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3,342,377

DISPENSING CONTAINER

Filed April 7, 1966

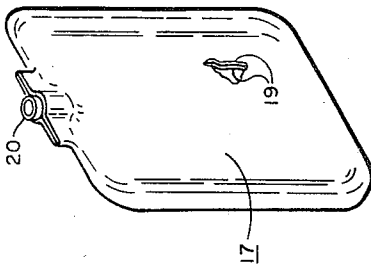


FIG. 2

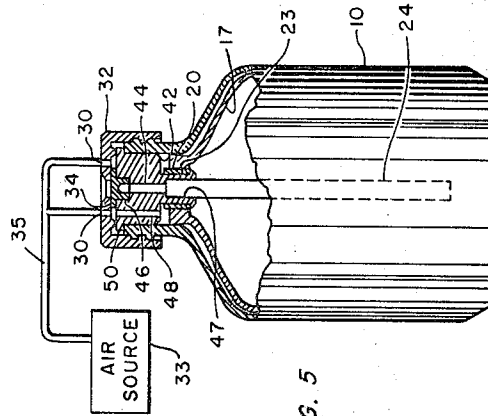


FIG. 5

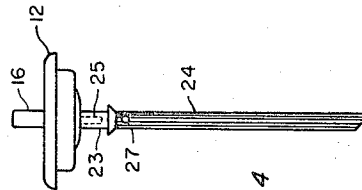


FIG. 4

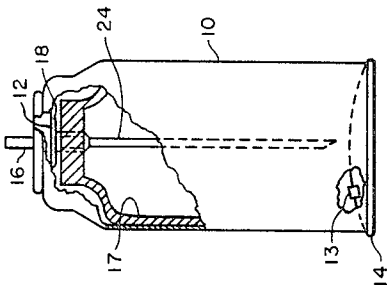


FIG. 1

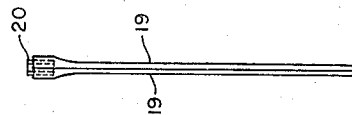


FIG. 3

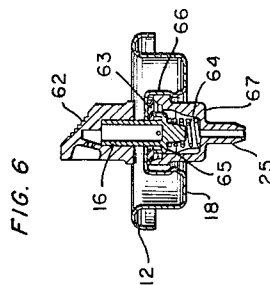


FIG. 6

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3,342,377

DISPENSING CONTAINER

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This invention relates to a dispensing container for pressure-propelled products and, more particularly, to containers in which the propellant is separated from the product to be dispensed by means of a flexible barrier.

It is known to pressure propel various products from valved containers. Generally the propellant, e.g., halogenated lower molecular weight hydrocarbons, such as the Freons or other suitable propellant material, of which there are many known varieties, is in contact or admixed with the product. Alternatively, a pressurized gas may be applied as the propellant from an external source. Whatever the propellant employed, there are certain products which may be intended for internal consumption or application such as toothpaste, foods, edible products, and the like. In these cases it is considered desirable and often essential to package the product without having it contact the propellant.

Many techniques and apparatus have been designated in the prior art for achieving this end. Most have used a flexible bag or container to separate the product from the propellant. One such dispensing container is described, for example, in U.S. Patent No. 2,889,078 issued June 2, 1959 to Ralph Henry Thomas. Another is described in U.S. Patent No. 2,953,304 issued Sept., 20, 1960 to Burton Sellinger. Although these and other containers available or known in the prior art are quite satisfactory, they have one general drawback. They often use bags which are unable to fully and completely collapse so as to completely expell all the contents of the bag. Quite often the bag will collapse in such a manner under the influence of the propellant gas as to choke-off a portion of the material in the bag. This action is referred to as "islanding."

Another disadvantage of prior art pressure containers is that they often tend to limit the capacity of the material that can be carried.

It is, therefore, an object of this invention to obviate many of the disadvantages of the hereinbefore described prior art pressure containers.

Another object of this invention is to provide an improved container having a separate sealed compartment for the material to be dispensed and a separate sealed compartment for the medium used as the expelling agent, the two compartments being separated by a novel bag.

An additional object of this invention is to provide an improved pressure container having an outer rigid container which encloses a flat flexible bag having two mating sides sealed at their periphery to provide a heavier and, therefore, less flexible seam which controls the collapsing of the bag toward the middle where the material is being discharged.

In a preferred embodiment of the invention the dispensing container is constructed to have a hollow rigid outer body member having a top member joined thereto. The top member has a discharge opening therein in which a suitable obturator means normally seals the discharge opening. A flat, flexible, pressure-deformable bag, having first and second mating side walls continuously joined together at their periphery, is placed within the body member. A peripheral opening in the bag at the seam, communicating with the valve means, forms (1) a valved chamber with the valve and (2) a sealed chamber with the body member. This construction facilitates the complete evacuation of the valved chamber when the pressure of the sealed chamber is increased as by a suitable

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gas or propellant which may be introduced therein by known means.

The novel features that are considered characteristic of this invention are set forth with particularity in the appended claims. The invention, itself, however, both as to its organization and method of operation, as well as additional objects and advantages thereof, will best be understood from the following description when read in connection with the accompanying drawings, in which:

FIGURE 1 is an illustration of one form of the dispensing container, shown with a fragmentary section, constructed in accordance with this invention;

FIGURE 2 is a view of the flat, flexible bag having a continuous peripheral seam for use in the container of FIG. 1;

FIGURE 3 is a side view of the bag illustrated in FIG. 2;

FIGURE 4 is a view of the valve and dip tube that may be used in the container of FIG. 1;

FIGURE 5 is an illustration of another dispensing container constructed in accordance with an alternative embodiment of this invention in which the propellant is introduced from an external source; and

FIGURE 6 is a cross-section view of the aerosol valve 18 illustrated in FIG. 1.

As may be seen in the drawing, the dispensing container comprises a rigid hollow cylindrical casing or can 10 having an opening at one end, illustrated as the top in the drawing. This opening is covered by a disc-shaped top member 12 which is hermetically sealed to the body member 10 as by a suitable S-seal of known type. The bottom portion (in the drawing) of the can 10 is also closed by a disc-shaped bottom member 14 and hermetically sealed in a manner similar to the top portion. If desired, of course, the can 10 may be formed having only the top portion open. An opening 13 may be provided in the bottom member 14 to permit the introduction of a suitable propellant gas. This opening 13 may be closed in accordance with known techniques by a plug constructed of rubber, plastic or other suitable material. The top member 12 also has a discharge valve stem 16 at the top thereof which is adapted to be closed by a suitable closure or valve 18 of known design. One valve of suitable design that may be used in conjunction with this can is the well-known Schrader "S-63" valve which is available from Scovill Manufacturing Company, Inc., Brooklyn, New York. Other valves are available from many other manufacturers such as Eaton Manufacturing Company of Cleveland, Ohio.

The details of the typical Schrader S-63 valve that may be used with this invention is shown in FIG. 6. The valve comprises the top member 12 which is sealed to the body member 10 as described. The valve itself includes the discharge opening or orifice 16 to which is press fitted a suitable nozzle 62. The discharge valve stem 16 has cuplike flange 65 formed at end thereof and is adapted to sealingly engage a suitable resilient washer 63 against the top member 12. A spring 64 urges the cuplike flange against the washer and is itself positioned within a cuplike housing 67 which is force-fitted into a recess 66 in the top member 12. The bottom portion of the housing 66 contains a short piece of conduit which forms the nipple 25 to which the dip tube 24 (FIG. 4) is force-fitted.

In accordance with the invention, a flat flexible pressure-deformable bag 17 is constructed, as seen in FIGURES 2 and 3, to have first and second mating side walls 19 which are continuously joined together at their periphery so as to provide a relatively heavy, less-compliant peripheral seam. The peripheral seam is interrupted only by a tubular member 20 which is introduced

through the seam at the top portion of the bag 17 and sealed. The dimensions of the bag 17 are chosen so that the bag will be restricted by the container and thereby not stretched under the filling pressure. The bag 17, itself, may be constructed of any suitable plastic material which is generally impervious to the propellant. In some instances some degree of perviousness may be permitted particularly where it is not necessary to separate completely the product to be dispensed from the propellant material.

In general, any polymer film may be used for the bag 17 although other suitable plastics such as polyethylene and the halogenated analogues, polyvinyl chloride, polyvinylidene chloride, and chlorinated rubber also may be employed. Thermoplastics are particularly preferred since they permit the side walls 19 to be heat sealed using known techniques.

One plastic material that is suitable for use in constructing the bag 17 is a product known under the trade name "Mylar" made and distributed by E. I. du Pont de Nemours & Company. Another suitable plastic material for constructing the bag is sold under the trade name "Capran" by the Allied Chemical Corporation.

A dip tube 24, which is hollow and adapted to fit over the end of a nipple 25 at the bottom portion of the valve 18, is fitted on the valve nipple 25 and introduced into the bag 17 through the tubular member 20 in a tight or press fit. The pressure of the propellant aids in the seal. In the alternative an adhesive bonded seal may be employed. In a preferred embodiment of the invention, a peripheral groove 23 is formed in the upper portion of the dip tube 24 and the length of the tubular member 20 is selected to be the same as the width of the groove 23. This improves the seal between the bag 17 and dip tube 24.

The dip tube 24, itself, may be constructed to have longitudinal grooves along the length of its outer peripheral surface and a radial hole 27 immediately adjacent the valve to facilitate the discharge of the material through the valve 18 from the bag 17. The grooving is not necessary to the invention but does provide improved results. The dip tube 24 may be constructed of any suitable material such as one of the thermoplastics sold under the trade name "polyethylene," or polyamides sold under the trade name "nylon," or polytetrafluoroethylenes sold under the trade name "Teflon."

In the manufacture of the dispensing container of this invention, the valve mechanism 18 and dip tube 24 are assembled onto the top member 12. The dip tube thus assembled is then inserted or press fitted into the pre-manufactured bag 17 through the compliant tubular member 20 in the bag. With the valve assembly and bag 17 thus assembled, they are ready to insert into the container 10 with the bottom member 14 attached, and the top member 12 sealed to the container 10 with an S-seal in a known manner. Through the bottom opening 13 of the container 10, the proper amount of propellant is introduced. This provides pressure outside the bag 17. The bottom cover is sealed as described.

A particular advantage of this invention is that substantially all of the material in bag 17 is expelled by the propellant. As the material is dispensed, the distended bag begins to collapse toward the dip tube 24 and away from the wall of the container in a manner quite similar to that in which toothpaste is expelled from a tube under pressure of the hand. The tendency to collapse at the peripheral portion is the result of the invention wherein the heavier, less-flexible peripheral seam of the bag 17 controls its collapse towards the middle. The dip tube 24 itself resists a complete collapse of the bag in the middle and, therefore, permits a steady flow of the material through the opening provided in the dip tube 24. This facilitates a substantially complete evacuation of all material in the bag.

In FIGURE 5 an alternative embodiment of this inven-

tion is illustrated in which a dispensing container of similar construction to that shown in FIGS. 1-4 is employed. The primary difference between the two embodiments is that the container illustrated in FIG. 5 is adapted to be pressurized from an external supply of gas 33 through axial holes 30 provided in an end cap 32 of the container. An air line 35 may be permanently attached to the holes 30 in cap 32 or, to facilitate its removability, the can 10 and its end cap 32 may be pressed and suitably clamped against a pressurized annular face seal (not shown). Instead of using a conventional aerosol type valve to control the expulsion of the contents of the bag 17, a suitable septum 34 is provided so that a hypodermic needle may be injected therethrough to permit the extraction of the pressurized material within the bag 17.

In the embodiment of FIG. 5 high pressures are normally not employed as in the embodiment of FIG. 1. Accordingly, it is permissible here to use the normal screw-type end cap 32 which fits over the open threaded end of the can 10. A resilient, cylindrical plug 42, having an axial bore 44 which positions the dip tube 24 and the ink bag 17, is placed in the open end of can 10. The plug may be formed or molded of the same plastic material as the dip tube. The plug 42 has a flanged peripheral groove 23 at its lower end (in the drawing) which is inserted through the complaint tube 20 in the ink bag 17 in the same manner as described in conjunction with FIG. 1. The bore 44 has a counterbore 46 adapted to receive the septum 34 and a second counter bore 47 to receive the dip tube 24. The dip tube 24 is press fit into the counter bore 47. The septum is easily removed for refilling the bag. Additional eccentric axial bores 48 are formed in the plug 42 to facilitate the passage of pressurized air or other fluid to the annular pressurized chamber between the bag 17 and the can 10. A flange 50 on the upper portion of the plug 42 permits a seal between the can 10 and the end cap 32 when the cap is suitably tightened. The thickness of the flange 50 permits an annular conduit between the end cap 32 and the eccentric holes or bores 48 for the passage of the pressurized air or other fluid.

The embodiment of FIG. 5 has particular application to dispensing ink and other fluid material in which externally pressurized air, for example, is applied through the holes 30 to cause the expulsion of ink through a hypodermic needle (not shown) which may be inserted through the septum.

This has the particular advantage that the container may be withdrawn from the hypodermic needle at any time so as to readily change the ink supply when exhausted or when a different color ink, for example, is desired.

It will be obvious that various modifications may be made in the apparatus and in the manner of operating it. It is intended to cover such modifications and changes as would occur to those skilled in the art, as far as the following claims permit and as far as consistent with the state of the prior art.

What is claimed is:

1. A dispensing container for pressure propelled products comprising:
 - a hollow rigid outer body member having first and second ends,
 - a discharge opening in said first end,
 - a passageway extending inwardly from the discharge opening and terminating in an inwardly extending nipple,
 - an obturator means sealing said discharge opening,
 - a flat, flexible, pressure-deformable bag having first and second mating side walls continuously joined together at their peripheries, thereby to form a seam having less flexibility than said side walls, and having a discharge opening and a tubular element in said bag discharge opening,
 - conduit means connected to said nipple, said bag being connected by said tubular element to said nipple, said conduit means extending into said bag when

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said bag is connected to said nipple, said bag and said container providing a product chamber in the bag and an annular chamber outside the bag whereby to facilitate the complete evacuation of said product chamber when said annular chamber is pressurized and said obturating means is opened.

2. The dispensing container set forth in claim 1 wherein said bag is a thermoplastic.

3. The dispensing container set forth in claim 2 wherein said seam is heat sealed.

4. The dispensing container set forth in claim 1 wherein said obturator means is a normally closed valve.

5. The dispensing container set forth in claim 1 wherein said conduit means comprises a tube having axial grooves on its outer periphery and a radial tube wall opening thereby to facilitate egress from said bag to said tubes.

6. The dispensing container set forth in claim 1 wherein said first end includes additional conduit means for introducing fluid under pressure into said annular chamber.

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7. The dispensing container set forth in claim 6 wherein said obturator means comprises a septum adapted to receive a hypodermic needle.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,342,377

September 19, 1967

Stephen K. Peredy

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 25, for "designated" read -- designed --;
line 36, for "expell" read -- expel --; line 41, for "capacitiy"
read -- capacity --; column 2, line 54, for "orifice" read
-- valve stem --; column 4, line 26, for "complaint" read --
compliant --.

Signed and sealed this 1st day of October 1968.

(SEAL)

Attest:

Edward M. Fletcher, Jr.

Attesting Officer

EDWARD J. BRENNER

Commissioner of Patents