

Aug. 22, 1967

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3,337,091

DISPENSING CONTAINER AND CHARGING VALVE THEREFOR

Filed Feb. 11, 1966

2 Sheets-Sheet 1

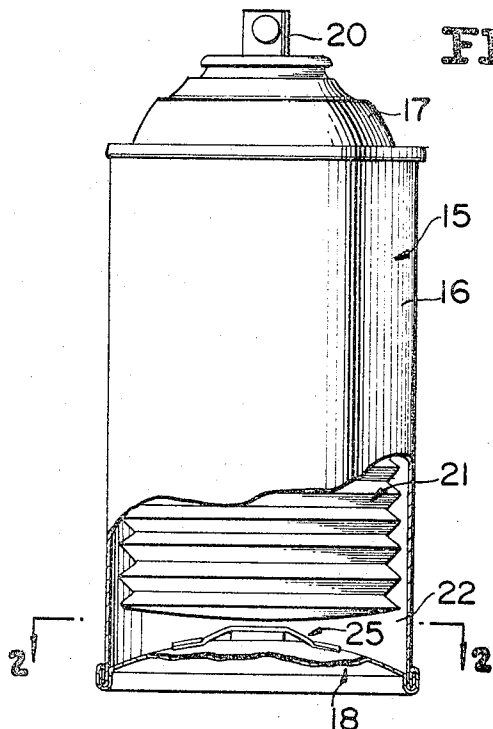


FIG. 1

FIG. 2

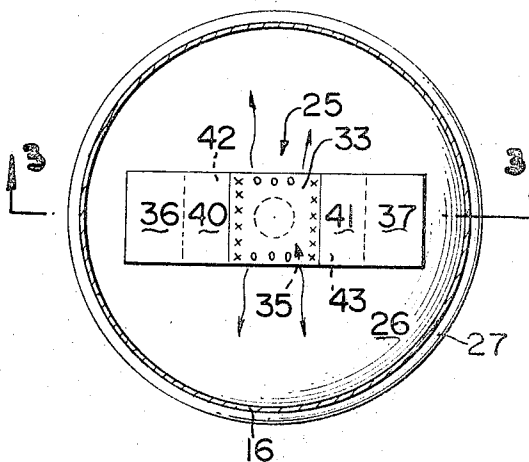


FIG. 3

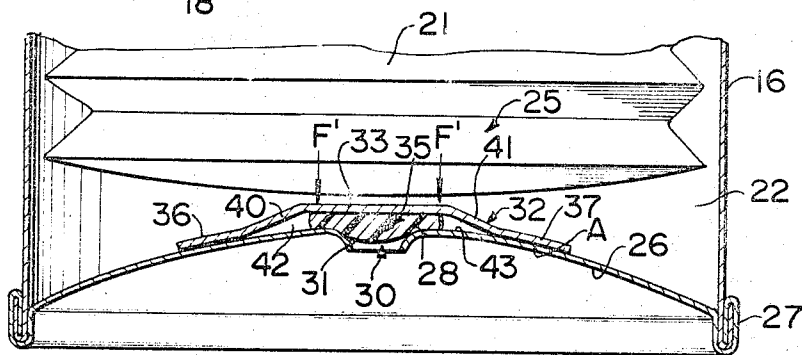


FIG. 4

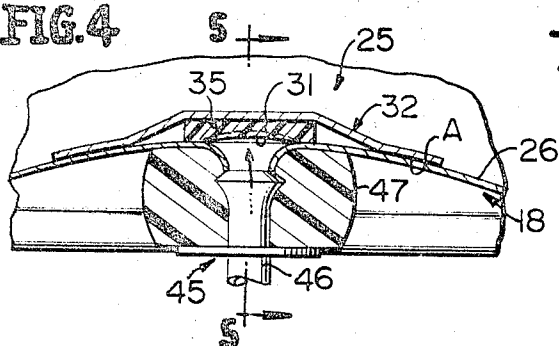
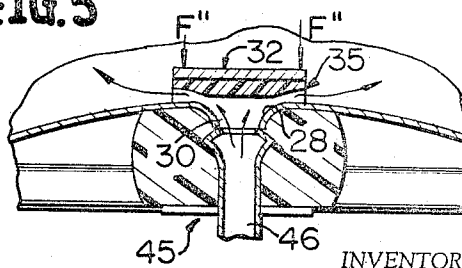


FIG. 5



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FIG. 6

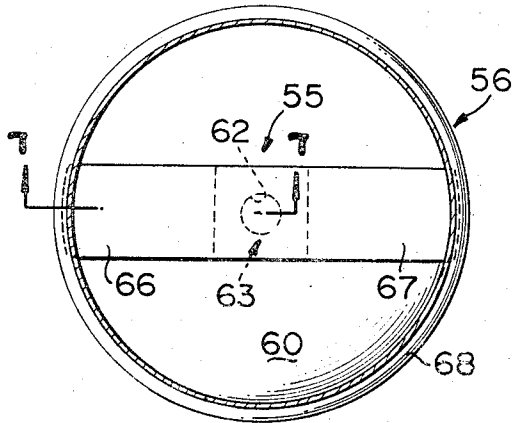


FIG. 7

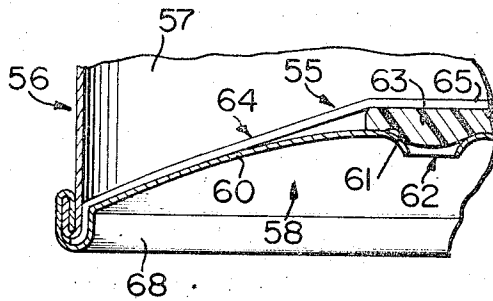


FIG. 8

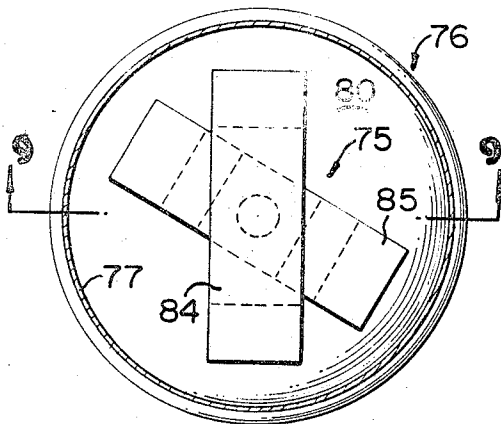


FIG. 10

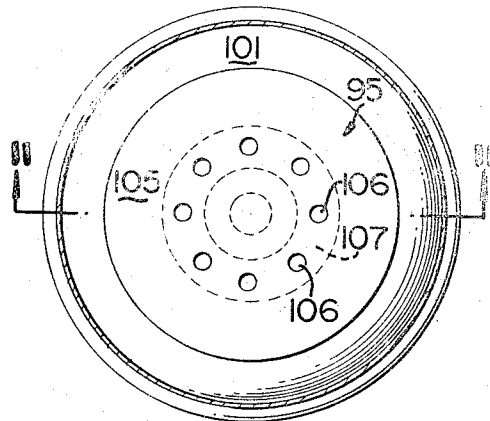


FIG. 9

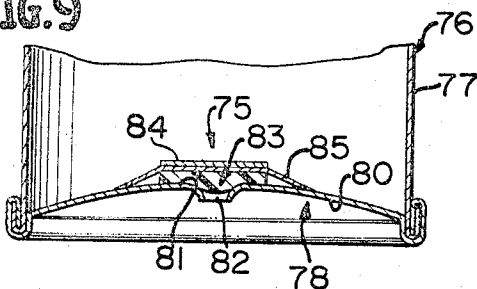
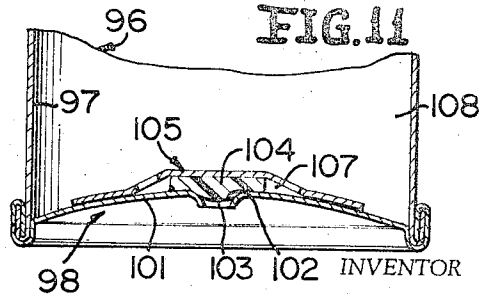


FIG. 11



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DISPENSING CONTAINER AND CHARGING VALVE THEREFOR

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8 Claims. (Cl. 222—95)

This invention relates to improvements in dispensing containers of the aerosol type, and is particularly directed to novel valve structures for charging a suitable propellant into a propellant chamber of the container while preventing the escape thereof upon the termination of a propellant charging operation and the subsequent life of the container.

A primary object of this invention is to provide a novel dispensing container which includes a product chamber and a propellant chamber, valve actuating means for controllably placing the product chamber in fluid communication with atmosphere to dispense a dispensable product therefrom, and valve means for permitting the introduction of propellant into the propellant chamber and preventing the leakage of propellant therefrom, the valve means being defined in part by a lower closure, the lower closure including aperture means, a valve disc of compressible material normally compressively sealingly overlying the aperture means, and means at all times maintaining at least a portion of the valve disc in engagement with the lower closure whereby propellant is introduced into the propellant chamber solely upon the deformation of the compressible material in the absence of bodily displacement of the valve disc.

A further object of this invention is to provide a novel dispensing container of the type immediately above-described wherein the maintaining means is a strip of material having a central portion and opposite end portions, the central portion being in overlying engagement with the valve disc, and the opposite end portions being secured between portions of a peripheral seam joining the lower closure to the container body.

A further object of this invention is to provide a novel dispensing container of the type heretofore described in which the maintaining means is a piece of substantially non-elastic tape, the tape having opposite end portions, a central portion and a portion connecting the end and central portions, the end portions being fixedly secured to the container, and the connecting portions being in spaced relationship to the bottom closure.

With the above, and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings:

In the drawings:

FIGURE 1 is a side elevational view of a novel dispensing container constructed in accordance with this invention with parts broken away for clarity, and illustrates a novel valve structure at a lower end portion of the container for introducing propellant into a propellant chamber thereof.

FIGURE 2 is an enlarged sectional view taken generally along line 2—2 of FIGURE 1, and illustrates a compressible valve disc maintained in overlying compressive engagement with an aperture in a lower closure of the container by means of a piece of generally non-elastic tape.

FIGURE 3 is an enlarged fragmentary sectional view taken generally along line 3—3 of FIGURE 2, and clearly illustrates a compressive seal between the valve disc and a valve seat defined by the lower closure prior to the introduction of a propellant into the propellant chamber.

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FIGURE 4 is a fragmentary sectional view of a portion of the lower closure of FIGURE 3, and illustrates the deformation of a lower portion of the valve disc during a propellant charging operation.

FIGURE 5 is a fragmentary sectional view taken generally along line 5—5 of FIGURE 4, and more clearly illustrates the deformation of the compressible valve disc under the influence of the force of the propellant during the introduction thereof into the propellant chamber.

FIGURE 6 is a transverse sectional view taken along a line corresponding to the line 2—2 of FIGURE 1, and illustrates a lower end portion of another dispensing container and another valve structure of this invention.

FIGURE 7 is an enlarged fragmentary sectional view taken generally along line 7—7 of FIGURE 6, and illustrates a valve disc compressively engaging a valve seat by means of a strip of material having opposite end portions clampingly engaged by a wall portion of a double seam of the container.

FIGURE 8 is a transverse sectional view of another dispensing container, and illustrates two strips of material urging a valve disc into compressed seating engagement with a valve seat of a lower closure.

FIGURE 9 is a fragmentary sectional view taken generally along line 9—9 of FIGURE 8, and more clearly illustrates the valve structure of FIGURE 8.

FIGURE 10 is a transverse sectional view of another dispensing container taken along a line corresponding to the line 2—2 of FIGURE 1, and illustrates a circular piece of sheet material maintaining a valve disc of compressible material in sealing engagement with a valve seat of a lower closure.

FIGURE 11 is a fragmentary sectional view taken generally along line 11—11 of FIGURE 10, and illustrates two of a plurality of apertures formed in the piece of generally circular material.

A novel dispensing container constructed in accordance with this invention is fully illustrated in FIGURE 1 of the drawings, and is generally designated by the reference numeral 15. The dispensing container 15 includes a metallic, cylindrical, tubular body 16 having opposite end portions (unnumbered) closed by upper and lower closures 17, 18. The upper closure 17 is generally dome-shaped in configuration and carries a conventional valve-actuated dispensing mechanism 20. The valve mechanism 20 is manually operable to selectively place the interior of a collapsible beaded product chamber 21 in fluid communication with atmosphere at which time a dispensable product is dispensed under the influence of propellant (not shown) in a propellant chamber 22 acting against the product chamber 21 in a conventional manner.

The dispensing container 15 includes a valve 25 for introducing a propellant into the propellant chamber 22 and preventing the escape therefrom. The valve or valve structure 25 is formed in part by the lower closure 18 which includes a generally dome-shaped end panel 26 having a peripheral edge portion (unnumbered) secured to the container body 16 by a double seam 27. An axial portion of the end panel 26 defines a generally annular valve seat 28 and an aperture 30.

A valve disc, generally designated by the reference numeral 35 is seated in overlying relationship to the aperture 30 and a lower surface 31 of the valve disc 35 is in sealing engagement with the valve seat 28. The valve disc 35 is generally square in configuration (FIGURE 2) and is constructed from compressible gasket material, such as rubber, plastic or similar compressible and elastic material.

Means 32 in the form of a strip of generally inelastic material is provided for maintaining the valve disc 35 in compressive sealing engagement with the valve seat 28. The means 32 may be, for example, a strip of tape hav-

ing a lower surface (unnumbered) coated with pressure-sensitive adhesive A. The strip of material 32 includes a center portion 33 (FIGURES 2 and 3) opposite end portions 36, 37 and bridging or connecting portions 40, 41. The center portion 33 of the tape 32 overlies and is adhesively secured to an upper surface (unnumbered) of the valve disc 35. The opposite end portions 36, 37 of the tape 32 are adhesively secured to an inner surface (unnumbered) of the end panel 26. The bridging portions 40, 41 are in spaced relationship to the end panel 26, as is best illustrated in FIGURE 3 of the drawings.

The dispensing container 15 of FIGURES 1 through 3 is charged with a suitable pressurized propellant such as carbon dioxide, Freon, etc., by seating the end panel 26 of the container 15 upon a filling head 45 (FIGURE 4) which is in turn placed in fluid communication with a source of pressurized propellant (not shown) by a conduit 46. A gasket 47 forms a seal between the filling head 45 and the end panel 26. Thereafter a valve (not shown) in the conduit 46 is opened and the force of the propellant acting against the surface 31 of the valve disc 35 deforms the material and the propellant enters the propellant chamber 22 in the manner graphically illustrated by the unnumbered headed arrows in FIGURE 5 of the drawings. It is to be understood that the compressive seal between the valve seat 28 and the surface 31 of the valve disc 35 prior to the introduction of the propellant into the propellant chamber 22 is effective above the complete periphery of the aperture 30. When the propellant is introduced through the aperture 30 the force F thereof overcomes the compressive force acting on the valve disc 35 thereby breaking the compressive seal and permitting the propellant to enter the propellant chamber 22. It should be particularly noted, however, that the compressive forces F' of the tape 32 are greater at the edges of the valve disc 35 adjacent the openings 42, 43 than forces F'' along edges of the tape 32 along the longitudinal edge portions of the tape 32. In FIGURE 2 of the drawings the x's indicate the forces F' while the o's indicate the forces F''. Due to the greater compressive seal effected by the forces F' the propellant acting against the undersurface 31 of the valve disc 35 deforms the valve disc 35 at the lesser compressed portions thereof i.e., in the area of the forces F''. Due to this construction the material of the valve disc 35 is not unseated along the edges of the valve disc 35 which are compressed by the forces F', as is readily apparent from FIGURES 2 and 5 of the drawings. Rather, the valve disc 35 is deformed along the edges thereof which are subjected to the forces F'' (FIGURE 5) and the propellant is introduced into the propellant chamber 22 in opposite directions which are normal to the longitudinal axis of the tape 32, as is best illustrated in FIGURE 2 of the drawings by the unnumbered headed arrows.

When a predetermined quantity of the propellant has been introduced into the propellant chamber 22 the valve (not shown) in the conduit 46 is closed and the dispensing container 15 is removed from the seated position thereof upon the filling head 45. When the valve is closed the force of the propellant augments the forces F', F'' of the tape 32 to again urge the surface 31 of the valve disc 35 into sealing engagement with the valve seat 28. The material of the valve disc 35 is therefore further compressed by the force of the propellant and the aperture 30 is substantially filled by the material of the valve disc 35 which is deformed downwardly causing an extremely highly efficient compressive seal between the surface 31 of the valve disc 35 and the valve seat 28.

Another novel valve structure constructed in accordance with this invention is illustrated in FIGURES 6 and 7 of the drawings, and is generally designated by the reference numeral 55. The valve structure 55 forms a portion of a dispensing container 56 which is substantially identical to the dispensing container 15, and a further description thereof is deemed unnecessary for a complete

understanding of this invention. The dispensing container 56 does, however, include a container body 57 and a lower closure 58 which in part defines the valve structure 55. The lower closure 58 includes an end panel 60 provided with an annular valve seat 61 and an aperture 62, corresponding to the aperture 30 of the dispensing container 15.

A valve disc 63 which is identical to the valve disc 35 is seated upon a portion of the end panel 58 adjacent the aperture 62 and forms a seal with the valve seat 61. The structure and function of the valve disc 63 is identical to that of the valve disc 35, and the former is maintained in compressive engagement with the valve seat 61 by a strip of sheet material or tape 64. The sheet material strip 64 includes a central portion 65 overlying the valve disc 63 and opposite end portions 66, 67.

In lieu of the adhesive A securing the tap 32 of the valve 25 to the end panel 26, the strip of material 64 is secured to the container 56 by means of a double seam 68, in the manner best illustrated in FIGURE 7 of the drawings. During the seaming of the lower closure 58 to the body 57 the end portions 66, 67 are clamped between wall portions of the double seam 68. In this manner the valve structure 55 is maintained fixedly secured in the body 57 of the dispensing container 56 in the absence of adhesive or other auxiliary securing means.

Another valve structure in accordance with this invention is illustrated in FIGURES 8 and 9 of the drawings, and is generally designated by the reference numeral 75. The valve structure 75 is associated with a dispensing container 76 which is identical to the dispensing container 15, and includes a container body 77 closed at a bottom end by a lower closure 78. The lower closure 78 includes an end panel 80 which includes a valve seat 81 and an aperture 82. A valve disc 83 of compressible material overlyingly compressively engages the valve seat 81, and is maintained in this position by means of two strips of material or tapes 84, 85. Each of the tapes 84, 85 is identical to the tape 32 heretofore described, and as is best illustrated in FIGURE 8 of the drawings, the longitudinal axes of the tapes are disposed in angular relationship to each other with the tape 84 positioned above the tape 85.

Another valve structure constructed in accordance with this invention is illustrated in FIGURES 10 and 11 of the drawings, and is generally designated by the reference numeral 95. The valve structure 95 is seated in a body 97 of a dispensing container 96 which is substantially identical to the dispensing container 15. A lower end of the container body 97 is closed by a closure 98 having an end panel 101 which is provided with a valve seat 102 and an aperture 103. A valve disc 104 which is structurally and functionally identical to the valve disc 35 is maintained in compressive sealing engagement with the valve seat 102 by means of a strip of inelastic material or tape 105. The strip of material or tape 105 is circular in configuration (FIGURE 10) and includes a plurality of identical apertures 106 which overlie an annular chamber 107 defined by portions of the strip 105, the valve disc 104 and the end panel 101.

Upon the introduction of a propellant through the aperture 103, the material of the valve disc 104 is deformed and the compressive seal is broken to permit propellant to flow from the aperture 103 into the annular chamber 107. The propellant thereafter flows from the annular chamber 107 through the apertures 106 into a propellant chamber 108. Resealing of the aperture 103 takes place at the termination of the charging operation in the manner heretofore fully described with respect to FIGURES 1 through 5 of the drawings.

From the foregoing, it will be seen that novel and advantageous provisions have been made for carrying out the desired end. However, attention is again directed to the fact that additional variations may be made in this

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invention without departing from the spirit and scope thereof as defined in the appended claims.

I claim:

1. A dispensing container comprising a container body having axially opposite ends at least one of which is closed by an associated closure to define a propellant chamber, valve means disposed wholly within said propellant chamber for permitting the introduction of propellant into said propellant chamber and preventing the leakage of propellant therefrom, said valve means being defined in part by said closure, said closure including aperture means, said valve means further including an imperforate valve disc of compressible material normally compressively sealingly overlying said aperture means, and means other than said disc and the propellant medium at all times maintaining at least a portion of said valve disc in engagement with said closure whereby propellant is introduced into said propellant chamber through said aperture means solely upon the compressive deformation of said compressible material in the absence of any bodily displacement of said valve disc.

2. The dispensing container as defined in claim 1 wherein said maintaining means is a strip of material overlying said valve disc, and adhesive means are provided for securing said strip to said closure.

3. The dispensing container as defined in claim 1 wherein said closure is a lower closure of said container joined to said body by securing means, and said securing means also secure said maintaining means in overlying relationship to said lower closure.

4. The dispensing container as defined in claim 3 wherein said securing means is a peripheral seam, said maintaining means is a strip of sheet material, and a portion of said strip is clampingly secured between portions of said peripheral seam.

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5. The dispensing container as defined in claim 1 wherein said maintaining means is a strip of material having a central portion overlying said valve disc and a peripheral portion secured to said closure, a medial portion of said strip between said central and peripheral portion being spaced from said closure, and aperture means in said medial portion.

6. The dispensing container as defined in claim 1 wherein said maintaining means is a piece of substantially non-elastic tape, said tape having opposite end portions, a central portion, and a portion connecting said end and central portions, said end portions being fixedly secured to said container, and said connecting portions being in spaced relationship to said closure.

7. The dispensing container as defined in claim 6 wherein adhesive means are provided for fixedly securing said tape to said closure.

8. The dispensing container as defined in claim 6 wherein said closure is secured to said body by a peripheral seam, and said end portions are fixedly secured to said container by being clampingly secured between portions of said seam.

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