United States Patent [19]

Schultz

[11] **3,901,416**

[45]***Aug. 26, 1975**

[54] **TOP-LOADED PRESSURE OPERATED CONTAINER FOR DISPENSING VISCOUS PRODUCTS**

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[73] Assignee: **Robert S. Schultz,** Old Greenwich, Conn.

[*] Notice: The portion of the term of this patent subsequent to Aug. 6, 1991, has been disclaimed.

[22] Filed: **Mar. 18, 1974**

[21] Appl. No.: **452,447**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 290,977, Sept. 21, 1972, Pat. No. 3,827,607, which is a continuation-in-part of Ser. No. 175,253, Aug. 26, 1971, abandoned.

[52] **U.S. Cl.** **222/389;** 92/243

[51] **Int. Cl.** **B67d 1/04**

[58] **Field of Search** 92/245, 237, 243, 253, 92/249; 222/386.5, 389

[56] **References Cited**

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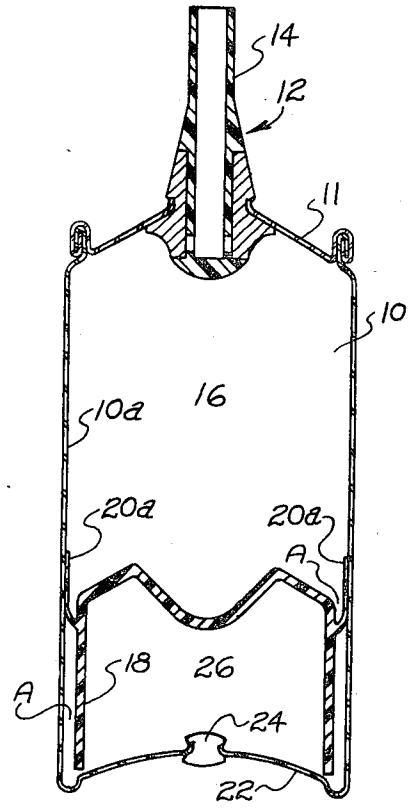
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[57] **ABSTRACT**

The invention contemplates a piston-operated pressurized container adapted for top-loading with viscous foods or other viscous products, the body of the piston having a substantially smaller diameter than the diameter of the container. The outer periphery of the piston is provided with a resilient flange member that maintains a light sealing pressure on the interior surfaces of the container, allowing the piston to move smoothly upwardly within the container. The inventive method provides enhanced assurance against product leakage and against propellant-contamination of product, prior to selective product discharge as desired.

21 Claims, 13 Drawing Figures



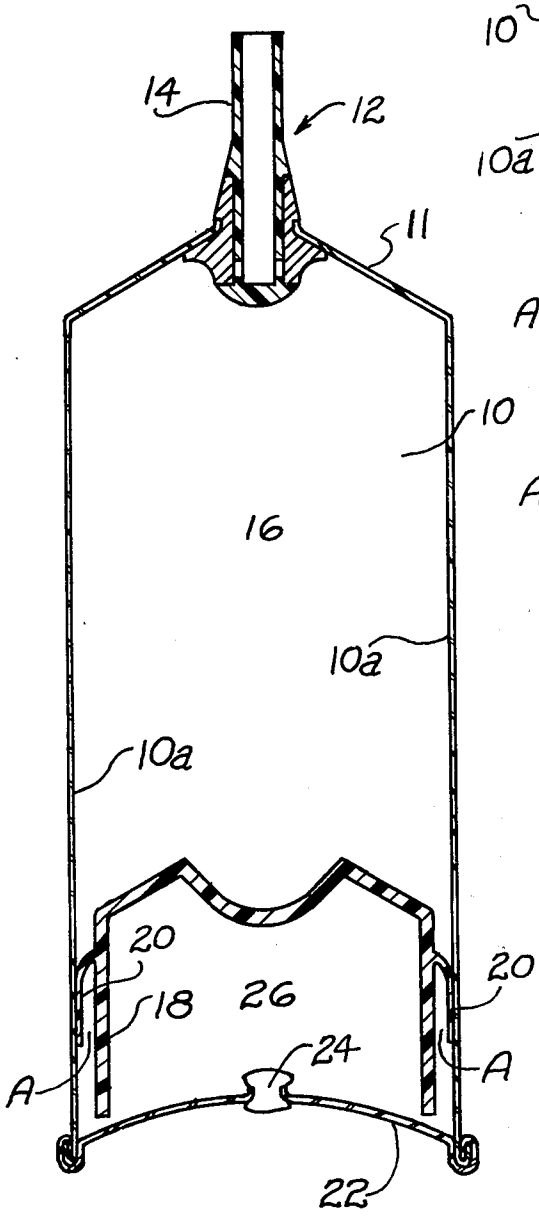


FIG. 1

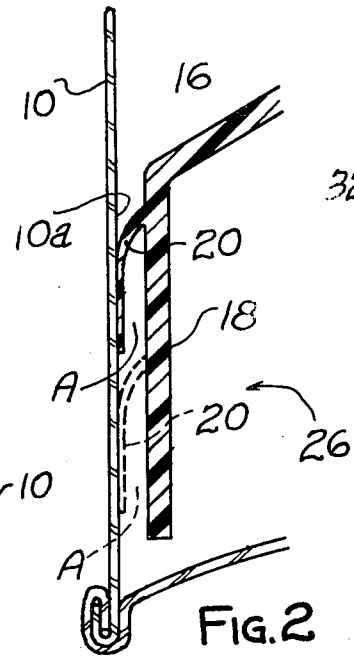


FIG. 2

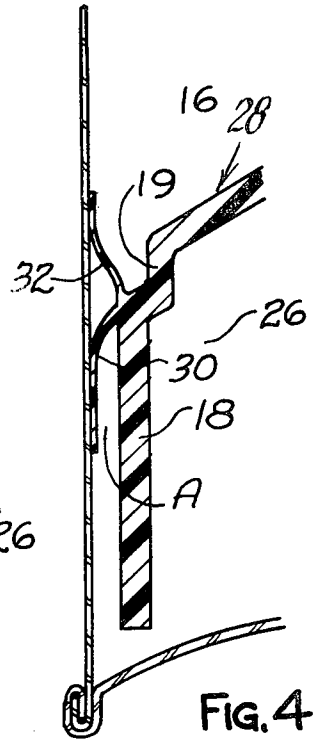


FIG. 4

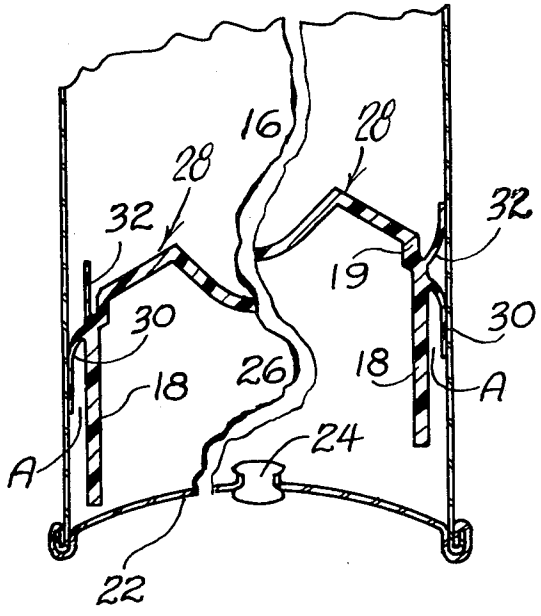


FIG. 3a FIG. 3b

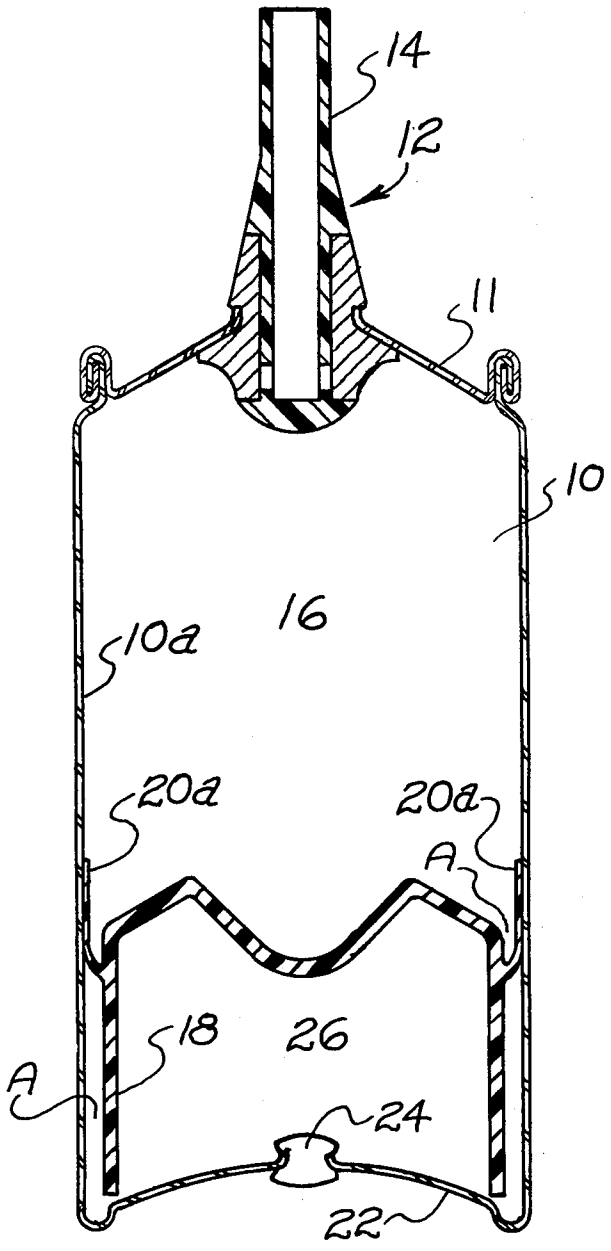


FIG. 5

FIG.6

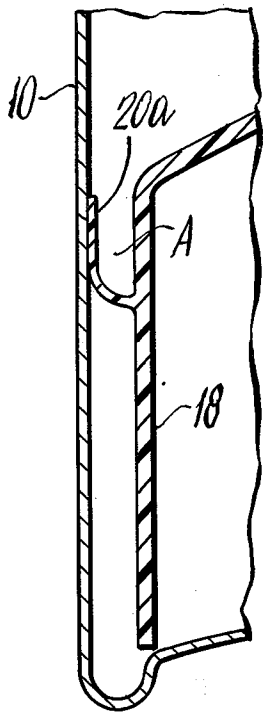


FIG.7

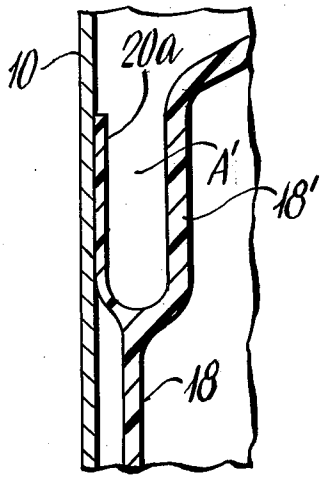


FIG. 8

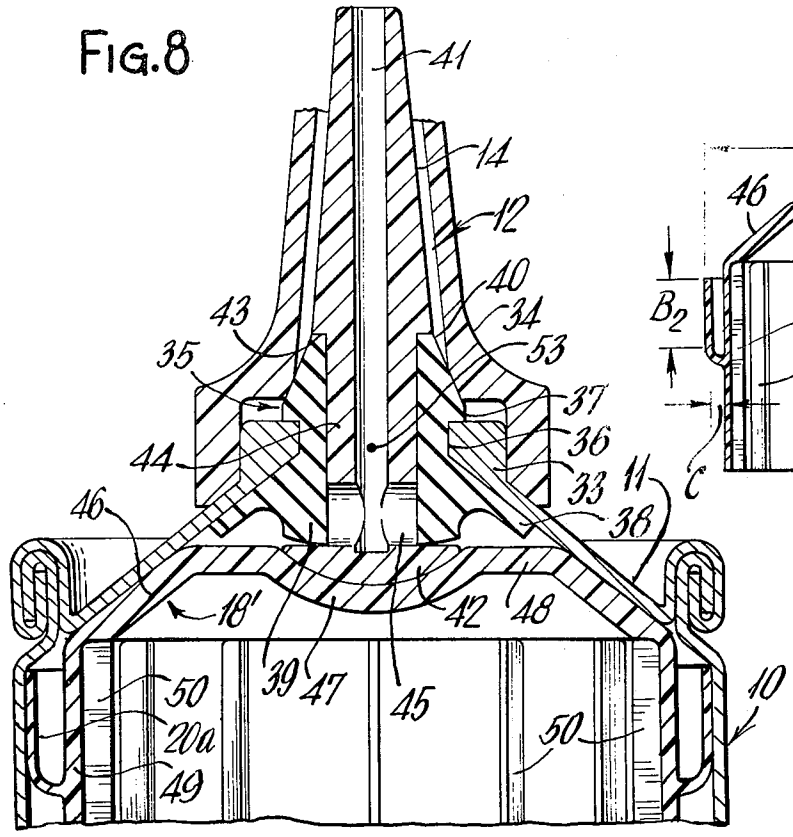


FIG. 11

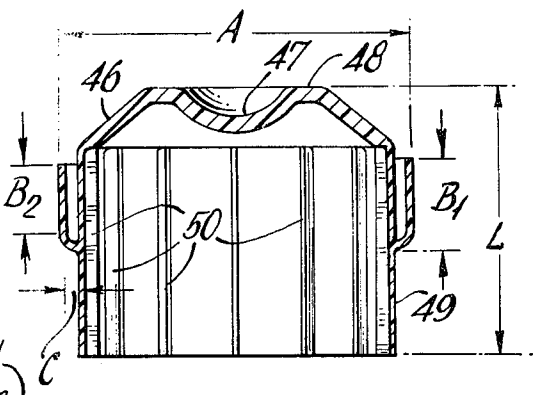


FIG. 9

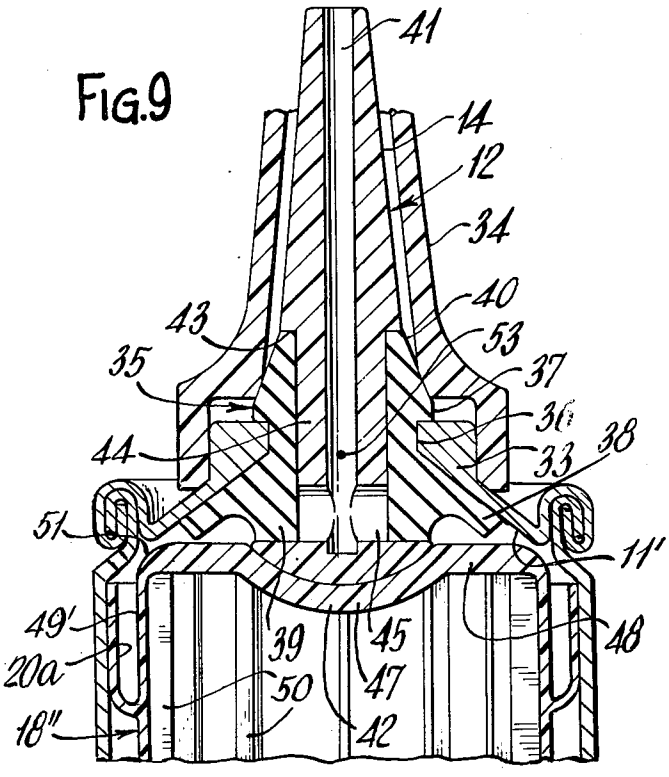


FIG. 10

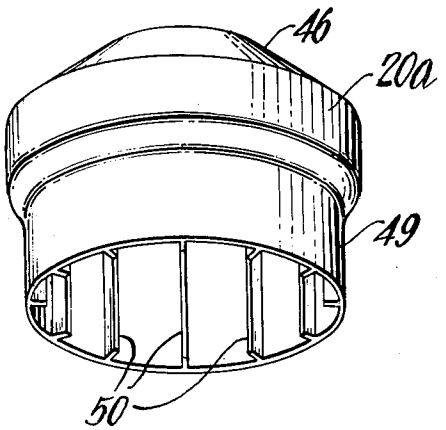
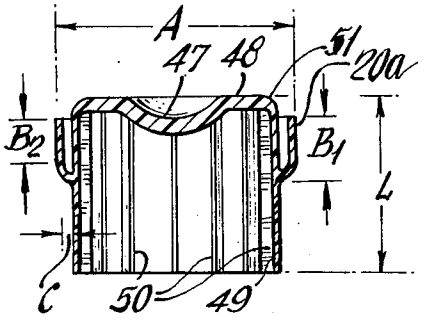


FIG. 12



TOP-LOADED PRESSURE OPERATED CONTAINER FOR DISPENSING VISCOUS PRODUCTS

This application is a continuation-in-part of my co-pending application Ser. No. 290,977, filed Sept. 21, 1972, (now U.S. Pat. No. 3,827,607) which copending application is a continuation-in-part of my now-abandoned parent application Ser. No. 175,253, filed Aug. 26, 1971.

The present invention relates to a top-loaded pressure packaging system for viscous products, whereby the system is characterized by improved operation.

It is an object of the invention to provide smoother discharge flow, more precisely controlled valve action, and inherently greater capacity in a given size container of the character indicated.

A specific object is to achieve the foregoing objects in a top-loaded valved pressure container having a piston operable therein in which the viscous product is in the valved end of the container and ahead of the piston while a gas, such as nitrogen, is introduced under pressure behind the piston to urge the latter against the product and expel the product through the valved opening.

Another specific object is to provide in such a container a piston and seal construction which permits the piston to operate smoothly within the container in spite of any piston expansion, as may be caused by piston absorption of oils present in the viscous product to be dispensed.

A general object is to achieve the foregoing objects with a method which inherently simplifies container assembly, which enables smooth and reliable operation, and which also ensures (a) against product-seepage past the piston and (b) against propellant-contamination of product.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification, in conjunction with the accompanying drawings. In said drawings:

FIG. 1 is a longitudinal sectional view of a pressurized container of the invention;

FIG. 2 is an enlarged fragmentary sectional view of the piston and adjacent container wall of FIG. 1, and further illustrating a modification;

FIGS. 3*a* and 3*b* are fragmentary sectional views to illustrate another modification and showing a double-acting piston in the container in both the unloaded (FIG. 3*a*) and loaded (FIG. 3*b*) condition thereof;

FIG. 4 is an enlarged fragmentary sectional view of a portion of FIG. 3;

FIG. 5 is a view similar to FIG. 1 to illustrate a further embodiment of the invention;

FIG. 6 is an enlarged fragmentary sectional view of a parts relationship for the structure of FIG. 5;

FIG. 7 is a similar view of a modified structure;

FIGS. 8 and 9 are similar enlarged fragmentary sectional views of the FIG. 5 combination, to show detail of the relation of parts for the uppermost position of the piston, in application to larger (FIG. 8) and smaller (FIG. 9) container bore sizes;

FIGS. 10 and 11 are respectively perspective and longitudinal sectional views of the piston in FIG. 8; and

FIG. 12 is a view similar to FIG. 11, but for the piston of FIG. 9.

Referring to FIG. 1, a pressurized container or can 10 is formed with an integral conical top-end wall and provided with a valve, referred to generally by the reference numeral 12. The valve 12 is of the variety in which a valve stem 14 is pressed laterally in a well-known manner in order to release the valve seal and permit the viscous product 16, which is at super-atmospheric pressure, to be expelled to the atmosphere. A generally tubular elastomeric hollow piston 18, which may be constituted of a low-density polyethylene or a polypropylene material, is used to drive product 16 through the dispensing valve 12. Secured to or integral with the piston 18 is a relatively thin annular-shaped flange 20 provided with a depending skirt portion. In fact, the thickness of the flange 20 is less than half the thickness of the wall of tubular piston 18. In this regard, the thickness of the flange 20 is in the order of 0.005 to 0.015 inches. Moreover, the flange 20 is provided with a large surface area for dependable but light sealing contact with the inner wall 10*a* of the container 10.

The container 10 is closed by a bottom wall 22 having a central opening having a sealing grommet 24 through which a gas 26, such as nitrogen, is introduced after the viscous product 16 and the piston 18 are inserted into the container. The gas 26 presses against the interior surfaces of the top of piston 18 as well as in the space A, beneath flange 20 and between the outer vertical walls of the piston and the inner wall 10*a* of the container 10. It will be apparent that the pressure of the gas 26 present in the space A will force the thin resilient flange 20 into light sealing contact with the inner wall 10*a* of the container 10.

The flange 20 may be separately secured or may be integral with the vertical wall of the piston 18 at various selected locations on the vertical wall of the piston; such a modified location of flange 20 is suggested by dashed outline in FIG. 2.

It will be noted that the space A, which permits the easy loading and operation of piston 18 in container 10, functions to provide room for the lateral expansion of the piston 18 especially when oily-type or flavored products are loaded in the container, and the piston expands due to the absorption of oils from the product. In that event, the resilient flange 20 is even further flattened against the inner wall 10*a* of the container 10; however, the light sealing pressure created by the resilient flange continues to seal the propellant from the product, but permits the piston 18 and associated structure to move smoothly in the container 10.

FIGS. 3 and 4 show an alternate type of piston 28 which is double-acting. This piston is provided with a thin resilient, annular flange 30 provided with a depending skirt portion, as already described in connection with FIGS. 1 and 2, as well as an additional annular flange 32 provided with a depending skirt portion, which is seen, in the left-hand fragmentary view of FIG. 3*a* in the unloaded state of the container 10, to be vertically self-supporting. The loaded condition of the piston 18 in the container 10 is depicted in the right-hand fragmentary view of FIG. 3*b*. Thus, when the loaded condition occurs, pressure of the product on the flange 32 of the upwardly moving piston 28 causes the flange to bend backwardly against the inner wall 10*a* of the container 10. Consequently, the piston structure shown in FIGS. 3 and 4 results in an arrangement which double-seals the piston flanges against the container wall. Moreover, the vertical body wall of the piston 28 is pro-

vided with a reduced portion **19** at the top thereof which permits substantially all of the product present to be dispensed through the valve **12.**

The nature of the thin resilient flanges **20-30-32** is to flex in and out of any indentations and over any projections or other imperfections that might be present on the interior wall surfaces of the pressurized container.

FIGS. **5** and **6** show another modification of the present invention in which like parts bear the same reference numerals applied to the structure shown in FIGS. **1** and **2.** In this embodiment, the container **10** is the type which is loaded with the product from the top of the container since the bottom and sides of the container are integral, the top panel **11** of the container being chime-connected to the cylindrical body **10,** as shown. As seen in FIG. **5,** the entire top unit with a valve assembly is inserted on the cylindrical can after the product is loaded through the top of the can. It will be noted that the upwardly projecting thin annular flange **20***a* provided with a depending skirt portion is normally in a position adjacent to the inner wall surface **10***a* which may include an actual light engagement of this wall surface by the flange; flange **20***a* extends no further upwardly than substantially to the geometrical projection of the upper surface of the piston **18,** as is apparent in FIG. **6.** Top-loading of the product **16** to be dispensed forces the upwardly projecting thin annular flange **20** *a* against the inner wall surface **10***a* of the container **10;** this sealing force and action are enhanced upon closure of the top end **11** and subsequent pressurizing of the container in the manner already described, so that a tight seal is achieved between the piston **18** and the product **16** to be dispensed. The propellant gas **26** present within the hollow piston **18** moves the latter upwardly when the valve **12** is opened. Thus, as seen in FIG. **6,** when the piston **18** reaches the end of its travel upwardly against the conical top part **11** of the container **10,** the flange **20***a* is fully accommodated and remains sealingly engaged to the cylindrical body **10;** and substantially all of the product in the container **10** is expelled therefrom. It will be understood that the same result is achieved for the bottom-loaded configuration of FIG. **3** by eliminating the lower annular flange **30** from the FIG. **3** construction, and thereby relying on only the additional annular flange **32** formed integral with the piston **18.**

In the modification of FIG. **7,** the cylindrical body of piston **18** is slightly reduced, at **18'**, i.e., at overlap with flange **20***a*, to provide a greater local radial clearance A' with flange **20***a* for products of relatively high viscosity. The larger clearance of A' will be understood to be readily fillable, without voids, for such products.

FIG. **8** provides illustrative detail for the FIG. **5** organization applied to a container of medium or relatively large diameter. The conical end wall **11** is tapered, as in the range of 35° to 55° and, preferably, at approximately $\pi/4$ radian to the container axis, terminating at a neck bead or shoulder **33** at the central opening. Shoulder **33** serves to frictionally retain the skirt of a removal nozzle-protecting closure cap **34,** as will be understood. An elastomeric grommet-like fitting or bushing **35** is locked to the reduced central end of wall **11,** and the dispensing stem **14** of the valve is, in turn, locked to the fitting **35.** More specifically, the fitting **35** is held at a reduced circumferentially continuous groove or waist **36,** between an upper shoulder portion **37** and a lower conical flange portion **38,** the latter including a substantial downwardly and outwardly projecting region that is relatively free of back-up connection to the central or main generally cylindrical body portion **39.** To facilitate longitudinal assembly of fitting **35** via the interior of the container, the shoulder **37** is upwardly tapered to a reduced nose-end diameter at **40,** well within the diameter of the opening of wall **11,** the taper angle being less with respect to the central axis of the container than the slope angle of the conical end wall **11.**

To complete the description of valve structure, the stem **14** has a central product-dispensing passage **41** which terminates at, but does not extend through, an enlarged integral head **42.** Head **42** and a shoulder **43** define longitudinal limits of a reduced cylindrical body **44** which is retained by the bore of fitting **35,** and one or more radial passages **45** open the lower end of passage **41** within the bore of fitting **35** and adjacent head **42.** Preferably, the lower exposed surface of head **42** is spherical, as shown, about a center which approximates the instantaneous center **53** of tilt displacement of stem **14.**

The closed end of the body of piston **18'** (FIG. **8**) is characterized by a conical portion **46** conforming in slope to the taper of wall **11.** A spherically dished central portion **47** conforms to the exposed contour of head **42,** and a flat radial annulus **48** integrally unites the portions **46–47,** in close proximity to the lower limit of flange **38.** FIGS. **10** and **11** provide further detail, revealing the cylindrical body of the piston as a relatively thin peripheral shell or skirt **49,** integrally reinforced at regular angular spacings by thin elongate and radially inward stiffening ribs **50.** The juncture of the still thinner suspension and seal flange **20***a* may be continuous with the shell **49,** the upper edge of flange **20***a* being substantially within the geometric projection of the outer surface of the conical portion **46,** as shown.

The arrangement of FIGS. **9** and **12** illustrates how precisely the same dispensing valve and its supporting structure may be made to serve containers of smaller diameter. For this reason, the same reference numbers are used, where applicable. However, in view of the smaller container diameter, the conical upper end wall **11'** is similarly limited, to the extent that flange **38** extends so near the lower (outer) end of wall **11'** that it is impractical to form a conical portion in the closed end of piston **18''**. The end-wall portions **47–48** are thus directly connected at a rounded corner **51** to the relatively thin cylindrical skirt **49',** backed by ribs **50,** and the upper edge of the flange **20***a* lies substantially within the geometrical projection of a cone sloped to match the slope of the container end **11'** and tangent to the piston corner **51.**

In the carrying out of my invention, the axial extent of the waist **37** of fitting **35** preferably exceeds, as by 0.020 to 0.030 inch, the corresponding axial extent of the bore of the can opening in which it is retained, and the unstressed conical angle of flange **38** preferably slightly exceeds, as by 5°, the conical slope of end wall **11;** thus, for a wall **11** of 45° slope from the container axis, the unstressed slope of flange **38** is preferably substantially 50°. This relationship will be understood to facilitate assembly of a stem **14** and its fitting **35** to the wall **11,** while assuring resiliently loaded, peripherally continuous contour-adapting fit of flange **35** to adjacent lapped areas of wall **11.**

Several important advantages will be seen to flow from the described cone-to-cone fit at **38-11**, quite aside from the assembly feature just noted. For example, valve operation is more easily controlled, and the precision of valve actuation is enhanced. In operation, the fitting **35** serves as a resilient pivotal suspension, stem **14** being tilted about an instantaneous center (suggested by point **53** in FIGS. **8** and **9**) within the waist region **36**. Initial tilting movement is not stiffly opposed, since the root end of flange **38** is in slight clearance relation with the wall **11** near the central opening thereof; furthermore, flange **38** can be said to have a somewhat tangential connection to body **39** (in the sense about the instantaneous pivot center **53**) so that flange **38** is either locally pulled down or pushed outward along wall **11**, in the course of its sliding adaptation to the magnitude of tilt actuation. Stated in other words, for normal desired extents of valve-stem tilt, there is no substantial shear-force development between body **39** and flange **38**. Additionally, the employment of a small-diameter container (e.g., a 1-inch diameter container, as in FIG. **9**), or of a larger-diameter container (e.g., a 1.5-inch or larger diameter container, as in FIG. **8**), both with conically tapered end walls **11** (**11'**), means greater facility for index-finger actuation of stem **14** while grasping the container body with the remaining fingers of the same hand. Still further, the use of a conical end wall (**11**) inherently provides more extensive area, within a given limiting container diameter, to accomplish extensive resilient overlap of a seal flange, such as the flange **38** of fitting **35**.

As to the piston **18** (**18'–18''**), the employment of a conical tapering portion (for the larger sizes), and the use of the particular spherical-surface relationship described in connection with **42-47-53**, means less axial draft in the formation of the piston end wall, while achieving a contour which can assuredly expel virtually all the viscous product. The seal skirt or flange **20***a* is initially of preferably slightly less diameter (e.g., 0.002 to 0.005 inch) than the container bore and has a length B_1 in the order of one third the piston length L (FIGS. **11** and **12**), the axial extent B_2 of the portion in contact with the container wall being in the order of one-quarter of the length L. The clearance C between flange **20***a* and the piston body shell **49** is in the order of 0.040 inch, for the 1-inch and 1.5-inch sizes thus far mentioned, wherein the ratio of overall piston length L to overall piston diameter D is less than unity, being preferably approximately 3:4; stated in other words, the radial offset of the tubular flange **20** from the body structure or shell **49** is in the order of 5 to 15 percent of the outer radius of flange **20**, being preferably no greater than substantially ten percent of this outer radius. In these circumstances, the piston advances with uniform ease and smoothness, even though it may have cause to tilt or slightly misalign, in the course of its travel. The lower end of the piston body shell (**49**) always provides a limit to the possible tilt, and throughout the range of tilt angles, the seal flange **20***a* maintains a smoothly continuous circumferential seal between the gas-pressure region **26** and the viscous-contents region **16**. Also, the spherical conformity of the convex and concave surfaces **42–47** and their relation to the instantaneous center **53** for stem (**14**) tilt will be seen as assuring no interference with smooth control of tilt of stem **14** (with related smooth control of discharged product flow) upon approach to final discharge of the container, and regardless of whether or not piston **18'** (**18''**) may have been slightly tilted in the course of such approach.

Quite aside from the foregoing considerations, the top-fillable embodiments of the invention (FIGS. **3** to **12**) present the obvious advantage of square supportability for the container bottom, and by introducing product over the central region of the top of piston **18**, the product must then flow radially outward, to fill the clearance A' and to deflect flange **20***a* into assuredly sealed relation with body wall **10***a* before the level of loaded product rises above the top of flange **20***a*. Pressure loading of the underside of the closed container immediately upwardly displaces product and piston, to produce a much reduced pocket of compressed air local to nozzle **12**, and sealing contact with the container wall is never jeopardized, thus assuring against product leakage into the pressurized-gas region **26**. Also, in the event that freon or other gas-producing liquid is relied upon for propellant purposes in region **26**, the mere development of gas pressure is found to be adequate to assure leakage of such propellant liquid into contaminating contact with the product. Product quality, dischargeable product volume, and gas pressure are thus found to be maintainable for substantially increased shelf life of the filled package, as compared with prior constructions and methods.

Quite aside from and in addition to the foregoing, it will be noted that by reason of equilibrium between hydrostatic pressure in the product region and gas pressure in the pressure region **26**, in conjunction with the convergent resilient conical annulus (e.g., at **38–39**, in bushing **35**) between the conical end wall **11** and the valve stem **44**, a residual pressure loading is automatically established in the upward direction and over the inwardly exposed effective area at **38-39-42**, resulting in a strong axially upward wedging force on bushing **35**, such that substantially continuous and highly effective seal action exists as between bushing **35** and container end **11**, and between bushing **35** and stem **44**. This strong and effective seal action is achieved as long as valve **12** is closed and as long as product remains to be dispensed, and regardless of the fractional extent to which product may have been dispensed; such seal action is a direct result of the indicated geometry of structural relation and of the indicated method steps which result in pressure-loading of the product.

While the invention has been described in detail for preferred and illustrative contexts, it will be understood that modifications may be made without departure from the scope of the invention.

What is claimed is:

1. A piston for a pressurized container having a viscous product and provided with a dispensing valve, said piston comprising a piston body portion of a generally tubular configuration and a resilient annular elastomeric flange provided with an upstanding skirt portion on the outer wall of said piston body portion, said piston body portion being radially spaced from the inner wall of said skirt portion, said upstanding skirt portion being for contact with a container wall and being the only means of piston support, said skirt portion being relatively thin with respect to the space between said skirt portion and the piston body portion, said skirt portion having a large surface area of substantial axial length; whereby, when said piston is inserted in a suitable container and when the space within said skirt por-

tion and above said piston is loaded with viscous product and the space beneath said skirt portion and piston is subjected to a predetermined charge of gas under pressure, said skirt portion will be pressure-loaded into peripheral and axially continuous light sealing and stabilizing contact with the container wall.

2. A piston as claimed in claim 1, wherein said piston body portion includes reinforcement means whereby said piston body portion is relatively stiff in relation to the resilience of said skirt portion.

3. A piston as claimed in claim 1, wherein the thickness of said skirt portion is in the range of 0.005 to 0.015 inch.

4. A piston as claimed in claim 1, wherein said skirt portion is integrally formed with said piston body portion.

5. A piston as claimed in claim 1, wherein said piston body is constituted of a plastic.

6. A piston as claimed in claim 1, wherein said resilient flange projects radially outwardly and axially toward the head end of said piston body portion.

7. A piston for a pressurized container having a viscous product and provided with a dispensing valve, said piston comprising a piston body portion of a generally tubular configuration, a first resilient annular elastomeric flange provided with an upstanding skirt portion on the outer wall of said piston body portion, a second resilient annular elastomeric flange provided with a skirt portion on the outer wall of said piston body portion and axially beneath said first flange, said piston body portion being radially spaced from the inner walls of said skirt portions, said skirt portions being for contact with a container wall and being the only means of piston support, said skirt portions being relatively thin with respect to the space between said skirt portions and the piston body portion, said skirt portions each having a large surface area of substantial axial length; whereby, when said piston is inserted in a suitable container and when the space within said first skirt portion and above said piston is loaded with viscous product and the space beneath said second skirt portion and piston is subjected to a predetermined charge of gas under pressure, said skirt portions will be pressure-loaded into peripheral and axially continuous light sealing and stabilizing contact with the container wall.

8. A piston as claimed in claim 7, wherein said second flange projects axially downwardly and radially outwardly from said outer wall to a location axially spaced from the location of said first annular flange.

9. In combination, a pressure container comprising an elongate cylindrical body with a closed upper end, dispensing-valve means in said upper end, a piston having a closed upper end and integral body structure extending downwardly within a cylinder spaced from the container wall and united to the closed end of said piston, a peripherally continuous axially upwardly directed flexible tubular elastomeric flange carried by said piston within the annular space between the piston body structure and the container wall and of axial extent substantially less than that of said piston, said flange being relatively thin with respect to the space between said tubular flange and the piston body having a periphery of substantially the inner wall-surface peripheral extent of the container body, with a substantial axially extensive area of circumferential flange-seal contact with the container wall by reason of the tubular structure of said flange, said tubular flange being the only means of piston suspension with respect to the container wall, whereby a product chamber is defined in the container space between the flanged piston and the valved end of the container, a viscous product in said product chamber, pressure-sealing means closing the lower end of said container to define a pressure chamber beneath said piston, and a predetermined charge of gas under pressure in the pressure chamber, whereby viscous product pressure loads said tubular flange into peripheral and axially continuous light sealing and stabilizing contact with the container wall.

10. The combination of claim 9, in which said container body has a top opening, said dispensing-valve means being assembled to said body at the top opening after dispensable product is loaded through the opening.

11. The combination of claim 9, in which the radial offset of said tubular flange from said body structure is substantially ten percent of the outer radius of said tubular flange.

12. The combination of claim 9, in which said closed upper end of said container is a conical reduction from said cylindrical body to a central valve-locating opening.

13. The combination of claim 12, in which said valve means comprises a resilient bushing having a central body and an integral conical flange generally conforming to the inner surface of the conical reduction of the container and peripherally continuously sealing said bushing to the container, and a headed dispensing-valve member having a stem portion extending through said bushing and located thereby.

14. The combination of claim 9, wherein said piston body and tubular flange are parts of the same single injection-molded plastic article, the wall thickness of the closed end of said piston being substantially greater than that of said tubular flange.

15. The combination of claim 14, wherein said piston body comprises a cylindrical sheath with internal elongate stiffening ribs at angularly spaced locations.

16. The combination of claim 9, wherein the upper wall-surface contour of the closed end of said piston includes an outer frusto-conical annulus of slope conforming to that of said conical reduction.

17. The combination of claim 16, in which said tubular flange is connected to said piston body near the upper end thereof, said tubular flange being of effective axial length less than one half the overall axial length of said piston, and the upper edge of said flange being at substantially the elevation at which the geometrical projection of the slope of the frusto-conical annulus intersects the cylinder defined by the outer surface of said tubular flange.

18. The combination of claim 9, wherein the portion of said valve means exposed internally of said container is characterized by a central convex spherical contour, and wherein the upper surface of the closed end of said piston is characterized by a central spherical concavity substantially matching the said convex contour.

19. The combination of claim 9, in which the peripheral extent of said tubular flange is slightly less than that of the adjacent cylindrical container-body wall surface, the material of said flange being sufficiently flexible to inflate into peripherally continuous container-wall contact in response to piston-loading of product by reason of super-atmospheric pressure in said pressure chamber.

20. In combination, a pressure container comprising an elongate cylindrical body with a closed upper end, dispensing-valve means in said upper end, a piston having a closed upper end and integral body structure extending downwardly within a cylinder spaced from the container wall and united to the closed end of said piston, a peripherally continuous axially upwardly directed flexible tubular elastomeric flange carried by said piston within the annular space between the piston body structure and the container wall, said flange being relatively thin with respect to the space between said piston body and the container wall and being the only means of piston suspension with respect to the container wall, said flange having a periphery of substantially the inner wall-surface peripheral extent of the container body and being of substantial axial extent which is substantially less than that of said piston body structure, whereby a product chamber is defined in the container space between the flanged piston and the valved end of the container, a viscous product in said product chamber, pressure-sealing means closing the lower end of said container to define a pressure chamber beneath said piston, and a predetermined charge of gas under pressure in the pressure chamber, whereby viscous product pressure-loads said tubular flange into peripheral and axially continuous light sealing and stabilizing contact with the container wall.

21. A piston for a top-loaded pressurized container having above said piston a viscous product and a dispensing valve, and a gaseous propellant at superatmospheric pressure beneath said piston, said piston comprising a piston-body portion of generally tubular configuration and a resilient annular elastomeric flange provided with an upwardly directed skirt portion which projects upwardly and outwardly relative to the outer vertical wall of the piston body, said piston body being spaced from the inner wall of said container and non-sealing therewith and said flange skirt portion being the only means of piston-body suspension with respect to the inner wall of said container, the included effective transverse sectional area of said piston body substantially exceeding the included effective transverse sectional area of said space between said piston body and the inner wall of the container, said skirt portion having a substantial axially extensive surface area and being of such a length that substantially the total portion of said surface area when the piston body is inserted in said container engages the inner wall of said container with a light sealing pressure by the force exerted by said gaseous propellant acting on the piston body and thereby transmitting the predominant fraction of said force to compressionally load the viscous product and, hence, said skirt into radially outward sealing contact with the inner wall of said container.

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