or copolymer has the lowest permeability, it may not always be the most satisfactory when considering other factors. For example, butyl has a low permeability to most products, but is not necessarily compatible with some as for example, alcohol and oil. For example, chloro-butyl, while not as satisfactory as butyl with regard to permeability, is easier to use and in some instances, much more desirable than the butyl polymer without the chloro radical. Permeability to fluids may be determined by acceptable test procedures sch as ASTM D814-55.

In any event, notwithstanding some of these properties, it is important that the inner bladder, which contains the fluid or material to be stored, meet certain minimum criteria so as to be able to function satisfactorily in containers of the type herein under discussion.

For example, it has been found that the wall thickness of the formed bladder may be within the range of about 0.040 to 0.060 inch and that the material used should also be capable of producing a bladder that is compatible with the material to be stored and should have a modulus of about 300 at 500 percent elongation. Additionally, it should have an ultimate tensile of about 2000 psi plus or minus 200 with an elongation factor of at least 850 percent which includes a satisfactory safety factor. The set that the material takes after standing, should not be more than about 20 percent although this of course, will vary depending upon the ultimate elasticity or elastic memory of the butyl-like material used and to some degree is influenced by the material used for the second or primary power bladder which furnishes the majority of the force used to dispense the stored product. These parameters may be easily determined utilizing accepted ASTM procedures, modified where necessary to meet the circumstances.

If undue set occurs, folds and/or wrinkles will form in the inner membrane making it difficult, if not impossible, to dispense the fluids contained within these folds. This undesirability is manifest. Volume expansion of the formed bladder should be at least 800cc and the S_2/S_0 should be at least 22. (S_2/S_0 refers to the thin film or bubble burst test that is applied to a section of the membrane. The so-called S_2/S_0 for the mebrane itself varies over the entire surface area of the expanded membrane. Values may range from 0.8/1 to 15.0/1. The relationship is determined by "gridding" or stamping the unexpanded membrane surface with squares 0.1 in width × 0.1 in length and measuring the sidth and lengths in various sections at different degrees of inflation. The primary objective of this type of test is to determine uniformity of expansion over the entire area and also the shape or profile for various volumes). All of the foregoing parameters are applicable for an ultimate container of the 8 ounce size variety. Obviously, some of the foregoing parameters will change depending upon the ultimate size of the container desired and are merely given for guide purposes.

The foregoing physical constants are determined for the most part, as previously indicated, according to accepted testing procedures utilizing for example, the Scott Test Procedures in order to determine the modulus, tensile and elongation factors, whereas the S_2/S_0 and volume test are determined by the thin-film burst tests as outlined in High Polymer Latices, D.C. Blackley, Palmerton Publishing Co., New York, Vol 2. Chapter VIII, Section 17.3.2.

Other types of butyl-like elastomers will also suggest themselves with respect to the ultimate end uses to which they are to be put. For example, where a food product, or the like, is intended to be the material or fluid to be contained in the first bladder, FDA approval must be available and where other products are contemplated that have a deteriorating effect upon the more commonplace butyl-elastomers, other compounds such as nitrile rubber, neoprene and the "Vitons" may be resorted to. In each of these instances, however, the basic physical properties as outlined hereinbefore, should be followed in order to have the most satisfactory container combination possible. In most instances, the butyl-like bladder or membrane will be molded as opposed to dip formed, but obviously where the materials from which the first or inner membrane is made, can meet the afore-described criteria, it matters not what manufacturing procedure or processes are employed. Additionally, while a specific polygonal configuration for the membrane has been illustrated, other shapes are indeed possible.

THE SECOND OR LATEX-TYPE MEMBRANE

The materials that are most suitable for the manufacture of the second or outer membrane, are the latex-type compounds. Undue regard need not be made with respect to permeability. However, the selected material should be of the type that closely approximates the basic physical consideration and parameters outlined above for the inner membrane or bladder, and in addition, one important criterion. This salient factor is that of elasticity or elastic momery. Elasticity must be such that the second member or membrane will always retain a sufficient tendency to return to its original, natural or unfilled state, so as to be capable of exerting dispensing forces upon the material contained within the first or inner membrane. For an 8 ounce size container, it is most desirable that the initial force exerted by the outer bladder or membrane, be in the area of about 15 psi with a final force factor of about 9 to 10 psi. It is, of course, obvious that at the initial period of shelf life of a recently-filled container, the inner membrane will help contribute some of the dispensing force which, depending upon the material utilized, will dissipate over a period of time because of the poor elastic memory of some of the butyl-like elastomers.

The second or outer membrane should have a modulus of about 500 or more at 500 percent, and a tensile strength of roughly 3000 to 5000 with an elongation factor within the range, of avout 750–1000. The volume test should be at least not below 600cc and preferably about 800cc at a 14 psi pressure. The $S2/S_0$ ratio should desirably be in the 25–35 range at a stress factor of about 7000 to 14000.

It has been found that most materials of the natural latex-type, natural or otherwise, will give the characteristics outlined above, wherein the wall thickness of the bladder lies within the range of about 0.030–0.090 inch. In most instances, an improved performance bladder is obtained by double or even triple dipping allowing the individual coats of material to dry or cure between dippings. That is not to say, however, that other materials that are moldable and still meet the foregoing criteria, will not suffice as indeed many other such materials will perform satisfactorily.

COOPERATIVE PARAMATERS

With respect to the first or inner bladder and the second or outer bladder, it is important that the physical relationship be maintained. Thus, while specific polygonal configurations of the bladders have been illustrated, other configurations are indeed possible just so long as the two members are substantially coextensive and preferably congruent in configuration and the following relationships be maintained.

The outside diameter of the first or inner bladder should be such as to combine with the second bladder in nesting relationship so that sufficient contact at the interface therof is obtained in order to ensure simultaneous distention and extension of the bladders during the filling process. Relative movement between the physically assembled first and second bladders, at the interface thereof, should be curtailed and avoided if possible, to eliminate the possibility of rupturing or localized overstressing of one bladder with respect to the other.

It is also important that the respective dimensions of the bladders be such that there is no excess or surplusage of material at the interface formed by the exterior of the first bladder and the interior of the second or outer bladder. The avoidance of the excess or surplusage prevents wrinkling of the bladder at the interface and eliminates the possibility of entrapment of fluid or material which is to be stored in the container in the voids and cavities of the wrinkles which would be produced by having oversized bladders and which formation would occur during the filling process. In order to aid in the correct interface condition formation, a friction-reducing material is preferably placed on either the exterior surface of the first or inner membrane or on the inside surface of the second or outer membrane. Such materials may comprise cornstarch, calcium carbonate, finely ground corn cobs or any of the other known such desiccant-type materials.

The specific configuration of the upper portion or extremities of the bladders is important with respect to the prevention of relative movement and displacement thereof with respect to one another, and with respect to the valve assembly with which they are assembled. For example, it will be noted that the first or inner bladder membrane, is provided with an upstanding flange of relatively square cross-section whereas thhe latex-type bladder or membrane is provided with a frustoconical upper extremity, all of which ensures satisfactory performance of the double bladder containers of this invention. Other modes are contemplated.

While the invention has been specifically described as it relates to non-aerosol-type containers, it is of course obvious that the basic idea of containing a substance in an impervious first member and having a second member coextensive therewith to exert dispensing forces on the stored material for one reason or another, has broader application as might be found in pressure accumulators, storage tanks, and other similar applications. All such applications will follow the spirit and essence of the invention as disclosed herein and are intended to be covered by the appended claims.

Using the criteria for the containers of this invention and specifically the disclosure directed to the FIG. 1 embodiment, a plurality of containers were fabricated and satisfactorily tested with various products from water to heavy viscous fluids such as hand creams. One such container is described below.

EXAMPLE I

A butyl-type elastomer from WARCO, a fabricator of elastomeric products, and specifically designated WARCO 5P-8A, was utilized to fabricate a first or or inner bladder using conventional molding techniques. The thickness of this member was 0.038 inch.

A second bladder or member was fabricated using a multi-dip process from a latex-type elastomer from Uniroyal Co. product designated Nat. 5085.

These materials produced bladders having the following characteristics:

	Modulus 500% PSI	Tensile PSI	Elong. %	VOLUME TEST Membrane PSI	Membrane Vo=5ml V —ml	Bubble S_y/S_o	Bubble Stress
BUTYL	307	2123	937	7.0	745	23.2	3940
LATEX	418	4370	843	14.0	1160	27.9	12,630

These bladders performed satisfactorily for most products tested having an acceptable shelf life and level of performance.

Thus, there has been disclosed unique containers for a myriad of products wherein the products are dispensed without the use of propellants of the conventional type.

We claim:

1. A non-aerosol container having an outer, substantially rigid exterior body to store fluids having a first inner conformable resilient member adapted to hold fluid therein and having the ability to resist molecular or other fluid migration therethrough; a second outer conformable member in the unstressed, unfilled state being substantially congruent in configuration to, juxtapositioned and contacting said first inner member at the interface formed by the exterior walls of each of said first and second members and having an elasticity thereof sufficient to exert an expelling force on the stored fluid and to drive same from said first member, each of said first and second members having an open end and a closed end, said first member being nested within said second member.

2. The container in accordance with claim **1** wherein said first member is fabricated of a material that is compatible with the fluid to be stored.

3. The container in accordance with claim **2** wherein said first member is inert to the stored material and comprises a butyl-type elastomer and said second member is fabricated of a latex-type elastomer having high elastic memory.

4. The container in accordance with claim **2** wherein the force exerted by said second member is sufficient to expel substantially all of stored fluid.

5. The container in accordance with claim **4** wherein the wall construction of said second member is of mul-

ti-layered construction and the wall construction of said first member is of integrally molded construction.

6. The container in accordance with claim 5 wherein in the normal unfilled state said first member is of smaller size to nest within said second member.

7. The container in accordance with claim 6 wherein the wall thickness of said first member lies within the range of about 0.040 to 0.060 inch.

8. The container in accordance with claim 7 wherein the wall thickness of said second member lies within the range of about 0.030 to 0.070 inch.

9. The container in accordance with claim 6 wherein a layer of friction reducing material is positioned at said interface to facilitate nesting of said first and second members.

10. The container in accordance with claim 9 wherein the upper portion of said first member is provided with a flange of relatively square cross-section.

11. The container in accordance with claim 10 wherein the upper portion of said second member is provided with a frusto-conical configuration.

12. The container in accordance with claim 11 wherein said first and second members are prestressed prior to filling with said fluid to be stored.

13. The container in accordance with claim 12 wherein said first and second members are longitudinally and radially stressed.

14. A non-aerosol fluid dispenser comprising the combination of: a substantially rigid container body and cover therefor, including a fluid passageway communicating the exterior thereof to a valve member supported within said container body; a valve member; a first inner resilient expansible member of fluid impermeable character having an open end and a closed end, the diameter proximate said open end being larger than the diameter of said closed end, said first expansible member being adapted to be retained within said container body and store fluid therein; a second outer expansible member in the unstressed, unfilled state being substantially congruent to, coextensive with and contacting said first member in juxtarelationship and having an open end and a closed end, said exterior walls of said first and second members being in substantial contact and forming an interface substantially coincident with said first and second members; a valve seating 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 first expansible member; a mandrel within said first expansible member forming a dispensing flow path for fluid to be stored within said first expansible member and pretensioning said first and second expansible members and said second expansible member overlying said first expansible member having high elastic memory and being conformable with said first expansible member when same is filled with a fluid exerting a dispensing force thereon to expel said fluid when said valve seating member is unseated.

15. The fluid dispenser in accordance with claim 14 wherein said mandrel and said first and second expansible members are about coextensive in the unfilled state.

16. The fluid dispenser in accordance with claim 15 wherein said first expansible member is compatible with and substantially impermeable to said fluids to be stored therein for a sufficient time to provide an acceptable shelf life.

17. The fluid dispenser in accordance with claim 16 wherein said first and second expansible members are retained in secured relationship proximate their upper portions.

18. The fluid dispenser in accordance with claim 17 wherein the upper portion of said second member terminates in a frusto-conical configuration.

19. The fluid dispenser in accordance with claim 18 wherein the upper portion of said first expansible member terminates in a flange of substantially square cross-section.

20. The fluid dispenser in accordance with claim 19 wherein said first and second expansible members form a substantially smooth interface therebetween.

21. The fluid dispenser in accordance with claim 20 wherein said first expansible member comprises a butyl-like material.

22. The fluid dispenser in accordance with claim 21 wherein said second expansible member comprises a latex-like material of relatively high elastic memory.

23. The fluid dispenser in accordance with claim 19 wherein said mandrel is cruci-form in cross-section.

24. The fluid dispenser in accordance with claim 19 wherein said mandrel is oval in cross-section.

25. The fluid dispenser in accordance with claim 19 wherein said valve member includes a valve body member having a valve seat and said valve seating member acts thereagainst to close said communication between said fluid passageway and the interior of said first expansible member.

26. The fluid dispenser in accordance with claim 25 wherein said valve seating member is normally spring biased into the closed position.

27. The fluid dispenser in accordance with claim 26 wherein said mandrel has a plurality of spaced grooves extending substantially the length thereof and the upper portion is adapted to form fluid paths for the fluid stored in said first expansible member to said fluid passageway.

28. The fluid dispenser in accordance with claim 27 wherein said valve seating member comprises an annular head with spaced peripheral protuberances thereabout, and a depending spring centering portion limits the downward movement thereof by abutting an upper surface of said mandrel.

29. The fluid dispenser in accordance with claim 28 wherein said spring is coil-shaped and is positioned to react against the under surface of said annular head and the upper surface of said mandrel.

30. The fluid dispenser in accordance with claim 29 wherein the upper surface of said head forms a sealing lip to engage the under surface of said valve seat in fluid-tight relationship.

31. The fluid dispenser in accordance with claim 30 wherein said valve seat and valve body member are received in nestled relationship by a ferrule member of deformable character and said valve seat is a disc of conformable material having an annular passageway of the same size as said fluid passageway and communicating thereto.

32. The fluid dispenser in accordance with claim 31 wherein said disc is retained in position with said valve body member by said overlying ferrule member and said ferrule member has an aligned aperture accommodating said fluid passageway and said annular passageway.

33. The fluid dispenser in accordance with claim 32 wherein the open ends of said first and second expansible members are retained in fluid-tight relationship in the assembly and a locking collar member received within said ferrule member is adapted to engage the interior wall of said container body and position the assembly within the neck of said container body with the coaction of said ferrule member.

34. The fluid dispenser in accordance with claim 30 wherein the open ends of said first and second expansible members are received by the lower portion of said valve body member and said valve seat and valve body member are received in nestled relationship by a ferrule member of deformable character to form an assembly and said valve seat is a disc of conformable material having an annular passageway of the same size as said fluid passageway and communicating thereto and the neck of said container body is adapted to support said assembly and expansible members in retained, fluid-tight relationship.

35. The fluid dispenser in accordance with claim 34 which includes a snap ring member received within said ferrule member with said open ends of said expansible members being retained in fluid-tight relationship therebetween and is adapted to engage the interior wall of said container body and position the assembly within the neck of said container body with the cooperation of said ferrule member in locked relationship.

36. The fluid dispenser in accordance with claim 35 wherein the depending wall portion of said valve body member and the opposed exterior surface of said snap ring member forms a sinuousity within which the open end of said second expansible member is received in retained relationship.

37. The fluid dispenser in accordance with claim 36 wherein a secondary ferrule is disposed within said ferrule member and engages the upper portion of said mandrel member and lateral contiguous portions of said valve body member and the lower portion of said snap ring member to form an initial sub-assembly prior to insertion into nested relationship with said ferrule member.

38. The fluid dispenser in accordance with claim 35 wherein the upper surface of said mandrel forms a receiving recess for said valve seat and is retained therein by an annular retaining member disposed between it and an upper crimped over portion of said ferrule member.

* * * * *