

### [54] FLOWABLE SUBSTANCES DISPENSER

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[58] Field of Search .... **141/23, 24, 25, 27; 222/94, 222/95, 105, 107, 183, 211, 212, 213, 386.5**

[56]

### References Cited

#### UNITED STATES PATENTS

3,317,090	5/1967	Meshberg .....	222/386.5
3,361,303	1/1968	Jacuzzi .....	222/212 X

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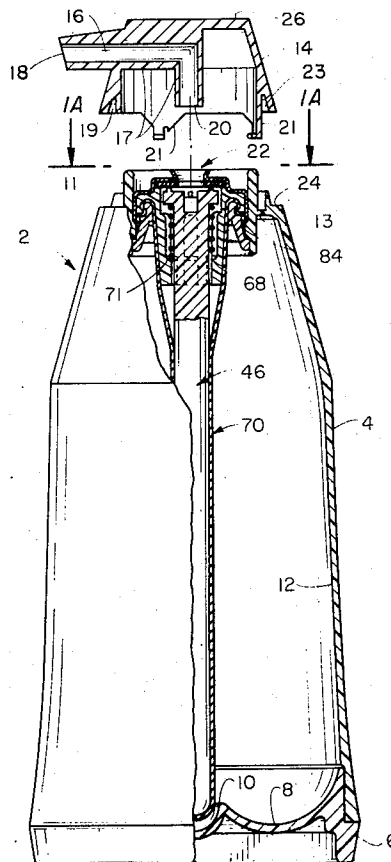
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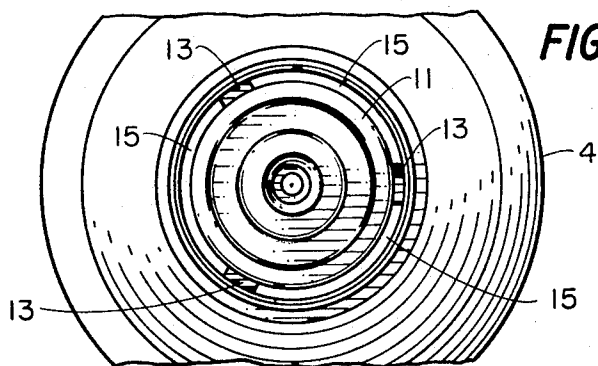
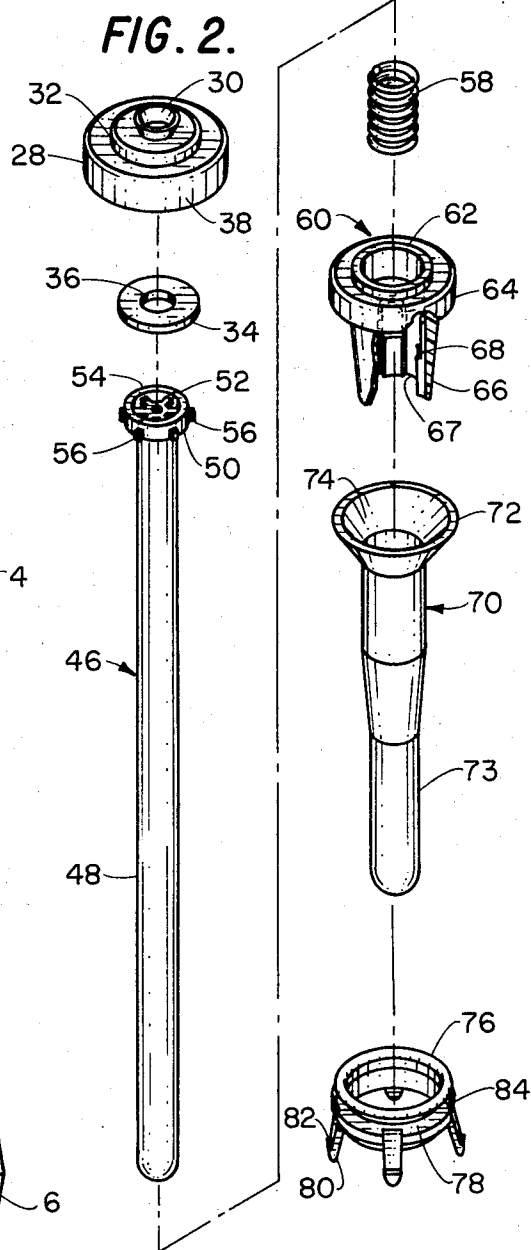
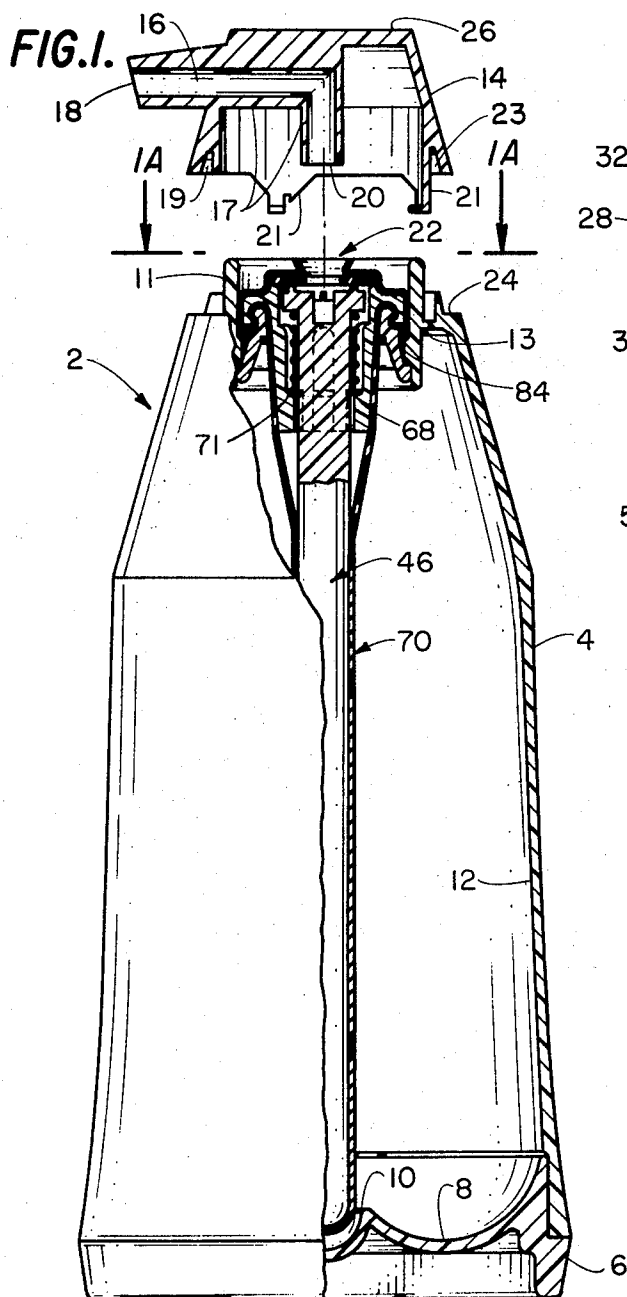
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### ABSTRACT

In a fluid dispenser of the expansible member or bladder type wherein the memory of the material furnishes the dispensing force, a unitary mandrel and valve closure member acts to pretension the expansible member and to act as the valve closure, the axial movement of which permits the fluid contained within the expansible member to be dispensed.

**11 Claims, 3 Drawing Figures**





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## FLOWABLE SUBSTANCES DISPENSER

## BACKGROUND OF THE INVENTION

This invention pertains to fluid dispensers utilizing expandible members, of elastic materials, which are pretensioned in a manner that fluids such as viscous liquids, pastes and the like contained within the expandible members are dispelled therefrom without the necessity of utilizing propellants of the aerosol type.

Dispensers of the general type referred to above and particularly of the type disclosed in U.S. Pat. No. 3,361,303 to Jacuzzi, have had shortcomings associated with the dispenser structures.

One of the serious drawbacks in the prior art dispensers of this type has been in the fact that separate mandrel or stem and valve closure components have been required leading to serious drawbacks with respect to manufacturing techniques, assembly of the dispensers and performance in use. A mandrel or stem is necessary in dispensers utilizing expandible members or bladders in order to exert pretensioning forces, specifically radial and longitudinal, thereon.

Some of the prior art structures utilizing such stems have the expandible members rigidly secured thereto thereby requiring that the stem or mandrel be relatively stationary and immobile thereby requiring a separate closing and opening mechanism wholly independent of the mandrel or stem.

With the herein disclosed invention, a dispenser of the expandible member type utilizing a mandrel or stem, which is integral with a closing element, is axially movable with respect to the expandible member thereby producing a fluid dispenser obviating the afore-alluded to shortcomings of the prior art structures.

## OBJECTS AND SUMMARY OF THE INVENTION

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

It is another object of this invention to provide a fluid dispenser of the expandible member type utilizing a unitary mandrel or stem and valve closing structure.

It is still another object of the invention to provide a fluid dispenser of the expandible member type wherein a single unitary structure performs the functions of mandrel and closing member.

It is still a further more specific object of the invention to provide a fluid dispenser of the expandible member type wherein a unitary structure provides a mandrel and closing element in combination with a unique valve closure structure.

It is still another and further specific object of the invention to provide a fluid dispenser of the expandible member type wherein the mandrel and closure element are of unitary construction and are axially movable within the expandible member of bladder.

It is still an even more and further object of the invention to provide a dispenser of the expandible member type utilizing a valve closure structure of unique design and configuration.

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

Generally, in an exemplary embodiment, the invention pertains to a fluid dispenser comprising the combination of a container body and cover therefor, including a member having a fluid passageway communicating the exterior thereof to a valve member, said valve member communicating to an expandible member adapted to store fluid therein and be retained within said container body, said valve member having an unitary, elongated mandrel and closure member, the mandrel portion extending into and substantially the entire length of said expandible member and the closure portion being normally seated in the closed position to block said fluid passageway and said mandrel and closure member being axially movable within said expandible member.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevational view partially in cross section of an exemplary dispenser of the invention showing the cover in the exploded position for purposes of clarity;

FIG. 1A is a view taken along the line 1A—1A of FIG. 1; and

FIG. 2 is an exploded view of the major components of the dispenser illustrated in FIG. 1, enlarged for clarity.

## DESCRIPTION OF THE BEST EMBODIMENTS CONTEMPLATED:

Referring to the drawing wherein like numerals of reference designate like elements throughout, an exemplary fluid dispenser 2 is illustrated as having a container body 4 of general configuration and size with a bottom portion 6 being of the type that has an interior double concave configuration 8 as shown with a central stem centering or locating cup portion 10 and being secured to the upper container body portion 12 by well known means in the art, such as for example, ultrasonic welding or the like. Upper body 12 has inset collar portion 11, provided with the interior configuration shown, spaced from the remainder of the container and having integral connecting webs 13 to thereby form discontinuous slots 15 to receive cover member 14 in close fit arrangement as will be apparent. Thus, the materials of construction for dispenser 2 particularly the body 4 may be those conventionally used in the art that will meet the criteria necessary for containing and dispensing fluids as will become apparent. Except as noted, plastic is the preferred material for all components of dispenser 2.

Dispenser 2 is provided with a cover member 14 of the usual type having a fluid passageway 16, formed by the walls 17, communicating the exterior 18 thereof to the inlet 20 which is in communication with a valve member component generally designated 22. Cover 14 is formed with inset rim 19 having three equally spaced depending legs 21 (only two being shown) of incline plane and notch configuration as shown for purposes as will become apparent. The outside wall of cover 14 and exterior wall of rim 19 form circumferential groove 23 therebetween. The cover 14, of molded plastic, is depressible in conventional manner to the extent of the axial movement permitted by shoulder 24 of container body 4, and to this end is provided with a flat thumb or finger engaging surface 26 by which means depression is easily accomplished.

Valve member component 22 comprises (in the order shown in FIG. 2 - the order of assembly) ferrule member 28 of thin wall, deformable aluminum, for example, of general cylindrical design having an orifice portion 30 communicating to the inlet 20 of passageway 16. Ferrule 28 may be within the thickness of about 0.020 of an inch so that the lower portion may be crimped or bent as shown in FIG. 1. A larger cylindrical portion 32 provides an interior recess to receive a valve seat 34, in this instance being an annular disc, having a central aperture 36 to accommodate the inlet 20 of passageway 16. Ferrule 28 has depending exterior wall 38, the lower portion of which becomes crimped in later assembly as will become apparent. The interior configuration of ferrule 28 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 be described. Seat 34 may be of rubber.

The mandrel or stem and closure member 46 comprises an integral, unitary structure having an elongate mandrel portion 48 and an upper valve closing portion 50, in this instance having an annular head 52 provided with a sealing surface 54 adapted to effect sealing and blockage of the inlet 20 by engagement with the adjacently positioned surface of valve seat 34. Spaced projections 56 spaced about the head 52 provide means by which spring 58 is retained in cooperative relationship within the assemblage. The elongate portion 48 of mandrel-closure member 46 is approximately three times the normal unextended length of the expandible member before assemblage into the dispenser 2 and as will become apparent.

The next component, valve body member 60, is of general cylindrical configuration having a first annular portion 62 of a size and shape to be accommodated within the confines of ferrule member 28, such that the valve seat 34 is securely positioned therebetween. A depending collar-like portion 64 is of appropriate size and configuration to be received within cylindrical portion 38 of ferrule member 28, and is provided with an interior shape substantially as seen in FIG. 1 to perform a gripping or holding function with the subsequent components of the assemblage. A lower depending portion 66 is provided with an interior slotted or notched configuration to form in effect a plurality of spaced ribs 67 to thereby permit free flow of a fluid contained within the expansible member therethrough, to and about the spring 58 retained within valve body 60 by means of the spaced shoulders 68 provided for that purpose. It will be noted that the spring chamber 71 formed between mandrel closure member 46 and the interior wall of valve body 60 permits passage of fluid contained within the expansible member to be positioned and readied at and about the head 52 ready for entry into inlet 20 of passageway 16 upon depression or actuation of cover 14 which axially shifts member 46 to unseat the valve closure.

The next member in the assemblage is the expansible member 70 here shown in the extended, elongate state but which may vary in the unassembled, unstressed condition, between about approximately one-half to one-third the length of the mandrel closure member 46. Expansible member 70 is provided with a flanged upper portion 72 and a mouth opening 74 to receive lower, depending interior rib portion 66 of the valve body 60. The mouth opening 74 extends into the interior of expansible member 70 which provides the chamber or receptacle into which fluid is to be stored as will become apparent. Expansible member 70 is preferably fabricated of an elastomeric material such as a natural latex or silicone rubber of varying thickness, depending upon applicability. Especially useful are those materials having exceedingly high memory or resilience capabilities which permits the membrane, after distortion, to exert substantially high forces upon the fluid contained therein. The inside diameter of the extended portion 73 is slightly larger than the outside diameter of the elongate portion 48 of mandrel-closure member 46, before assemblage.

In order to secure the expansible member 70 within the assemblage, a snap ring member 76 is provided and is generally of ring or collar-like configuration having collar portion 78 and depending locking legs 80 provided with locking lip surfaces 82 for engagement with the interior shoulder of inset collar portion 11 of upper container body 12. It will be noted that the snap ring 76 is provided with a locking groove 84 and the general exterior configuration is such as to be received within the interior of valve body member 60 with the flanged portion 72 of expansible member 70 held rigidly and securely therebetween. The lower depending wall 38 of ferrule 28 may now be crimped at spaced points or about the entire lower periphery. When locked in the position shown, the flanged portion 72 of expansible member 70 is securely retained in substantially fluid-tight secured relationship.

After assemblage in the manner just described and as shown in FIG. 1, but with the cover 14 not yet assembled, a filling tool may be inserted into the valve member 22 to thereby axially move member 46 and put the interior of flexible membrane 70 into communication with a fluid supply. After filling of the expansible membrane 70 to the interior limits of the container 4, the filling tube is removed and the cover 14 positioned onto the collar 11. The cover 14 and collar 11 cooperate in friction fit engaging relationship usual in this art and to which no inventive claims is laid except as permitted by the prior art. Suffice to say that the incline and notch tabs 21, upon rotational movement of cover 14, engage the webs 13 to move cover 14 into an upwardly locked position thereby preventing its vertical movement with respect to the valve member component 22. Rotation in the opposite direction to an extreme is prevented by the spacing of webs 13.

In the filling operation, the filling tube depresses axially movable mandrel closure member 46 thereby disengaging sealing surface 54 with valve seat member 34 allowing the introduction of a fluid such as paste, hand cream etc. into the interior of expansible member 70 to the extent that the expansible member 70 billows outwardly until the interior surface of upper body portion 4 and lower body portion 6 are engaged. When a metered amount of fluid has been introduced into the interior of flexible and expansible member 70, the filling tube is withdrawn and the spring 58 returns the mandrel closure member 46 into the closed position thereby effectively blocking the valve passageway. The central concave portion 10 of lower body portion 6 insures proper alignment and placement of mandrel closure member 46 within the interior of dispenser 2.

The materials of construction for dispenser 2 may be any of those generally known in the container art but preferably include, except for those components as noted, the commercially available plastics and the like. Expansible member 70 preferably is of a natural rubber or latex material and is pretensioned so that any fluid contained therein and tending to deform the natural shape thereof will be expelled to the extent that the pretensioning and the natural memory of the material tends to return the expansible member 70 to its unfilled state.

Thus, there has been disclosed a fluid dispenser of the expansible member type wherein a unitary mandrel and closure member acts in conjunction with unique components to allow dispensing of fluids without the use of propellants or the like. Various modifications and substitutions will make themselves readily apparent to those of ordinary skill in the art and all such departures and modifications are intended to be covered by the appended claims.

We claim:

1. A fluid dispenser comprising the combination of: a container body and cover and cover therefor including a member having a fluid passageway communicating the exterior thereof to a valve member, said valve member communicating to an expansible member adapted to store fluid therein and be retained within said container body, said valve member having an axially shiftable, unitary elongated mandrel and closure member, having mandrel and closure portions, said mandrel portion extending into and substantially the entire length of said expansible member and said closure portion normally being seated in the closed position to block said fluid passageway.

2. A fluid dispenser in accordance with claim 1 wherein a valve body member, including a valve seat, encircles said mandrel and closure member and said closure portion acts against said valve seat to block said fluid passageway.

3. A fluid dispenser in accordance with claim 2 wherein said valve body member has slotted wall portions by which communication into the interior of said expansible member is obtained.

4. A fluid dispenser in accordance with claim 1 wherein said mandrel and closure member is spring-biased to position said closure portion into the closed position.

5. A fluid dispenser in accordance with claim 4 including a valve body member in encircling relationship with said mandrel and closure member and wherein the interior of said valve body member is adapted to retain a spring member therein.

6. A fluid dispenser in accordance with claim 5 additionally including a valve seat in said valve body member and wherein said closure portion has an annular head, the upper surface thereof forming a continuous sealing surface with said valve seat and a lower surface adapted to form an abutting surface for a spring member.

7. A fluid dispenser in accordance with claim 6 wherein said valve seat and said valve body member are received in nested relationship by a ferrule member of deformable character and said valve seat is a disc having an annular passageway of the same size as said fluid passageway and communicating thereto.

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8. A fluid dispenser in accordance with claim 7 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.

9. A fluid dispenser in accordance with claim 8 which additionally includes a coil spring retained within said valve body member acting against the interior thereof and said lower surface of said closure portion.

10. A fluid dispenser in accordance with claim 9 wherein said expansible member is retained in fluid-tight secured relationship and a snap ring member adapted to engage the interior wall of said container, positions the assembly within the neck of said container body.

11. A viscous fluid dispenser comprising the combination of: a container body, the walls thereof forming a inclosure

open to external atmosphere; a cover supported on said container body and having a fluid passageway communicating the exterior thereof to a valve member disposed in supported relationship within said inclosure, said valve member communicating to and supporting a flexible, expansible bladder, adapted to store viscous fluid therein, within said closure; said bladder, in the unfilled state being pretensioned in the radial and linear directions; and an axially shiftable unitary elongated mandrel and closure member, having mandrel and closure portions and being supported within said valve member and said bladder, said mandrel portion extending substantially the entire length of said bladder and said closure portion normally being seated in the closed position to block said fluid passageway.

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