Nov. 26, 1968 D. F. MACAULAY 3,412,900

DISPENSING CONTAINER

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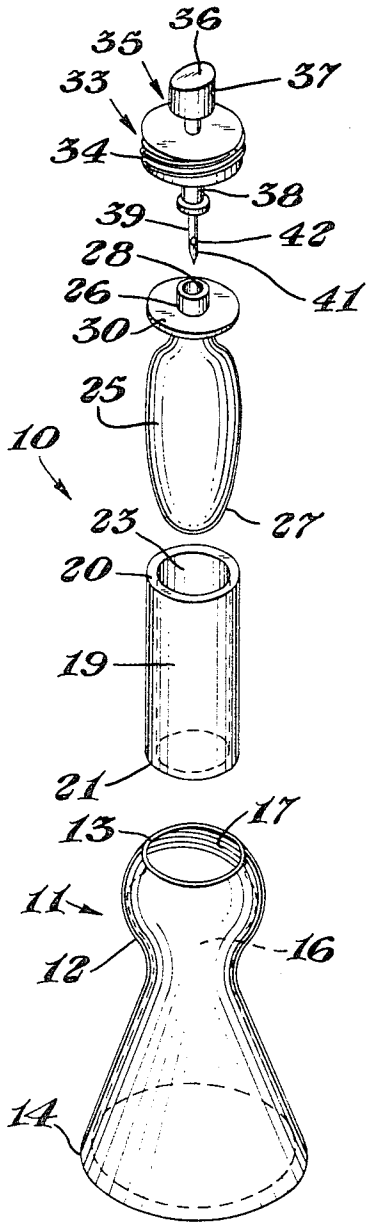


Fig. 1

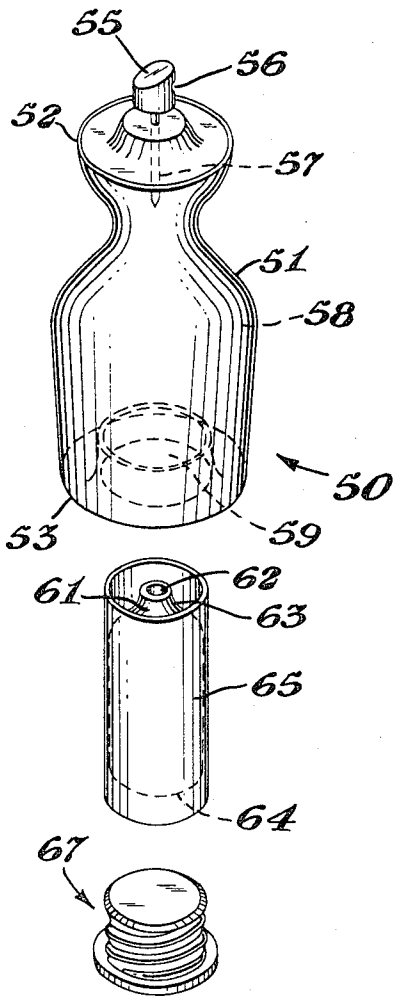


Fig. 2

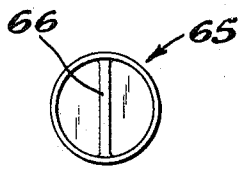


Fig. 3

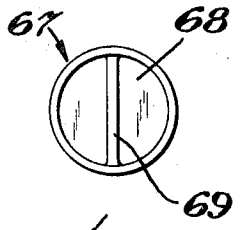


Fig. 4

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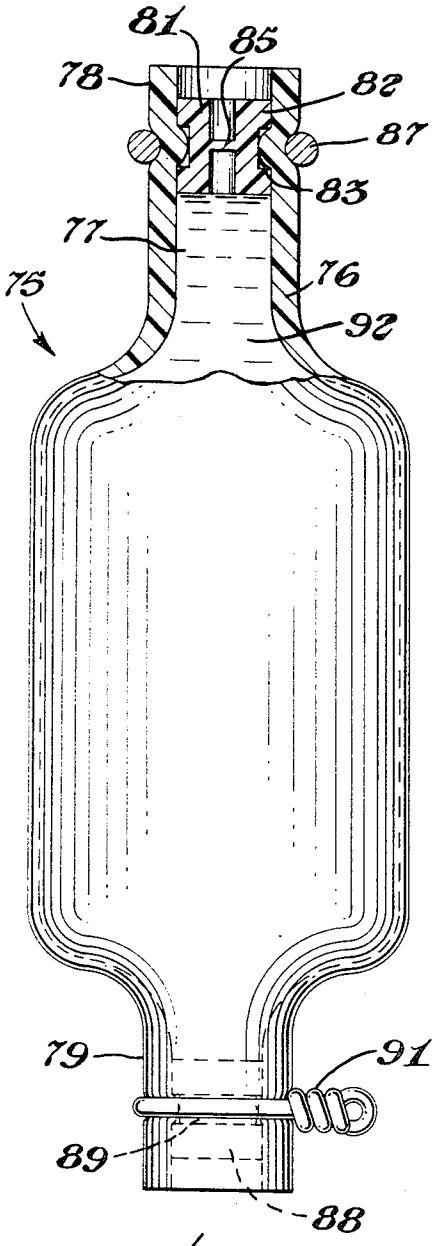


Fig. 5

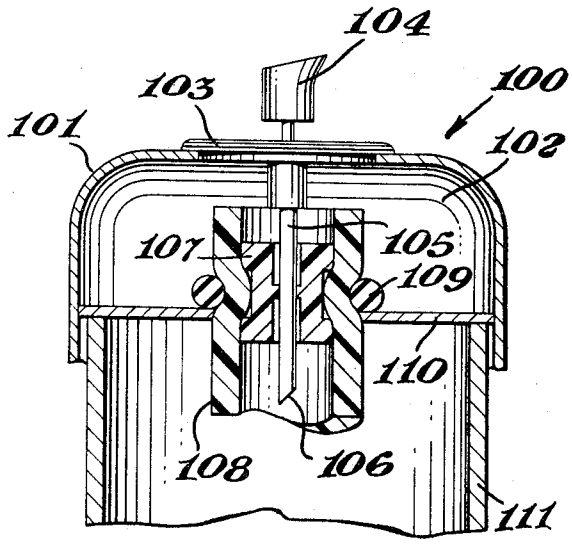


Fig. 6

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DISPENSING CONTAINER

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6 Claims. (Cl. 222—82)

ABSTRACT OF THE DISCLOSURE

A pressurized dispensing container is provided by injecting a liquid into an elastomeric rubber tube, stretching the tube and sealing. The dispensing pressure is provided solely by the stretched rubber tube.

This invention relates to an improved dispensing container, and more particularly relates to an improved pressurized dispensing container which is readily rechargeable.

Many pressurized dispensing containers are known in the art. Particularly popular and well known at the present time are the dispensing containers generally referred to as aerosol packages. Such aerosol packages contain a liquid material admixed with volatile propellant or a separate phase of volatile propellant which serves to force the contents of the container through a suitable dispensing valve which is generally manually operated. Beneficially, many materials may be dispensed without the use of a gaseous propellant by employing an elastomeric container which oftentimes has the form of a generally cylindrical tubular body of a material such as gum rubber which is closed at one end by a dispensing valve and sealed by a suitable means at the opposite end such as by clamping or by preforming a tube with only one open end. Generally, it is necessary that such pressurized containers be factory filled and when empty, the entire container is discarded. Such a practice is often a wasteful one as when the contents have been depleted the container itself is still in excellent mechanical condition but no facilities are at hand which conveniently permit refilling by the consumer.

It would be beneficial and advantageous if there were available a pressurized dispensing container which was readily refillable by the consumer.

It would be also advantageous if there were available an improved dispensing container which could be refilled without the necessary replacement of the valve and the rigid outer portion thereof.

Furthermore, it would be beneficial if there were a refillable pressurized dispensing container which could be refilled conveniently from prefilled packages or charges.

These benefits and other advantages in accordance with the present invenion are achieved in a pressurized dispensing container which comprises a rigid container adapted to be manually grasped; the rigid container defining at least one open end; means to secure a pressure dispensing valve to the rigid container; the valve being manually operable and providing selective communication between an internal surface of the rigid container and an external surface of the rigid container; a portion of the valve extending into an internal space within the container; the portion of the valve within the space terminating in a hollow, open-ended tubular member having a point thereon, the hollow tubular member being adapted to penetrate a resilient material; an inner container of a resilient elastomeric material; the inner container having a first end and a second end; a resilient plug being disposed within the first end of the elastomeric container; the elastomeric container being distended by a fluid disposed therein to a diameter at least twice its diameter in the relaxed state; the point of the tubular member of the dispensing valve penetrating the resilient plug of the elastomeric container and thereby providing communication by means of the manually operable dispensing valve between the interior of the elastomeric container and the exterior of the rigid container.

Further features and advantages of the present invention will become more apparent from the following specification when taken in connection with the drawing wherein:

FIGURE 1 schematically illustrates an exploded view of one embodiment of the container.

FIGURE 2 is an exploded view of a second embodiment of the invention.

FIGURE 3 is a view of one of the elements of the embodiment of FIGURE 2 taken along the line 3—3 thereof.

FIGURE 4 is a view of one of the elements of FIGURE 2 taken along the line 4—4 thereof.

FIGURE 5 is a schematic representation of an elastomeric container for use in the practice of the present invention.

FIGURE 6 is a schematic sectional view of an elastomeric container in operative connection with the rigid outer container.

In FIGURE 1 there is schematically represented a pressurized dispensing container in accordance with the present invention generally designated by the reference numeral **10**. The container **10** comprises in cooperative combination a rigid or outer container **11**. The container **11** has an exterior wall **12**, an upper end **13** and a lower end **14**. The container **11** defines a space **16** disposed therein. The lower end **14** is closed while the upper end **13** defines an internally threaded opening **17** providing communication between the space **16** and the space external to the container **11**. A sleeve **19** having a first end **20** and a second end **21** is adapted to be disposed within the cavity **16** of the container **11**. The sleeve **19** defines a generally cylindrical internal space **23** which is axially disposed within the sleeve and beneficially is open on at least the first end **20** and optionally on the second end **21**. The sleeve or guide means **19** fits smoothly within the cavity **16**. A distended elastomeric container **25** adapted to be disposed within the sleeve **19** is shown adjacent the first end **20** of the sleeve **19**. The elastomeric container **25** has a first end **26** and a second end **27**. The second end **27** is closed. The first end **26** has disposed therein a resilient perforable plug **28**. A support or locating collar **30** is in operative engagement with the distended elastomeric container **25** and adapted to engage the first end **20** of the sleeve **19** and to prevent significant lateral motion of the first end **26** of the elastomeric container **25** when the collar is disposed within the space **16** of the rigid or outer container **11**. The container **25** has disposed therein and is distended by a fluid or liquid. A closure or valve support **33** is disposed adjacent the first end **26** of the distended elastomeric container **25**. The closure **33** has an externally threaded peripheral portion **34** adapted to mate with the threads of the internally threaded cavity **17**. A manually operable pressurized liquid dispensing valve **35** passes through the closure **33**. The valve **35** has a valve operating means **36** which defines a discharge orifice **37**. The discharge orifice **37** is located external to the cavity **16** of the body **11**. The valve **35** has a valve body **38** passing through the closure **33**. Dependent from the valve body **38** remote from the discharge opening **37** is a tubular inlet **39** having a terminal piercing point **41**. The tube **39** defines an inlet passageway **42**. The tube **39** is of sufficient length that in the assembled configuration, the tubing pierces the plug **28** and provides communication between the interior of the distended elastomeric con-

tainer **25** and the discharge opening **37** selectively by means of the valve actuating means **36**.

In assembly of the dispensing container **10** of FIGURE 1, the sleeve **19** is placed about the distended resilient container **25**. The support or guide **30** engages the first end **20** of the sleeve **19**. The sleeve and the container are passed into the opening **17** and into the cavity **16** with the first end **26** of the elastomeric container **25** being disposed adjacent the internally threaded opening **17**. The closure **33** is then placed on the container **11** in such a manner that the point **41** of the tube **39** engages the resilient plug **28** and the closure **33** threaded into the opening **17** at least until the opening **42** of the tube **39** penetrates the plug **28** to provide communication between the interior of the container **25** and the interior of the tube **39**. Thus, by operation of the valve **35**, the contents of the distended container are selectively dispensed. When the container **25** is empty, the closure **33** is removed, the empty container **25** discarded and a full, distended elastomeric container positioned within the sleeve and the closure **33** replaced.

In FIGURE 2 there is illustrated an exploded view of an alternate embodiment of the invention designated by the reference numeral **50**. The embodiment **50** comprises an outer or rigid container **51** having a first end **52** and a second end **53**. The first end **52** is closed and supports a pressure dispensing valve **55** of generally similar configuration to the valve **35** of FIGURE 1. The valve **55** has a discharge opening **56** disposed externally to the container and an inlet tube **57** within the container **51** having a piercing point and inlet not shown. The container **51** defines an internal cavity **58**. The second end **53** of the container **51** defines an internally threaded opening **59** adapted to provide communication between the cavity **58** and the exterior of the container **51**. A distended elastomeric liquid filled contained **61** is disposed adjacent the opening **59**. The container **51** has a resilient readily pierceable plug **62** disposed in a first end **63**. The container **61** has a second or closed end **64**. A sleeve **65** having a hollow cylindrical configuration is disposed about the container **61**. The sleeve **65** is adapted to pass through the opening **59** and align the container **61** in such a manner that the tube **57** can pierce the resilient plug **62**. An externally threaded plug or closure **67** is provided adjacent the sleeve **65** and adapted to mate with the internally threaded opening **59**.

In FIGURE 3 there is depicted a bottom view of the sleeve **65** wherein a retracting means or finger grip **66** is disposed within the end of the sleeve **65** remote from the first end **63** of the container **61**.

FIGURE 4 depicts a bottom view of the plug **67**. The plug **67** defines a recess **68** adapted to be disposed externally to the container **51**. An extracting means or finger grip **69** is disposed within the recess **68**.

The embodiment illustrated in FIGURE 2 differs from that shown in FIGURE 1 in that the resilient fluid filled pressurized container **61** is inserted within the sleeve or guide tube **65** from the bottom and the valve **55** is rigidly affixed to the upper end of the rigid container **51**. The rigid containers **11** and **51** have configurations which are esthetically appealing, and for the particular configurations shown, it is beneficial to employ a guide or locating sleeve such as the sleeves **19** and **65**. However, if the desired external and internal configuration of the outer or rigid container provides the desired guiding action such as in the case of a cylindrical outer container, the locating collar such as the support means **30** and the sleeves **19** and **65** may be omitted.

In FIGURE 5 there is schematically illustrated a sectional view of an elastometric container suitable for the practice of the present invention generally designated by the reference numeral **75**. The container **75** comprises a resilient elastomeric tubular body **76** defining an internal cavity **77**. The body **76** has a first end **78** and a second end **79**. A resilient perforable plug **81** is disposed within the first end **78**. The plug **81** comprises a body portion **82** of a generally cylindrical configuration. The body **82** defines an external annular groove **83** and a perforable centered membrane **85** generally centrally disposed within the body **82**. The plug **81** is maintained in sealing engagement with the first end **78** of the container **75** by means of an external tension member or band **87** adapted to deform the resilient body **76** into sealing engagement with the annular groove **83**. Within the second end **79** of the body **76** is disposed a plug or closure **88** of generally cylindrical configuration and having an annular groove **89**. The closure **88** is maintained in position by an external tension member **91**. A liquid **92** is disposed within the distended body **76** of the container **75**.

In FIGURE 6 there is depicted a schematic fractional sectional view of a dispensing container in accordance with the present invention generally designated by the reference numeral **100**. The dispensing container **100** comprises an external rigid body **101** defining an internal cavity **102**. The body **101** has disposed therein a valve assembly **103** having an operating and discharge means **104**, an internal inlet and perforating tube **105**. The tube **105** terminates remote from the valve body in an inlet opening **106**. A perforable sealing plug **107** generally equivalent to the plug **81** of FIGURE 5 is disposed about the tube **105** and a resilient distensible elastomeric container **108** surrounds the plug **107** and is maintained in sealing engagement by means of the external tension member **109**. A guide disc **110** affixed to the container **108** in the region of the external tension member **109** serves to positively locate the perforable plug **107** within the cavity **102**. The guide sleeve **111** is shown in engagement with the locating means **110**.

Containers in accordance with the present invention are readily fabricated from a wide variety of conventional materials. Beneficially, the rigid outer container may be fabricated from plastics of the rigid or semi-rigid variety, metals, paper, or soft deformable plastics, if desired. The inner or distensible container beneficially may be prepared from almost any elastomeric material which on distension provides a compressive force on the liquid material container thereon of at least about 10 pounds and beneficially up to about 50 pounds per square inch gauge. Such pressures are generally satisfactory for dispensing liquid or viscous materials through known pressure dispensing valves. The distensible pressure dispensing container may be formed from any of the well known distensible elastomeric materials such as gum rubber, butyl rubber and the like. Sealing of the terminal portions of the body is accomplished by the use of wire clamps, crimped rings, hinge clamps, rubber O rings and other devices well known in the art.

Beneficially, if the material to be packaged is detrimental to the elastomeric deformable material forming the distensible body, a layer of a more chemically resistant material is beneficially provided on the interior surface of the container. The layer may comprise an extensible neoprene rubber either in cured or partially cured form or a thin layer of an unoriented thermoplastic material which is readily stretched, such as polytrifluoroethylene, amphoteric copolymers of vinylidene chloride, vinyl chloride and the like. Such lined bodies are beneficially prepared by the extrusion of a thin layer of the desired material within the distended body employing a moving mandrel such as is done in wire coating. The preparation of multiple layer tubes by extrusion is well known in the art and need not be further discussed.

Alternately, a chemically resistant liner in the form of a thin film may be positioned within a tube such as a vulcanized gum rubber tube by providing a plurality of longitudinal folds in the liner tube and in accordion fashion positioning the tube within the distensible tube, subsequently heating the end portions adjacent the plug to

cause them to fuse into a smooth configuration adaptable to receive a plug or other sealing means. Such a liner provides only the function of chemical resistance and barrier properties, and may be very thin and flexible having a wall thickness in a range from about one half to 5 mils, and beneficially in a range from about 1 to 3 mils. The perforable sealing plug beneficially may be fabricated from elastomeric or readily deformable thermoplastic materials which are chemically resistant to the material being fabricated or alternately a suitable liner such as a thin film may be provided on the inner surface of the plug. The deformable plug which can be pierced by the hypodermic needle is well known in the art and is eminently satisfactory when available in the desired size.

Employing the container of the present invention, refilling is readily accomplished by disassembly and replacement of the empty distensible container. Containers in accordance with the present invention are readily refilled many times without undue sign of wear.

As is apparent from the foregoing specification, the present invention is susceptible of being embodied with various alterations and modifications which may differ particularly from those that have been described in the preceding specification and description. For this reason, it is to be fully understood that all of the foregoing is intended to be merely illustrative and is not to be construed or interpreted as being restrictive or otherwise limiting of the present invention, excepting as it is set forth and defined in he hereto-appended claims.

I claim:

1. A pressurized dispensing container which comprises

a rigid container adapted to be manually grasped, the rigid container defining at least one open end,

means to secure a pressure dispensing valve to the rigid container, the valve being manually operable, and providing selective communication between an internal surface of the rigid container and an external surface of the rigid container, a portion of the valve extending into an internal space within the container, a portion of the valve within the space terminating in a

hollow tubular member, the hollow tubular member provided with a point adapted to penetrate a resilient material,

an inner container of a resilient elastomeric material, the inner container having

a first end and

a second end,

a resilient plug being disposed within the first end of the elastomeric container, the elastomeric container being distended by a fluid disposed therein to a diameter at least twice its diameter in the relaxed state, the point of the dispensing valve penetrating the resilient plug of the elastomeric container and thereby providing communication by means of the manually operable dispensing valve between the interior of the elastomeric container and the exterior of the rigid container.

2. The container of claim 1 wherein the dispensing valve is affixed to a closure for the open end of the rigid container.

3. The container of claim 1 wherein a locating collar is disposed adjacent the first end of the elastomeric container, the locating collar engaging the internal surface of the rigid container.

4. The container of claim 1 wherein the pressure dispensing valve is affixed remote from the open end of the rigid container.

5. The container of claim 1 wherein the rigid container has a circular cross-sectional configuration narrowing between the first and second ends and the resilient container is disposed within a cylindrical body within the rigid container.

6. The container of claim 5 wherein a guide disc is disposed about the first end of the resilient container and is in engagement with the cylindrical container and the rigid container.

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