Aug. 19, 1969 H. D. BARTELS 3,462,046

AEROSOL CONTAINER AND VALVE THEREFOR

Filed May 3, 1966 2 Sheets-Sheet 1

FIG. 1

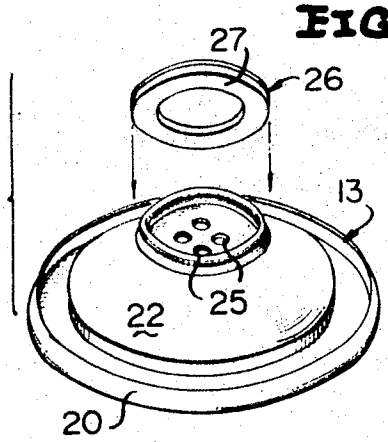

FIG. 2

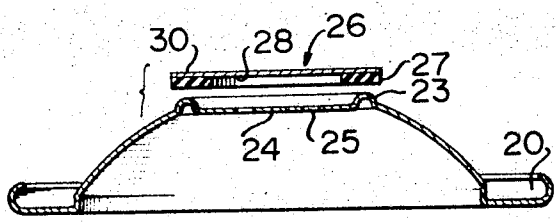

FIG. 3

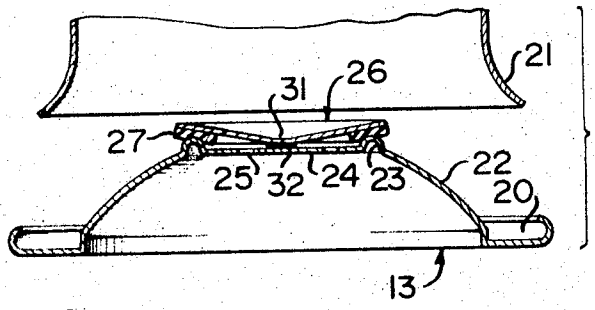

FIG. 4

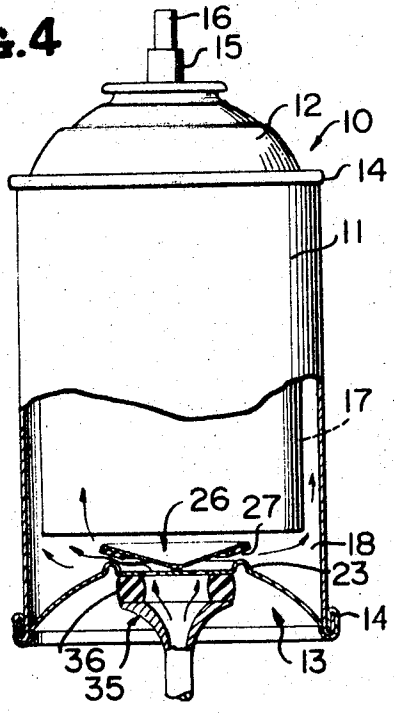

FIG. 5

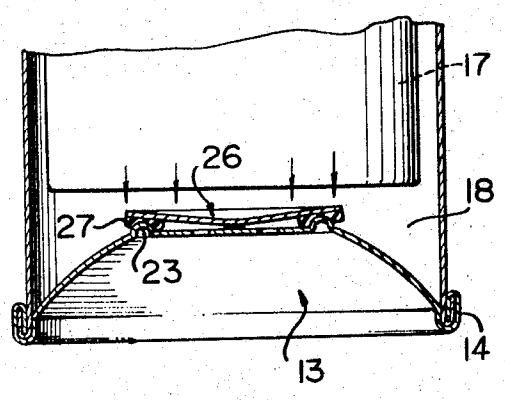

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FIG. 6

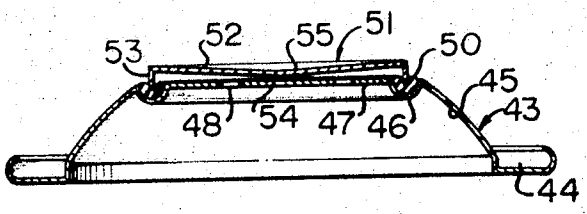


FIG. 7

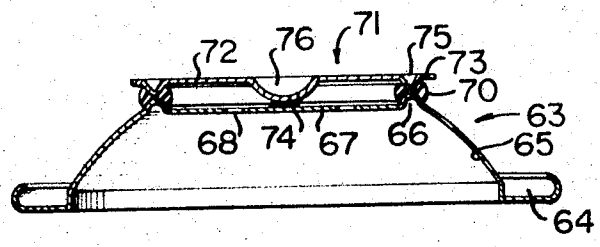


FIG. 8

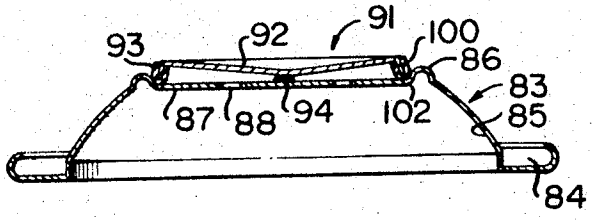
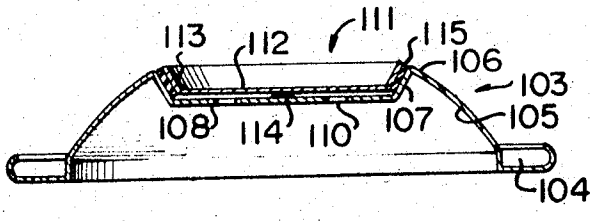


FIG. 9



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AEROSOL CONTAINER AND VALVE THEREFOR

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Int. Cl. B65d 83/14; F16k 15/14; B65b 31/00
U.S. Cl. 222—394 10 Claims

ABSTRACT OF THE DISCLOSURE

A dispensing container having an apertured end closure, an annular bead surrounding the aperture, and a flexible disc secured with its periphery in generally overlying sealed relationship to the annular bead. The periphery of the disc is either downwardly or upwardly directed and may be in turn provided with a bead corresponding to the bead formed in the closure.

A primary object of this invention is to provide a novel dispensing container having a container body closed at axially opposite ends by upper and lower closures, means defining product and propellant chambers within the body, the lower closure in part defining means for introducing propellant into and preventing the escape of propellant from the propellant chamber, the lower closure including an end panel having an apertured central panel portion and an annular bead defining a valve seat, a flexible valve disc in overlying relationship to the central panel portion and fixedly secured centrally thereof, a peripheral edge portion of the valve disc being positioned in generally opposed relationship to the valve seat, and compressible sealing material between the peripheral edge portion of the valve disc and the valve seat forming a gas impermeable seal which is opened by the deflection of the valve disc under the influence of propellant being introduced into the propellant chamber and being reboundable to a closed position whereby the escape of propellant from the propellant chamber is precluded.

A further object of this invention is to provide a novel dispensing container of the type immediately above described in which the annular bead defines a channel opening toward an upper closure of the container, and the peripheral edge portion of the valve disc is in biased compressing engagement with the sealing material which is located in the channel.

Still another object of this invention is to provide a novel dispensing container of the type heretofore described in which the valve disc includes an annular bead in overlying relationship to the annular bead of the end panel, and the sealing material is disposed between the annular beads.

Another object of this invention is to provide a novel dispensing container of the type heretofore described wherein the annular bead of the end panel is defined in part by an annular wall sloping radially outwardly and upwardly from the central panel portion, the peripheral edge portion of the valve disc is defined by an annular wall sloping radially outwardly and upwardly from the central portion of the valve disc, and the sealing material is disposed between the annular walls.

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 an exploded perspective view of a lower closure and valve disc of a dispensing container prior to being assembled, and illustrates an annular upstanding bead of the closure and sealing material secured to a lower face of the valve disc.

FIGURE 2 is an enlarged exploded axial sectional view of the closure and valve disc of FIGURE 1, and illustrates the sealing material overlying the annular bead of the closure prior to complete assembly of the components, and apertures in a central portion of the closure.

FIGURE 3 is an exploded axial sectional view through the closure and valve disc of FIGURE 2 and an associated dispensing container body, and illustrates a central portion of the valve disc being depressed and fixed to the end panel of the lower closure.

FIGURE 4 is a side elevational view of a completely assembled dispensing container with parts broken away for clarity and illustrates propellant being introduced into a propellant chamber by the unseating of the valve disc under the influence of the propellant.

FIGURE 5 is an enlarged fragmentary axial sectional view through the dispensing container of FIGURE 4, and illustrates the formation of a seal between the annular bead and the sealing material after the completion of the charging operation.

FIGURE 6 is an axial sectional view of another closure and valve constructed in accordance with this invention, and illustrates sealing compound located in an upwardly opening annular channel of the closure and a peripheral edge of a valve disc forcefully sealingly engaging the sealing material.

FIGURE 7 is an axial sectional view of another closure and valve structure constructed in accordance with this invention, and illustrates sealing material disposed between opposed annular beads on the closure and a valve disc.

FIGURE 8 is an axial sectional view of another closure and valve structure constructed in accordance with this invention, and illustrates sealing material carried by a peripheral flange of a valve disc fixed to the closure.

FIGURE 9 is an axial sectional view of another closure and valve structure of this invention and illustrates a valve disc housed in an upwardly opening recess of the closure and sealing material between complementary contoured annular walls of the closure and the disc.

A dispensing container constructed in accordance with this invention is fully illustrated in FIGURE 4 of the drawings, and is generally designated by the reference numeral **10**. The dispensing container **10** includes a tubular, cylindrical metallic body **11** closed at opposite ends by respective upper and lower closures **12, 13**. The closures **12, 13** are secured to the body **11** by identical conventional double seams **14**. The upper closure **12** is generally dome-shaped in configuration and includes a conventional manually operable dispensing mechanism, generally referred to by the reference numeral **15**. The dispensing mechanism **15** is preferably valve actuated and, upon depressing a plunger **16** thereof, a dispensable product (not shown) within a product chamber **17** is dispensed in a conventional manner under the influence of a propellant (not shown) in a propellant chamber **18**.

The lower closure **13** is best illustrated in FIGURES 1 through 3 of the drawings, and includes an end panel (unnumbered) having a peripheral edge portion **20** which receives a lower edge **21** of the body **11**. The peripheral edge portion **20** and the lower edge portion **21** are formed into the double seam **14** (FIGURE 4) by conventional seaming apparatus (not shown). The peripheral portion **20** is integrally joined to a generally annular wall portion **22** which is in turn integrally joined to a downwardly opening annular or circular bead **23** having a bight portion (unnumbered) defining a valve seat, as will be more apparent hereafter. The bead **23** is in turn integrally joined

to a central panel portion 24 which is generally circular in outline and lies in a plane normal to the longitudinal axis of the closure 13 and the container body 11. A plurality of apertures 25 (FIGURE 1) are formed in the central panel portion 24 at points radially outwardly of the closure axis. There are four such apertures 25 formed in the central panel portion 24 of the closure 13, as is best illustrated in FIGURE 1 of the drawings, but the number of these apertures may be increased or decreased in accordance with this invention.

Prior to assembling the lower closure 13 to the body 11 by means fo the double seam 14 a flexible valve disc, generally referred to by the reference numeral 26, is positioned in overlying relationship to the central panel portion 24, as is best illustrated in FIGURE 2 of the drawings. The valve disc 26 is circular in outline and is preferably constructed from flexible metallic material but can, if desired, be constructed from plastic material. Compressible sealing material 27, which is preferably end seam sealing compound, is applied to an undersurface 28 of the valve disc 26 adjacent a peripheral edge portion 30 thereof. The valve disc 26 is seated upon the lower closure 13 with the sealing material 27 contacting the bight portion (unnumbered) of the annular bead 23. Thereafter a central portion 31 of the valve disc 26 is flexed or depressed against the center of the central panel portion 24 and is fixedly secured thereto by, for example, a spot weld 32. In the event the valve disc 26 is constructed from plastic material, a suitable adhesive may be employed in lieu of the spot weld 32 to maintain the valve disc 26 secured to the lower closure 13 in the manner best illustrated in FIGURE 3 of the drawings.

The dispensing container 11 is "charged" with a suitable propellant (not shown) in the form of either a compressed gas or a compressed liquid by positioning the central panel portion 24 of the lower closure 13 upon a nozzle 35 provided with an annular gasket 36 in sealing contact with the central wall portion 24 of the closure 13 radially outwardly of the apertures 25. The propellant from a suitable source (not shown) flows through the apertures 25 and deflects the valve disc 28 upwardly, as is best illustrated in FIGURE 4 of the drawings, which forms an annular gap upon the unseating of the sealing material 27 and the annular bead 23. The propellant thereby enters the propellant chamber 18 in the manner graphically illustrated by the headed unnumbered arrows in FIGURE 4.

After a predetermined quantity of propellant is introduced into the propellant chamber 18, a valve (not shown) is closed to interrupt the fluid communication between the propellant source and the nozzle 35. Thereafter, the dispensing container 11 is removed from the nozzle 35 and the pressure of the propellant within the chamber 18 urges the valve disc downwardly in the manner best illustrated in FIGURE 5 of the drawings causing the sealing material 27 to deform and compressingly sealingly engage the annular bead 23.

Another lower closure constructed in accordance with this invention and adapted for assembly with a dispensing container similar to that heretofore described is illustrated in FIGURE 6 of the drawings, and is generally referred to by the reference numeral 43. The lower closure 43 includes a peripheral edge portion 44 and an annular wall 45 corresponding to the portions 20, 22 respectively of the closure 13. However, in lieu of the upwardly directed bead 23 of the lower closure 13, the closure 43 is provided with a downwardly directed annular or circular bead 46 which defines an upwardly opening channel (unnumbered). The bead 46 surrounds a central panel portion 47 which is provided with a plurality of apertures 48 corresponding in location and function to the apertures 25 of the closure 13. Sealing material 50 is located in the channel (unnumbered) defined by the upwardly opening bead 46.

A flexible valve disc 51 having an end panel 52 and a depending peripheral edge portion or skirt 53 is fixed to the center of the wall portion 47 by suitable means 54, such as spot welding cement, etc., depending upon the material from which the lower closure 43 and the valve disc 51 are constructed. A central portion 55 of the valve disc 51 is depressed downwardly forming an upwardly opening recess (unnumbered) which is somewhat shallower than the recess defined by the valve disc 26 due to the inverted position of the annular bead 46 as compared to the position of the annular bead 23. Due to the depression of the central panel portion 55, the valve disc 51 is stressed and the peripheral skirt 53 is continually urged downwardly into compressing engagement with the sealing material 50.

The lower closure 43, when secured to a dispensing body, such as the dispensing body 11 of FIGURE 4, is operative in the manner heretofore described with respect to the lower closure 13, and a description thereof is deemed unnecessary for a complete understanding of this invention.

Another lower closure and valve structure provided in accordance with this invention is illustrated in FIGURE 7 of the drawings and includes a lower closure 63 having a peripheral edge portion 64 and an integral upstanding annular wall 65. The annular wall 65 is joined to a central panel portion 67 by an upstanding annular or circular bead 66 which corresponds in structure and function to the annular bead 23 of the lower closure 13. A plurality of apertures 68, corresponding to the apertures 25 of the lower closure 13, are formed in the central panel portion 67.

A flexible valve disc 71 having an end panel 72 and a peripheral edge potrion 73 is secure to the central panel portion 67 of the lower closure 63 by conventional securing means 74, such as a weld, adhesive, etc. A center portion 76 of the end panel 72 is depressed to define an upwardly opening concave recess (unnumbered) and the formation of the depression 76 stresses the valve disc 71 in the manner heretofore noted. The peripheral edge 73 of the valve disc 71 is provided with a downwardly directed upwardly opening annular or circular bead 75 which is in axially opposed relationship to the upwarly directed bead 66 of the lower closure 63. Sealing material 70 is positioned between the beads 66, 75 and is illustrated in a compressed state due to the force of the internal stresses of the valve disc 71 urging the annular bead 75 downwardly toward the bead 66. The sealing material 70 is preferably fixed to the annular bead 66 by, for example, a suitable adhesive. In lieu of fixing the sealing material 70 to the bead 66 the sealing material 70 may be fixed to the bead 75. In either case propellant introduced through the apertures 68 of the lower closure 63 in the manner heretofore described causes the upward flexing of the valve disc 71 and the unseating of one of the beads 66, 75 relative to the sealing material 70 and the subsequent resealing therebetween at the completion of the charging operation.

Another closure and valve structure constructed in accordance with this invention is illustrated in FIGURE 8 of the drawings, and includes a lower closure 83 having a peripheral edge potrion 84 and an upstanding annular wall 85. A central panel portion 87 of the lower closure 83 is provided with apertures 88 and is integrally joined to the annular wall 85 by an upstanding circular or annular bead 86.

A flexible valve disc 91 having a depressed central panel portion 92 and a downwardly directed peripheral edge portion or peripheral skirt 93 is fixedly secured to the central panel portion 87 of the lower closure 83 by means 94, such as a spot weld, cement, adhesive or similar conventional securing means. A coating of sealing material 100 completely covers the peripheral edge 93 of the valve disc 91 and normally seats against an annular juncture 102 between the annular bead 86 and the central panel portion 87. Upon the introduction of a propellant through the apertures 88, the valve disc 91 is flexed

upwarly and sealing contact between the sealing material **100** and the annular juncture **102** is broken to permit charging of a container in the manner heretofore described and the subsequent resealing thereof.

Another novel closure and valve structure constructed in accordance with this invention is illustrated in FIGURE 9 of the drawings and includes a lower closure **103** provided with a peripheral edge portion **104** and an upwardly directed annular wall **105**. The wall **105** merges with an upwardly directed annular or circular bead **106**. The annular bead **106** includes an upwardly diverging annular wall **107** integrally joined to a central pauel portion **108** having a plurality of apertures **110** corresponding to the apertures **25** of the lower closure **13**. A flexible valve disc **111** overlies the central panel portion **108** and includes an end panel **112** and an upwardly diverging annular peripheral wall or skirt **113**. The central portion of the end panel **112** is secured to the central panel portion **108** of the lower closure **103** by conventional securing means, generally referred to by the reference numeral **114**.

Sealing material **115** is disposed between the annular walls **113, 107**. The sealing material **115** is preferably secured by conventional means, such as an adhesive, to the annular wall **107**. However, the sealing material **115** may be secured to the peripheral skirt **113** of the valve disc **111**. In either case propellant introduced through the apertures **110** causes the valve disc **111** to flex upwardly and unseat a seal between either of the annular walls **107, 113** and the sealing material **115**.

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 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, a lower closure at an end of said body, said lower closure in part defining means for introducing propellant into and preventing the escape of propellant from a chamber within said body, said lower closure including an end panel, said end panel including a central panel portion, aperture means in said central panel portion, an annular bead surrounding said central panel portion and defining a valve seat, a flexible valve disc in said body in overlying relationship to said central panel portion, said valve disc having a central portion fixedly secured to said central panel portion and a peripheral edge portion positioned in generally opposed relationship to said annular bead, compressible sealing material between the peripheral edge portion of said valve disc and said valve seat, said valve disc deflecting to an open position under the influence of propellant being introduced into said propellant chamber through said aperture means and further rebounding to a closed position once the introduction of propellant is terminated whereby the escape of propellant is precluded by said sealing material.

2. The dispensing container as defined in claim **1** wherein said valve disc central portion is depressed and defines a shallow recess opening toward an opposite end of said body.

3. The dispensing container as defined in claim **1** wherein said valve disc central portion is depressed and defines a shallow recess opening toward an opposite end of said body, and said lower closure end panel is generally dome-shaped and defines a recess opening away from said opposite body end.

4. The dispensing container as defined in claim **1** wherein said annular bead defines a channel opening toward an opposite end of said body.

5. The dispensing container as defined in claim **1** wherein said valve disc includes an annular bead in overlying relationship to the annular bead of said end panel, and said sealing material is disposed between said annular beads.

6. The dispensing container as defined in claim **1** wherein said annular bead is defined in part by an annular wall sloping radially outwardly and upwardly from said central panel portion, the peripheral edge portion of said valve disc is defined by an annular wall sloping radially outwardly and upwardly from said central valve disc portion, and said sealing material is disposed between said annular walls.

7. The dispensing container as defined in claim **1** wherein said valve disc peripheral edge portion is defined by a downwardly directed peripheral wall, said peripheral wall being directed toward a juncture of said annular bead and said central panel portion, and said sealing material being disposed at said juncture.

8. The dispensing container as defined in claim **1** wherein said annular bead defines a channel opening toward an opposite end of said body, and the peripheral edge portion of said valve disc is directed toward said channel.

9. The dispensing container as defined in claim **2** wherein said central portion and central panel portion are in generally parallel spaced relationship.

10. The dispensing container as defined in claim **3** wherein said valve disc is fixedly secured to the center of said central panel portion, and said aperture means are disposed radially outwardly of said center and radially inwardly of said annular bead.

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U.S. Cl. X.R.

137—525.3; 141—20; 222—95