May 20, 1958 M. J. MANETTI 2,835,418

DISPENSING CONTAINER

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Fig. 1

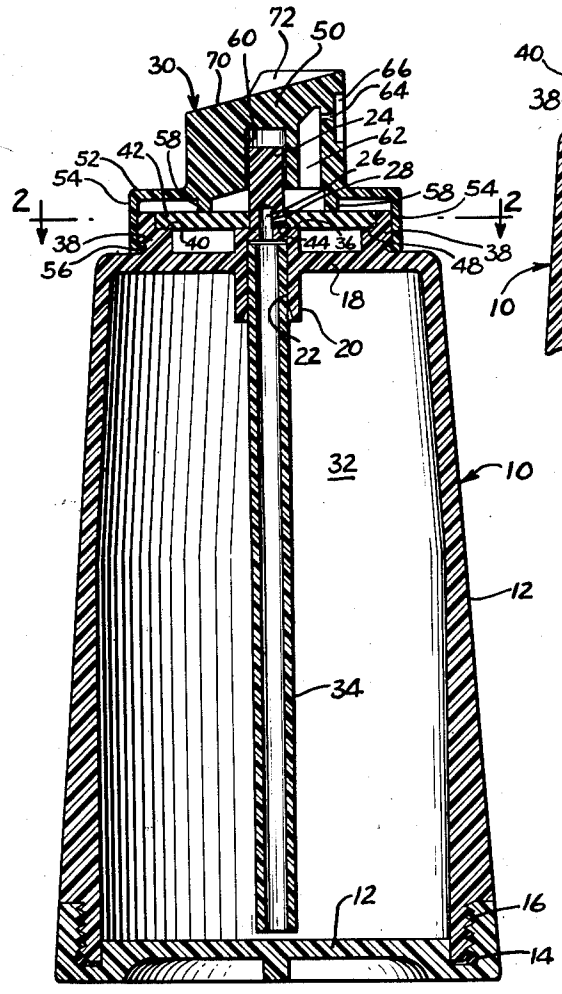


Fig. 3

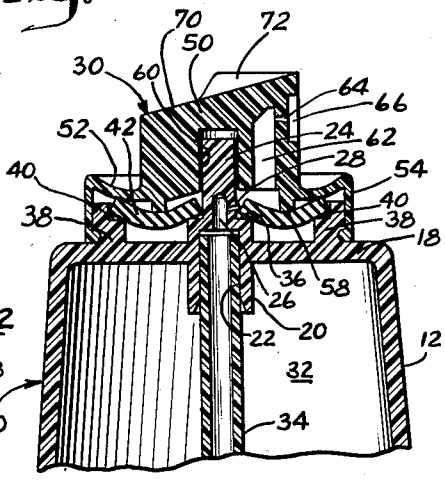
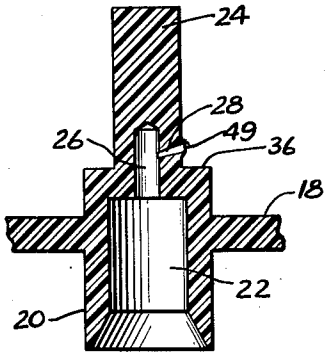


Fig. 4



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DISPENSING CONTAINER

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Fig. 2

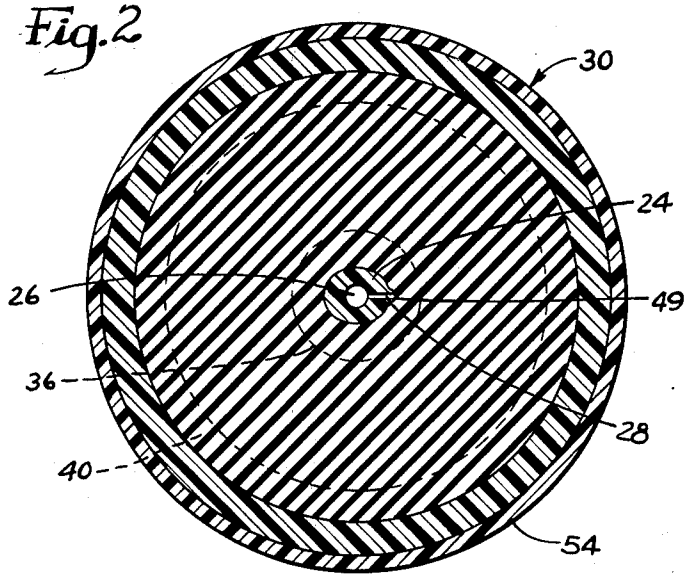
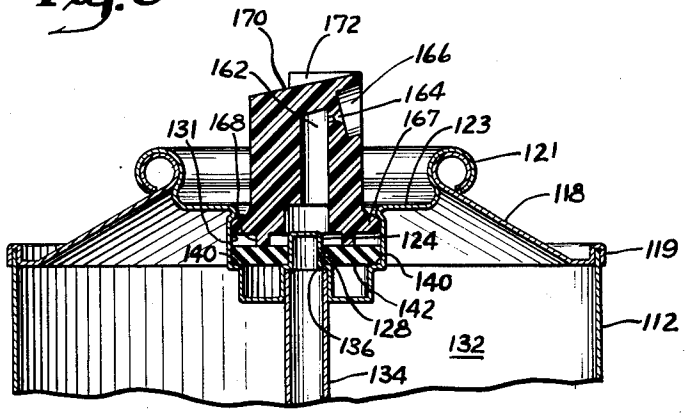


Fig. 5



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DISPENSING CONTAINER

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Application May 23, 1956, Serial No. 586,725

11 Claims. (Cl. 222—394)

The present invention relates to dispensing containers and more particularly to containers of the type commonly employed for dispensing liquids which are maintained under superatmospheric pressure within the container through a small orifice and which are propelled through the orifice by a gas propellant so as to discharge the liquid in small particles to the atmosphere in the form of a spray, mist, foam, lather or the like.

The improved dispensing container comprising the present invention has been designed primarily for household use in connection with the dispensing of liquids such as shaving cream, hair lacquer, deodorants, fumigants, insecticides, nasal sprays and other medicants, foodstuff such as whipped cream and similar beverages, suspensions and emulsions designed for coatings such as paint, varnish, lacquer and the like, and other liquids or semi-liquids too numerous to mention. The invention is, however, not limited to the dispensing of liquids and semi-liquids and the improved dispensing container may, if desired, with or without modification, be employed for the dispensing of gases under pressure in which case the gas will act as its own propellant. Additionally, the dispensing container may be employed for the dispensing of liquids in the form of a stream without particle dispersion as for example the dispensing of carbonated beverages and the like. Irrespective however of the particular use to which the invention may be put, the essential features of the same remain undisturbed.

Briefly, the present invention contemplates the provision of a dispensing container of the character outlined above and having a discharge port formed therein, together with a yieldable resilient closure for the port having one dimension which is relatively thick and a transverse dimension which is relatively thin. Normally, the closure is positioned against the port in such a manner as to close the same with the thick dimension of the closure yieldingly but tightly abutting against the port. Manually operable means are provided for flexing the closure in the direction of its thin dimension so as to distort the closure and, by such distortion, cause the port to be uncovered and allow fluid to escape therethrough. In one form of the invention, such manually operable closure-distorting means is in the form of a unitary one-piece nozzle member fixedly secured to the container proper and having a discharge orifice therein in communication with the discharge port of the container when the former is uncovered, a portion of the nozzle member being yieldable and thus capable of manual distortion in such a manner that when distorted the displaced portion thereof will engage the resilient closure member and flex the same to port opening position. In another form of the invention, the manually operable closure-distorting means comprises such a nozzle member likewise carried by the container proper but slidable relative thereto and manually movable into and out of engagement with the closure member for closure distorting purposes as previously described.

The provision of a dispensing container of the character briefly outlined above being among the principal objects of the invention, a further object is to provide a novel form of liquid-holding receptacle and dispensing nozzle therefor, the nozzle being capable of permanent assembly or attachment on the receptacle for cooperation therewith in the manner set forth above so that nozzles of different orifice sizes may be constructed by the manufacturer to correspond to the properties of the fluid and the character of the spray, lather, foam, etc. desired and thereafter applied to the filled receptacles and permanently united therewith.

The provision of a dispensing container in which the spray nozzle and valve structure associated therewith is of relatively simple construction and which therefore may be manufactured at a relatively low cost; one which is comprised of a minimum number of relatively moving parts and which therefore is unlikely to get out of order; one which may be formed almost entirely of plastic material resulting in lightness as well as contributing toward economy of manufacture; one which is comprised in the main of two easily assembled parts; one which may be operated with facility; and one which otherwise is well adapted to perform the services required of it, are further desirable features which have been borne in mind in the production and development of the present invention.

Other objects and advantages of the invention, not at this time enumerated, will become readily apparent as the nature of the invention is better understood.

In the accompanying two sheets of drawings forming a part of this specification, two illustrative embodiments of the invention have been shown.

In these drawings:

Fig. 1 is a sectional view taken substantially centrally and longitudinally through a dispensing container assembly constructed in accordance with the principles of the present invention and showing the discharge port thereof in its closed condition.

Fig. 2 is an enlarged sectional view taken substantially along the line 2—2 of Fig. 1 in the direction indicated by the arrows.

Fig. 3 is a fragmentary sectional view similar to Fig. 1 showing the discharge port in its open condition.

Fig. 4 is an enlarged sectional view taken substantially longitudinally and centrally through the upper regions of the container receptacle in the vicinity of the discharge port thereof, and

Fig. 5 is a fragmentary sectional view similar to Fig. 1 showing a modified form of container assembly.

Referring now to the drawings in detail and in particular to Figs. 1 to 4 inclusive, the invention in one form thereof involves in its general organization a receptacle 10 which may, in its entirety be formed of a suitable plastic material having a substantial degree of rigidity and provided with a generally cylindrical side wall 12, thickened in its lower regions and closed at its bottom by a bottom closure member gasketed as at 14 and threadedly received as at 16 on the end of the receptacle wall. The receptacle 10 is formed with an integral top wall 18 having a central boss-like hub portion 20 having an inwardly facing recess or socket 22 formed therein and an upstanding post portion 24 exteriorly of the receptacle confines. The socket 22 communicates through a narrow cylindrical passage 26 with an outlet port 28 which is shown as being radially disposed with respect to the post 24 and slightly inclined upwardly and outwardly and communicating with the interior of a nozzle member 30 which is secured to the receptacle 10 in a manner and for a purpose that will be made clear presently.

The receptacle 10 provides an internal liquid-contain-

ing chamber 32 and a tubular stem 34 has its upper end fitted within the socket 22 and extends to a point adjacent the bottom of the chamber 32 for conducting the liquid to be discharged to the outlet port 28. Where the character of the liquid undergoing dispensing and the manner in which it is to be delivered requires delivery of a lather or foam with the receptacle inverted, for example in the delivery of shaving cream into the palm of the hand, the tubular stem may be dispensed with and the inwardly projecting portion 20 of the socket wall omitted.

The post portion 24 of the hub 20 is reduced in diameter and is generally elliptical in cross section as seen in Fig. 2, thus providing an upwardly facing annular but elliptical ledge or shelf surface 36 (Fig. 4). The top wall is formed exteriorly thereof with a circular rib 38 which is recessed to provide an internal annular ledge 40 which faces upwardly and occupies substantially the same horizontal plane as the elliptical ledge 36.

Spanning the distance between the two ledges 36 and 40 and seated thereon is a relatively thick, flat annular sealing member or ring 42 which, in effect, constitutes a valve element for cooperation with the port 28 to control the opening and closing of the latter. The sealing ring 42 is preferably formed of a suitable elastomeric material such as rubber, either natural or synthetic, or a rubber substitute and the inner and outer peripheral edges 44 and 46 respectively are firmly wedged or compressed between the outer elliptical surface of the post 24 and the inwardly facing surface 48 of the rib 38. In the normal position of the sealing ring 42, the inner peripheral elliptical wall 44 thereof is thus caused to firmly bear against the wall of the post 24 so as to cover the port opening 28 which communicates with the passage 26. To insure a perfectly tight sealing fit of the inner peripheral surface or edge 44 of the sealing member or ring 42 over the port 28, the wall of the post 24 is formed with a bead or protuberance 49 (Figs. 2 and 4) in the immediate vicinity of the port 28 for better sealing contact of the sealing ring 42 with the rim of the port.

As best seen in Fig. 1, the nozzle member 30 is of inverted cup-shape design and includes a central generally cylindrical body portion 50 in the form of an upstanding hub-like portion which is formed at its lower regions with an annular top wall 52 and a depending apron or side wall 54 which encompasses the upstanding rib 38 and which may be beaded as at 56 over the rib or otherwise secured coextensively around the latter.

When the nozzle member 30 is secured in position on the upper end of the receptacle 10 in the manner just described, the top wall 52 thereof remains spaced a slight distance above the upper surface of the sealing ring 42 and a circular or otherwise annular rib 58 is formed on and depends from the underneath side of the hub portion 50 and overlies the medial regions of the sealing ring 42 in close proximity to the upper surface thereof. The rib 58 is designed for positive sealing engagement with the upper surface of the sealing member 42 to displace the latter and uncover the port 28 upon distortion of the nozzle member 30 in a manner and for a purpose that will be made clear presently.

Still referring to Fig. 1, the hub portion 50 of the nozzle member 30 is formed with an internal socket 60 into which the upper regions of the post 24 extends. The hub portion 50 is further provided with a vertical passage 62 which communicates at its upper region with a laterally extending discharge opening 64 formed in a recessed area 66 of the outside passage wall. The opening 64 and recess 66 constitute a spray opening or discharge jet for the dispenser assembly.

It is to be noted that the annular wall 52 of the nozzle member 30 is of relatively thin construction and, since the latter is formed of a thermoplastic material a certain amount of flexing of the wall 52 is possible. The hub portion 50 is vertically slidable on the upstanding post 24 of the receptacle throughout a limited range of movement and it will be seen that the hub portion may be manually depressed so that it will assume the position in which it is illustrated in Fig. 3 wherein the annular depending rib 58 sealingly engages the upper surface of the sealing ring 42 in the medial regions thereof and causes the ring to become flexed so as to pull the inner peripheral edge 44 of the ring away from the port 28 to uncover the same and allow the fluid under pressure contained within the receptacle body to be forced upwardly through the tubular stem 34 and passage 26 and be expelled through the port 28. The liquid leaving the port 28 enters the passage 62 and is finally discharged through the outlet opening 64, 66 to the atmosphere in the form of an aerosol or other spray, mist, foam, lather or the like, the character of the discharged material being a function of the design of the outlet opening and of the specific nature of the material.

It should be noted that although the sealing ring 42 is capable of being flexed when manual pressure is applied to the nozzle member to depress the same, it possesses sufficient rigidity that the underneath surface thereof will firmly bear downwardly against the annular ledge or seating surface 40 and effect a seal completely around this surface to prevent the gas-propelled liquid leaving the outlet port 28 from escaping into the lower regions of the annular trough or well which surrounds the centerpost by virtue of the raised rib 38 and from thence escaping to atmosphere by egress through the joint existing between the apron 54 and rib 38. A similar annular seal will become effective between the shelf surface 40 and sealing ring 42, particularly since the inwardly flexed wall 52 of the nozzle member engages the upper surface of the sealing member and serves to clamp the same against the shelf surface 40. During the time that the port 28 is uncovered, the rib 58 sealingly engages the sealing ring 42 and prevents escape of the fluid radially outwardly toward the apron 54.

To facilitate manual depression of the nozzle member 30 in the manner previously described, the hub portion 50 thereof may be formed with an inclined upper contact surface 70 having a pair of spaced upwardly extending finger-engaging ribs 72 thereon providing a suitable finger trough for better frictional contact between the finger and upper surface of the hub portion 50.

Referring now to Fig. 5 wherein a slightly modified form of the invention has been illustrated, the dispensing container herein shown is provided with a sheet metal receptacle while the nozzle member may be formed of thermoplastic material. Since the principle of operation involved is substantially the same as in the form of the invention illustrated in Figs. 1 to 4 inclusive, needless repetition of description has been obviated by the application of similar reference numerals of a higher order to the drawing.

In this form of the invention, the metal receptacle may be formed sectionally to include a cylindrical side wall 112 having a bottom wall (not shown). A generally conical top wall 118 is beaded or rolled as at 119 over the upper rim of the side wall 112 and, in turn, is beaded as at 121 to a closure member 123. The top wall 52 and apron 54 of the nozzle member 30 has been eliminated and the present nozzle member 130 is slidable within a well 131 in the form of an annular trough having a hollow centerpost 124 in which the upper end of the tubular stem 134 may be fitted. The elastomeric sealing ring 142 seats on inner and outer annular ledges 136 and 140 respectively and the outlet port 128 extends radially through the wall of the post 124. The vertical passage 162 and discharge outlet 164, 166 remain substantially the same as in the previously described form of the invention.

In the operation of the dispensing container of Fig. 5, the lower end of the nozzle member 130 is prevented from being withdrawn from the well 131 by an internal rib 167 provided at the upper rim of the well. The nozzle

member 130 is thus slidable within the well 131 and, upon depression thereof the annular rib 168 cooperates with the elastomeric sealing ring 142 to flex the same and uncover the outlet port 128 as in the previously described form of the invention.

The invention is not to be limited to the exact arrangement of parts shown in the accompanying drawings or described in this specification since various changes in the details of construction may be resorted to without departing from the spirit of the invention.

I claim:

1. In a dispensing container, in combination, a receptacle adapted to contain a fluid under pressure, said receptacle having a top wall provided with a fixed upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, a nozzle member mounted on the receptacle and overlying the centerpost, said top wall being formed with inner and outer concentric shelf surfaces surrounding the centerpost, a flat sealing ring formed of elastomeric material surrounding the centerpost and supported on said shelf surfaces, the inner peripheral edge of said sealing ring closely hugging the outer surface of said centerpost and normally closing said radial outlet port, said nozzle member including a body portion axially shiftable with respect to the receptacle and post and having a passage formed therein in register with said outlet port, there being a discharge port formed in said nozzle member in register with said passage and communicating with the atmosphere, a protuberance on said body portion in register with the medial regions of said sealing ring, said body portion being movable between a retracted position wherein said protuberance is out of flexing contact with the sealing ring to an advanced position wherein it engages the latter and flexes the same and causes the inner edge thereof to uncover said outlet port.

2. In a dispensing container, the combination set forth in claim 1 wherein said protuberance on the body portion of the nozzle member is in the form of an annular rib designed for sealing contact with the medial regions of the sealing ring when said body portion is moved to its advanced position.

3. In a dispensing container, the combination set forth in claim 1 wherein said body portion of the nozzle member is formed with a socket substantially centrally and axially thereof for telescopic reception of the centerpost when said body portion is moved to its advanced position.

4. In a dispensing container, in combination, a receptacle adapted to contain a liquid under the pressure of a gas propellant, said receptacle having a top wall provided with an upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, said top wall being formed with inner and outer concentric shelf surfaces surrounding the centerpost, a flat sealing ring formed of resilient material surrounding the centerpost and supported on said shelf surfaces, the inner peripheral edge of said sealing ring closely hugging the outer surface of said centerpost and normally closing said radial outlet port, a nozzle member including an apron mounted firmly on the receptacle and overlying said centerpost, said nozzle member including a flexible top wall overlying the top wall of the receptacle and spaced therefrom, there being a passage in said nozzle member in communication with said discharge outlet, a discharge port formed in said nozzle member in register with said passage and communicating with the atmosphere, a protuberance carried by said flexible top wall and in register with the medial regions of said sealing ring, said protuberance engaging said medial regions and flexing the same to cause said inner edge of the sealing ring to uncover said outlet port when said top wall is displaced in a direction toward said sealing ring.

5. In a dispensing apparatus, the combination set forth in claim 4 wherein said protuberance on said top wall is in the form of an annular rib designed for sealing contact with the medial regions of the sealing ring when said top wall is displaced.

6. In a dispensing apparatus, the combination set forth in claim 5 wherein said nozzle member is formed with an axial socket into which said centerpost extends and on which centerpost the nozzle member is axially slidable.

7. In a dispensing container, in combination, a receptacle adapted to contain a liquid under the pressure of a gas propellant, said receptacle having a top wall provided with a fixed upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, said top wall being formed with inner and outer concentric shelf surfaces surrounding the centerpost, a flat sealing ring formed of resilient material surrounding the centerpost and supported on said shelf surfaces, the inner peripheral edge of said ring closely hugging the wall of said centerpost and normally closing said radial port, a nozzle member slidable on said centerpost and having a portion thereof movable upon depression of the nozzle member into engagement with the medial regions of said sealing ring to flex the latter and cause the inner edge thereof to uncover said port, and means in said nozzle member effective when said sealing ring is flexed to conduct the fluid discharged from said outlet port to atmosphere.

8. In a dispensing container, in combination, a receptacle adapted to contain a liquid under the pressure of a gas propellant, said receptacle having a top wall provided with an upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, spaced concentric upstanding flanges on said top wall and surrounding the centerpost, an annular flat sealing ring formed of elastomeric material resting on the top edges of said flanges and closely hugging the wall of said centerpost and closing said radial port, a nozzle member secured to said receptacle and having a flexible top wall overlying the top wall of the latter, a protuberance depending from the top wall of the nozzle member and engageable with the medial regions of said sealing ring when said top wall of the nozzle member is flexed downwardly to flex the sealing ring and cause the latter to uncover said outlet port, and means on said nozzle member operable when said sealing ring is flexed to conduct the fluid discharged from said outlet port to the atmosphere.

9. In a dispensing container, the combination set forth in claim 8 wherein said centerpost is of elliptical shape in cross section with said radial outlet port being coincident with the major axis of the ellipse and the inner perimeter of the sealing ring normally is circular so as to be distorted by the centerpost and be held in snug engagement therewith normally.

10. In a dispensing container, in combination, a receptacle adapted to contain a liquid under the pressure of a gas propellant, said receptacle having a top wall provided with an upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, spaced concentric upstanding flanges on said top wall and surrounding the centerpost, said centerpost being elliptical-shaped in cross section with said radial outlet port coincident with the major axis of the ellipse, an annular flat sealing ring formed of elastomeric material resting on the top edges of said flanges and closely hugging the wall of said centerpost and closing said radial port, a nozzle member secured to said receptacle and having a flexible top wall overlying the top wall of the latter, a protuberance depending from the top wall of the nozzle member and engageable with the medial regions of said sealing ring when said top wall of the nozzle member is flexed downwardly to flex the sealing ring and cause the latter to uncover said outlet port, a protuberance on the outer surface of said centerpost in the immediate vicinity of and surrounding the outlet port to enhance the sealing action of said sealing

ring on said port, and means on said nozzle member operable when said sealing ring is flexed to conduct the fluid discharged from said outlet port to the atmosphere.

11. In a dispensing container, in combination, a receptacle adapted to contain a liquid under the pressure of a gas propellant, said receptacle having a top wall provided with an upstanding hollow centerpost, there being a radial outlet port extending through the wall of said centerpost, spaced concentric upstanding flanges on said top wall and surrounding the centerpost, an annular flat sealing ring formed of elastomeric material resting on the top edges of said flanges and closely hugging the wall of said centerpost and closing said radial port, a nozzle member secured to said receptacle and having a flexible top wall overlying the top wall of the latter, a

protuberance depending from the flexible top wall and engageable with the medial regions of said sealing ring when said flexible top wall is flexed downwardly to flex the sealing ring and cause the latter to uncover said outlet port, a protuberance on the outer surface of said centerpost in the immediate vicinity of and surrounding the outlet port to enhance the sealing action of said sealing ring on said port, and means on said nozzle member operable when said sealing ring is flexed to conduct the fluid discharged from said outlet port to the atmosphere.

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