Jan. 16, 1968 P. MESHBERG 3,363,810

REFILLABLE PRESSURIZED CONTAINER HAVING VENTING MEANS

Filed April 21, 1966 2 Sheets-Sheet 1

Fig. 1

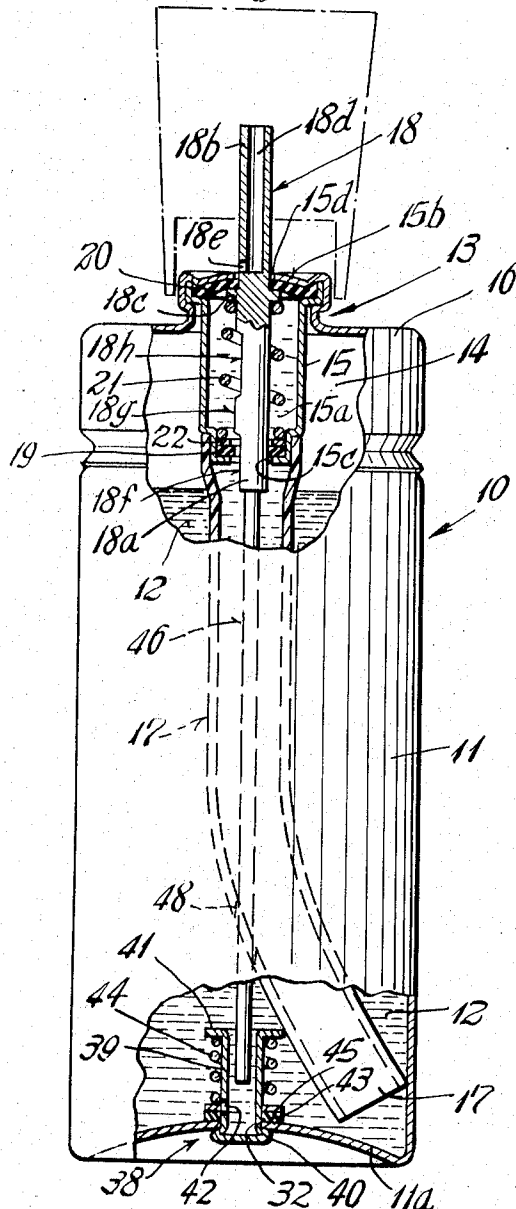


Fig. 2

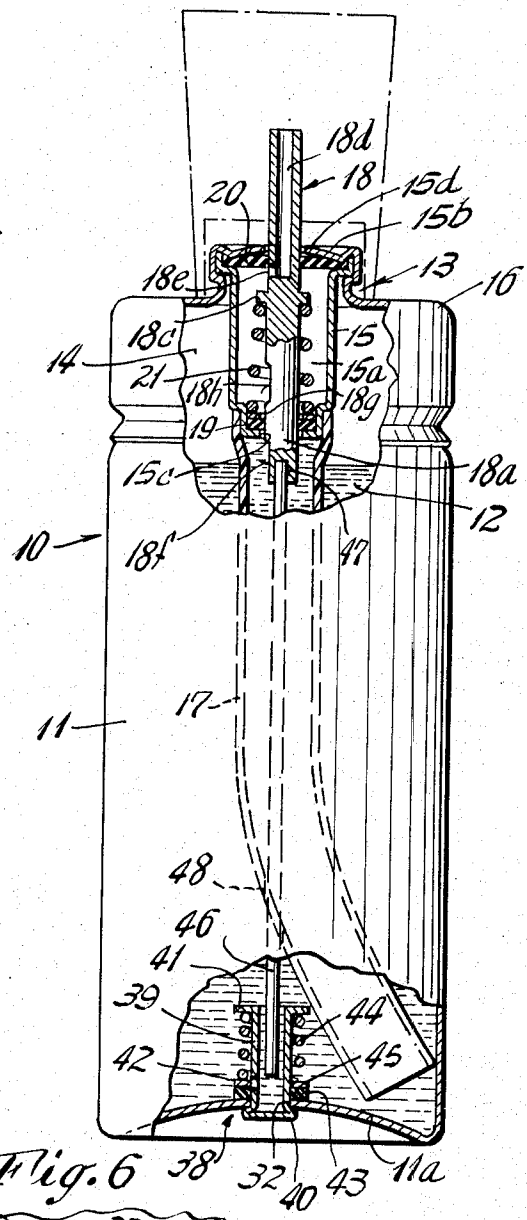


Fig. 5

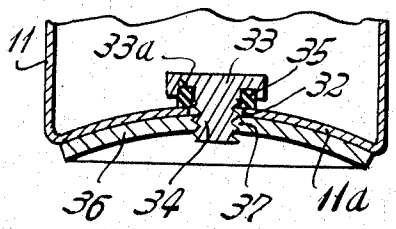
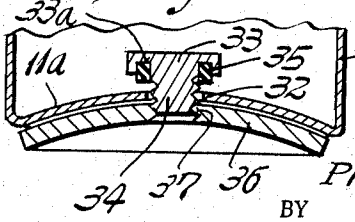


Fig. 6



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REFILLABLE PRESSURIZED CONTAINER HAVING VENTING MEANS

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Fig. 3

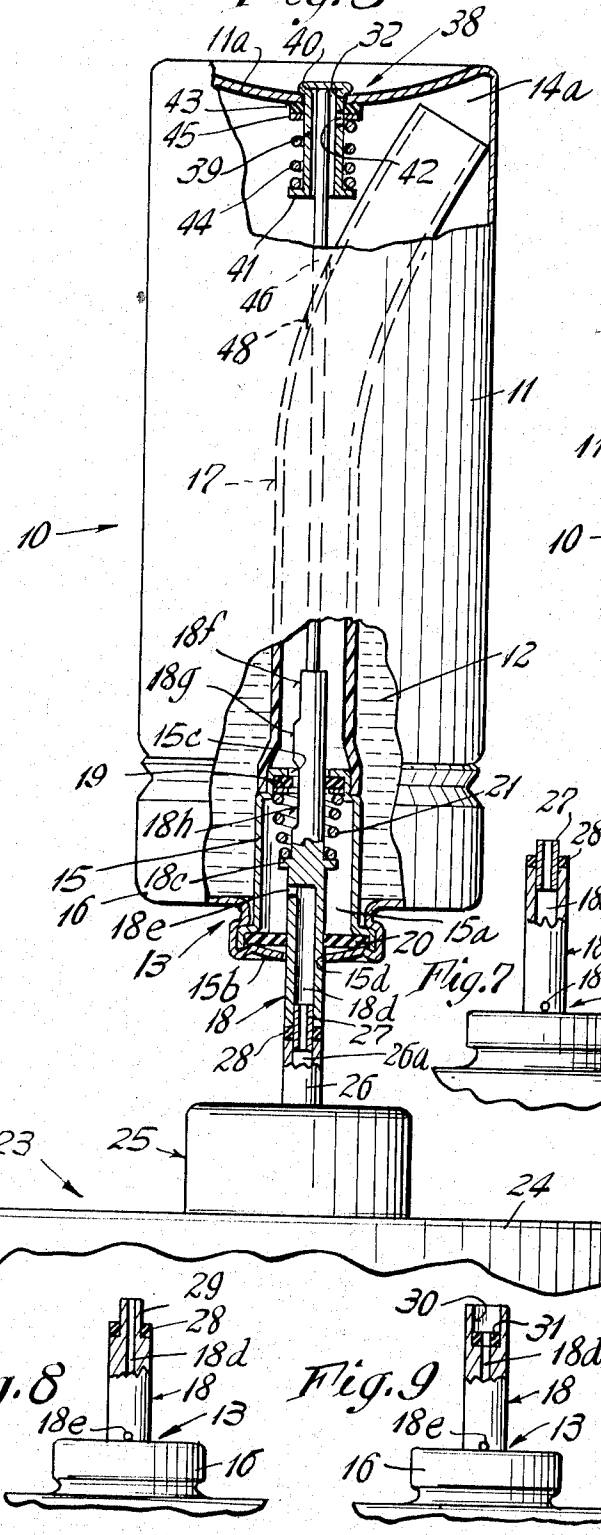


Fig. 4

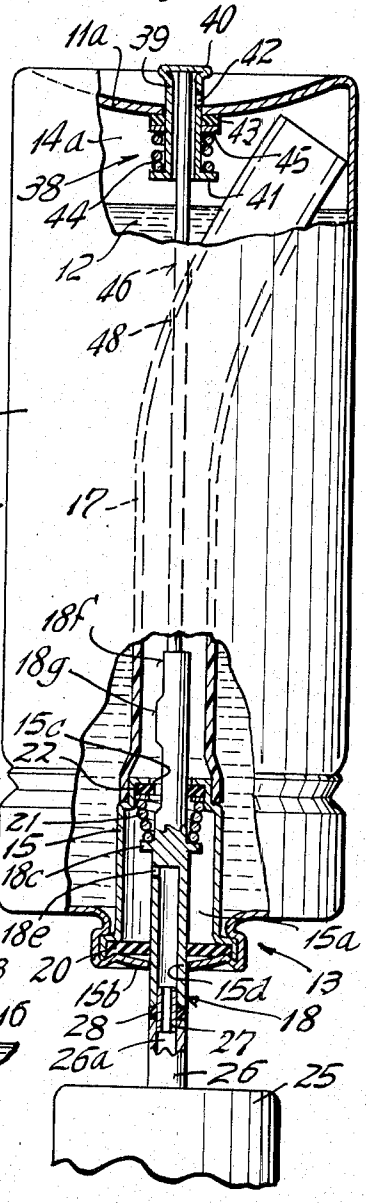


Fig. 7

Fig. 8

Fig. 9

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REFILLABLE PRESSURIZED CONTAINER HAVING VENTING MEANS

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Filed Apr. 21, 1966, Ser. No. 544,228
14 Claims. (Cl. 222—397)

ABSTRACT OF THE DISCLOSURE

The aerosol device includes a single valve unit for controlling the dispensing of material under pressure from a container and the filling and refilling of the container with means controlled by the valve for automatically venting the container during the refilling operation with the stem of the valve unit having an aligning and annular sealing means cooperating with the refilling source.

Heretofore, containers for material under pressure have been filled or refilled, through valve means mounted thereon, from a "mother" container or source of material under pressure. However, it has been found in connection with such filling operations that, where the pressure on the material is produced by a highly volatile liquid or the material itself is a highly volatile liquid, there is a tendency, during the filling operation, for the highly volatile liquid to expand almost immediately, on being introduced into the container, into its vapor phase, thus producing a vapor head that prevents complete, or at least practical, filling of the container.

In order to overcome this problem and enable containers to be filled to a practical level, the prior art has found it necessary to back up the material and/or highly volatile liquid in the source or "mother" container with a gas, such as nitrogen, compressed to provide a pressure sufficient to maintain the highly volatile liquid in liquid form and, consequently, prevent the formation of an appreciable vapor head in the container being filled, which would ultimately limit the degree the container could be filled.

Other means, including maintaining the material at low temperatures during the filling operation, have also been resorted to for assuring complete filling of the container, but these means, similar to the use of compressed gas, are either too expensive or complicated for general use or are not readily adapted for refilling operations practiced by a consumer in the field, as is common in the material dispensing art for example.

The present invention ovrcomes the problems of the prior art, and eliminates the necessity of using compressed gas or other means for assuring complete filling of a container, by providing the container itself with means operable for venting it to the atmosphere so that the pressure in the head space is reduced and substantially complete filling of the container can be achieved.

Accordingly, it is an object of the invention to provide a container, for materials under pressure of a highly volatile liquid, which is formed with means operable to vent the interior of the container to the atmosphere, whereby the size of the head space, produced by the vapor phase of the highly volatile liquid, is reduced to enable a greater quantity of the material to be received therein.

It is also an object of the invention to provide a container having valve means operable to facilitate the filling and refilling thereof and normally sealably closed venting means, the latter being operable to open position during a filling operation for venting the interior of the container to the atmosphere for reducing the pressure in the container and enabling a greater amount of material to be received therein.

It is also an object of the invention to provide a container for holding material under pressure of a highly volatile liquid, which is readily refillable from a source of material under pressure, such container mounting valve means operable to facilitate the filling thereof and including a normally sealably closed venting means, the venting means being operable by the valve means during the filling of the container, whereby the head space formed by the vapor phase of the volatile liquid is vented to the atmosphere to reduce the pressure thereof and enable a greater quantity of material to enter the container.

Another object of the invention is to provide a refillable dispensing package for material under pressure of a highly volatile liquid propellent, the package including a container for holding the material and propellent, valve means mounted on the container and operable for discharging the material therefrom and for connecting the container to a source of material under pressure to be filled therefrom, and normally closed venting means mounted on the container and operable for venting the interior thereof to the atmosphere, the venting means being positioned relative to the container for directly communicating the head space, formed therein by the vapor phase of the propellent, with the atmosphere when the container is disposed in filling position with respect to the source of material under pressure.

Still another object of the invention is to provide a refillable dispensing package for materials under pressure of a highly volatile liquid propellent which includes a container for holding the material and propellent, valve means mounted on the top of the container and operable for discharging the material therefrom and, when the container is in inverted filling position, for connecting it to a source of material under pressure for refilling the container, and venting means sealably mounted in an opening in a wall of the container at the end thereof opposite the valve means for venting the interior of the container to the atmosphere, the venting means being operable, when the container is in inverted filling position, for directly communicating the head space, defined by the immediately adjacent interior of the container with the atmosphere, for venting the vapor phase of a highly volatile propellent and enabling a substantially greater quantity of material and propellent to enter the container.

Yet another object of the invention is to provide a dispensing package for materials under pressure of a highly volatile liquid propellent which includes a container for the material and propellent and a valve means, having a movable operating member, mounted thereon for discharging the material in the upright position of the container and for operably connecting the container, when the latter is in inverted filling position, to a source of the material and propellent for filling the container, the container mounting a normally closed venting means for communicating the interior of the container with the atmosphere, the venting means being positioned relative to the container so that when the latter is in inverted filling position the venting means is disposed in the portion of the container defining the head space and being operable by the operating member of the valve means for venting the head space to the atmosphere, whereby the pressure of the vapor phase of the propellent trapped therein is reduced to enable material to enter the container.

It is further an object of the invention to provide a refillable container for holding material under pressure of a highly volatile liquid, the container having mounted in an opening in a wall thereof a normally closed venting means operable for communicating the interior of the container with the atmosphere, the venting means including a hollow cup-shaped member, movably disposed in the said opening in the container, having a transverse passage formed through a side wall for communicating with the

hollow interior thereof, resilient sealing means cooperating between the cup-shaped member and the wall of the container for sealing the opening therearound, and means normally biasing the cup-shaped member inwardly of the container so that the transverse passage is wholly disposed inwardly thereof, the venting means being operable by the operator of a valve means mounted by the container, which valve means connects the container to a source of material under pressure for filling the container therefrom, whereby during the filling operation the cup-shaped member is moved against its normal bias outwardly of the container so that the interior of the container is vented to the atmosphere through the hollow interior of the cup-shaped member and the transverse passage for reducing the pressure in the container and enabling a greater quantity of material to be forced therein.

It is still further an object of the invention to provide a valve stem operator for a valve means which has a passage therethrough for passing material when the valve is operated, the valve stem being formed with an outer end adapted to frictionally engage the dispensing outlet of another valve means for retaining the valve stem and dispensing outlet in predetermined relation one to another and aligning the passage with the outlet.

Other objects and advantages of the invention will be apparent from the specification and claims, when considered in connection with the attached sheets of drawings, illustrating one form of the invention, wherein like characters represent like parts and in which:

FIGURE 1 is an elevational view, broken away and partially in section, of a refillable material dispensing package embodying the concepts of the invention, the package including a metering valve means, for discharging measured quantities of material from the container, shown in normal non-dispensing position;

FIG. 2 is an elevational view, similar to FIG. 1, showing the valve means in material dispensing position;

FIG. 3 is an elevational view, broken away and partially in section, showing the dispensing package of FIG. 1 in inverted filling position and connected to a "mother" container to be filled therefrom, the valve means being shown in filling position;

FIG. 4 is similar to FIG. 3, but showing the valve means and venting means for the invention in filling and venting position;

FIG. 5 is a fragmentary cross-section view showing a manually operated form of venting means according to the invention in non-venting position;

FIG. 6 is similar to FIG. 5, but shows the venting means in venting position; and

FIGS. 7 through 9 are fragmentary elevational views, partially in section, showing different embodiments of the valve stem operator for the valve means, according to the invention, which facilitate operable connection of the dispensing package to the "mother" container during a filling operation.

While the invention is hereinafter described in connection with a material dispensing package for discharging measured quantities of a material under pressure of a highly volatile liquid propellent, it will be understood that the concepts of the invention, as they relate to means for venting the container, are applicable equally as well to other types of pressurized material dispensing packages and other devices which include a refillable container adapted to hold a highly volatile liquid therein. It also will be understood that, as used herein, the word "material" may mean a mixture of a material and a highly volatile liquid or the highly volatile liquid alone.

Referring now to the drawings, and FIGS. 1 to 4 in particular, a dispensing package **10** for dispensing materials under pressure is shown embodying the concepts of the invention. The dispensing package which may be of any well known type so long as it is adapted to be filled from a so-called "mother" container or source of material under pressure includes, as is well known in the art, a

container **11**, for holding under pressure the material **12** to be dispensed, and a valve means **13**, mounted on the container and operable to discharge the material therefrom.

For purposes of this description, the material **12** will be understood to include the material to be dispensed as well as a highly volatile liquid propellent, such as Freon, which produces the force for dispensing the material through the valve means. In the illustrated form of the invention, as is well understood in the art, the material **12** fills a portion of the container and the portion thereof above the material defines a head space **14** for holding the vapor phase of the liquid propellent, the vapor phase being produced by the expansion of the propellent and providing the actual force for moving the material.

The valve means **13**, which may be of any known form, so long as it is operable to facilitate filling of the container as well as for controlling the discharge of material therefrom, in the herein illustrated embodiment of the invention comprises a metering valve and includes a valve housing **15**, defining a metering chamber **15***a* of predetermined capacity, mounted in the open end of the container for closing the same. The valve housing, which is mounted on the container by a mounting cup **16** forming the outer end wall **15***b* of the housing, as is well understood in the art, is formed with an inlet port **15***c* at the inner end thereof, for communicating the metering chamber **15***a* with the interior of the container, and an outlet port **15***d* in the outer end **15***b* thereof, for communicating such chamber with the atmosphere.

The valve housing, which has connected thereto a dip tube **17** for directly communicating the inlet port with the interior of the container below the level of the material **12** therein, mounts a reciprocable operator or valve stem **18** having an inner end **18***a* disposed in the inlet port **15***c* and an outer end **18***b* projecting through the outlet port **15***d*. As is well understood in the art the valve housing also is provided with resilient sealing means **19** and **20**, having bores therethrough, disposed, respectively, adjacent the inner and outer end walls of the housing for cooperating with the valve stem to seal the inlet and outlet ports as required.

The valve stem **18** is normally biased to project outwardly of the valve housing by a spring **21** bearing against a shoulder **18***c* formed on the valve stem and a washer **22** carried by the resilient sealing means **19** at the inner end of the valve housing. The shoulder **18***c* in the normal position of the valve stem engages the sealing means **20** and in cooperation therewith seals the outlet port **15***d*, thereby closing the metering chamber **15***a* to the atmosphere. The outer end of the valve stem, as is well understood in the art, is formed with a longitudinally extending passage **18***d* and is provided with a transverse port **18***e* which, when the valve stem is moved inwardly of the housing against its normal bias, communicates the passage **18***d* with the metering chamber whereby material is enabled to pass into and out of the metering chamber, as will be hereinafter explained.

The inner end of the valve stem **18** is formed with a flat or other means **18***f* which, when the valve stem is in its normal position is disposed in the inlet port **15***c* for providing an open passage through the inlet port whereby the metering chamber is directly and operably communicated with the interior of the container **11**. Inwardly of the flat **18***f* the valve stem is formed to provide means **18***g* for closing the inlet port when the valve stem is moved inwardly of the valve housing to discharge a measured quantity of material from the container. The valve stem is also formed with an elongate second flat **18***h* to facilitate filling or refilling of the container as will be hereinafter explained in detail.

Referring now to FIGS. 1 and 2 in particular, it will be seen that in FIG. 1 the metering valve is shown in non-dispensing position, with the valve stem **18** closing

the outlet port 15*d* and opening the inlet port 15*c*. In such non-dispensing position material 12 is enabled to flow up the dip tube 17, under the pressure of the vapor phase of the liquid propellent in the head space, into the metering chamber 15*a* for filling the same. Thereafter, in order to discharge a measured quantity of material from the container, the valve stem 18 is moved inwardly of the valve housing to its discharge position, as shown in FIG. 2, so that the inlet port 15*c* is closed, by cooperation of the portion 18*g* of the valve stem with resilient sealing means 19, to trap a predetermined quantity of material in the measuring chamber and the outlet port means is opened, by transverse port 18*e* bypassing the seal 20 and communicating the measuring chamber to the atmosphere through passage 18*d*, for enabling the trapped material to discharge to the atmosphere.

Thus far a fairly conventional metering dispensing package for dispensing material under pressure has been disclosed. Dispensing packages of this type, as well as a variety of others, including those having standard dispensing valve means, are often designed to be filled or refilled from a "mother" container or source of material under pressure.

Referring now to FIGS. 3 and 4 in particular, the dispensing package 10 is shown being refilled from a "mother" container 23, the latter including a container 24 for holding the material and liquid propellent, which is to be fed into the dispensing package, under pressure and valve means 25 for controlling the flow of the material and propellent from the container 24 into the dispensing package. The valve means 25 may be of any well known type, and is preferably a standard valve having a reciprocable operator or valve stem 26 therefor, which is adapted to discharge a continuous flow of material into the dispensing package 10 on operation of the valve.

It will be seen that, when refilling the dispensing package 10, the package is inverted from the normal dispensing position shown in FIGS. 1 and 2 and the valve stem 18 thereof is coupled with the valve stem 26 so that material may flow from the "mother" container 23 through the valve means 13 into the container 11 of the dispensing package. While it is not absolutely necessary to provide a special coupling between the valve stem 18 and the valve stem 26 in order to fill or refill the container 11, in the herein illustrated form of the invention a sleeve 27 (see FIG. 7) is positioned and frictionally retained in the passage 18*d* of the valve stem 18 to project therefrom and provide a shoulder against which the valve stem 26 may abut when the sleeve is inserted in the passage 26*a* during a filling operation. To assure a complete seal between the abutting ends of the valve stems an annular resilient gasket or sealing means 28 is mounted around the sleeve 27.

In FIGS. 8 and 9, modified forms of the valve stem 18 are shown to facilitate sealably coupling and connecting such valve stem to the valve stem 26 of a source of material and propellent under pressure. In FIG. 8 the tip of the valve stem 18 is formed of reduced diameter, as shown at 29, to provide a projection, corresponding to the projecting portion of sleeve 27 shown in the valve stem construction of FIG. 7, for insertion in the passage 26*a* of the valve stem 26. Similar to the construction shown in FIG. 7 a resilient annular sealing member 28 is mounted on the projection or reduced portion 29 of valve stem 18 to assure a complete seal between the abutting ends of the valve stems. In FIG. 9 the valve stem 18 is provided with a counterbore as shown at 30 for receiving therein the outer end of the valve stem 26 of the "mother" container. In this form of the invention an annular sealing member 31 is seated within the counterbore, on the shoulder formed thereby, to assure the desired seal between the abutting ends of the valve stem 18 and the valve stem 26.

When the dispensing package 10 is disposed in coupled filling position with respect to the "mother" container 23, as shown in FIGS. 3 and 4, filling of the dispensing package 10 is accomplished by applying pressure against the container 11 and the "mother" container 24 in opposite directions so that both the valve stem 26 and the valve stem 18 are moved inwardly of their respective valve housings. Movement of the valve stem 26 inwardly of its housing operates the valve means 25 to dispense material and propellent from the container 24. Movement of the valve stem 18 inwardly of the valve housing 15, beyond material discharging position as shown in FIG. 3, opens both the inlet means 15*c* and the outlet means 15*d*, thus permitting material flowing from the valve stem 26 of the "mother" container to pass through the passage 18*d* and port 18*e* of the valve stem into the measuring chamber 15*a* and outwardly therefrom into the container through the dip tube 17.

While the container 11 may be partially filled by the procedure above-described, it has been found that the rapid expansion of the liquid propellent, into its vapor phase, when it is introduced into the container 11 along with the material 12, produces a large head space 14*a* as seen in FIG. 3, which prevents complete or practical filling of the container. The prior art has resorted to the use of compressed gas or other means for eliminating this problem but such practices have not proven to be entirely practical and may be expensive and difficult to achieve in the field.

According to the present invention, the problems encountered in filling and refilling dispensing packages from a "mother" container are overcome by providing means in the container itself which are operable to vent the head space to the atmosphere for reducing the pressure therein and consequently permitting a greater amount of material to flow into the container.

In FIGS. 5 and 6 of the drawings, a simplified form of venting means is shown in accordance with the invention. This form of venting means, which is manually operable to vent the head space in the container during the filling operation, is disposed in an opening 32 formed in the end wall 11*a* of the container, opposite that mounting the valve means 13. The venting means comprises a closure member 33 disposed adjacent to and overlying the opening and having a threaded portion 34 projecting through the opening. The closure member 33, which may be of any desired form, is here shown formed with an annular groove 33*a* for receiving therein an annular resilient sealing member 35 cooperable between the closure member and the wall 11*a* of the container for sealing the opening 32 when the closure member 33 is moved toward the wall for compressing the sealing member. A nut 36 or other manually operable means is disposed outwardly of the wall 11*a* of the container and is provided with a threaded bore 37 adapted to engage the threaded portion 34 of closure member 33 for moving such member toward and away from the wall 11*a* for compressing the sealing member therebetween or relaxing the compressing pressure thereon.

In FIG. 5 the venting means is shown in its normal non-venting position, with the closure member 33 drawn into position for compressing the resilient sealing member 35 against the wall 11*a* of the container, whereby the interior of the container is closed to the atmosphere. This position of the venting means is maintained during normal use of the dispensing package and substantially throughout the filling operation; it is only changed at such time during the filling operation as it is necessary to vent the head space to assure complete filling of the container and, only then for long enough to achieve the desired venting.

In FIG. 6 the closure member 33 of the venting means is shown moved to its venting position, away from the wall 11*a* of the container, by manipulation of the nut 36, whereby the seal between the closure member and the wall of the container is broken and the interior of the container is vented to the atmosphere through the

opening 32. It will be understood that the venting means shown in FIGS. 5 and 6 will only be operated to vent the container during the filling of the container and, only then, to vent the head space in the container to the atmosphere so that a greater amount of material may be forced into the container.

Referring again to FIGS. 1 through 4 of the drawings, a preferred form of venting means 38, operable by the operator for the valve means 13, is shown mounted in the end of the container 11, opposite the end mounting the valve means. It should here be noted that, no matter what form of venting means is utilized the venting means must be positioned or operable to vent the upper end of the container, when the latter is in filling position, so that only the head space is vented to the atmosphere. In the instant embodiment of the invention, the dispensing package is inverted during the filling operation and, accordingly, the venting means is disposed at the end thereof which will be directed upwardly during such operation.

As illustrated, the venting means 38 includes a substantially elongate hollow cup-shaped or thimble like member 39 longitudinally movably disposed in the opening 32 formed in the end wall 11*a* of the container. The cup-shaped member 39, which is formed with a flange or crimp 40 at its outer end, for limiting movement inwardly of the container, and a flange 41 at its inner end, for a purpose to be hereinafter explained, is provided with a transverse orifice 42 in a side wall thereof, whereby the hollow interior of the cup-shaped member is communicated outwardly of the side thereof. Slidably disposed around cup-shaped member 39 is an annular resilient sealing member 43 adapted to seal the opening 32 around the cup-shaped member. A spring 44, which bears against the flange 41 of the cup-shaped member and a washer 45 carried by the sealing member 43, normally biases the cup-shaped member 43 inwardly of the container to non-venting position so that the transverse orifice 42 is disposed wholly inwardly of the wall 11*a* of the container and sealing member 43. The spring also compresses the sealing member 43, by the pressure it applies against the washer 45, into sealing engagement with the side wall of cup-shaped member 39 and end wall 11*a* of the container, whereby the opening in the end wall is sealed against leakage of pressure and material from the container.

In order to operate the venting means 38, by moving the cup-shaped member 39, against its normal bias, outwardly of the container to a position wherein the interior of the container is communicated to the atmosphere through the hollow interior of the cup-shaped member and the orifice 42, means are provided for operably connecting the valve stem 18 of the valve means 13 to the venting means, whereby movement of the former is imparted to the latter, as required. While various means may be resorted to for transmitting movement of the valve stem to the cup-shaped member of the venting means, in the herein illustrated embodiment of the invention an operating rod or linkage means 46 is connected to the inner end of the valve stem 18 to extend inwardly of the container in a direction toward the cup-shaped member 39. The operating rod, which may be connected to the inner end of the valve stem by frictional insertion of an end thereof into a bore 47 formed in the valve stem, extends downwardly, as shown in FIGS. 1 and 2, through the dip tube 17 and passes through an opening 48 formed in the side wall of the dip tube and thence into the hollow interior of cup-shaped member 39. In order for the operating rod to operate the venting means only at such time as it is desired to vent the head space in the container during the filling operation, the connecting rod is formed of such a length that it will not operably engage the cup-shaped member when the valve stem is in normal non-dispensing position or through movement of the valve stem to dispensing or filling positions. It will be seen that movement of valve stem 18 to filling position, as shown in FIG. 3, merely causes operating rod 46 to engage the cup-shaped member 39 but does not cause operable movement thereof. Thereafter, when the head space 14*a*, produced by the rapid expansion of the highly volatile liquid entering the container, prevents the further filling of the container, continued movement of the valve stem beyond filling position to venting position, as shown in FIG. 4, moves the connecting rod to force cup-shaped member 39 outwardly of the container end wall 11*a* so that the transverse orifice 42 bypasses the sealing member 43 and the container wall to vent the head space to the atmosphere. In this manner the head space of the container may be vented during the filling operation, when and as required, to assure a substantially complete filling of the container as shown in FIG. 4.

Thus, among others, the several objects and advantages of the invention as aforenoted are achieved. Obviously numerous changes in the structure may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. A refillable dispensing aerosol device including a container having a material under pressure therein, said material including at least in part a highly volatile liquid and filling a portion of said container, the remaining portion of the container defining a head space having the vapor phase of the volatile liquid therein; a normally closed valve means mounted on one end of said container and communicating with the interior thereof, said valve means having a dispensing and a filling position and said container having an upright dispensing position and an inverted refilling position; and normally closed venting means disposed in an opening in a wall at the other end of the container for communicating the interior of said container with the atmosphere to facilitate refilling thereof, means on said valve means for operating said venting means only when the container is in the refilling position and the valve is connected to a source of material under pressure for refilling the container and for opening said head space to the atmosphere, whereby the vapor phase of said volatile liquid is vented to reduce the pressure in the head space and enable a greater quantity of the material to enter said container from the source.

2. A refillable device as defined in claim 1, wherein said valve means includes an operating member therefor movable from a position in which the valve means is normally closed to a position in which the valve means is opened for communicating the interior of the container with the source of material under pressure, said operating member being operably connected to said venting means for operating the same when said valve means is opened, whereby the head space is vented to reduce the pressure therein and facilitate filling the container from the source.

3. A refillable dispensing package as defined in claim 1, in which said valve means includes a reciprocable valve stem normally biased to valve closing position, said valve stem being movable in the upright dispensing position of the container from normal position to dispensing position for discharging said material from the container and being movable in the inverted filling position of the container to a position in which the interior of the container is directly communicated with said source of material under pressure, said valve stem being operably connected to said venting means for operating the same only on movement of the valve stem to refilling position, whereby the head space in the container may be vented as required to permit substantially complete filling of the container.

4. A refillable dispensing package as defined in claim 1, in which said valve means includes a longitudinally reciprocable valve stem normally biased to project outwardly of the container to a valve closing position, said valve stem being longitudinally movable from valve closing position inwardly of the container in the upright dispensing

position of the latter for discharging said material from the container under the pressure of the propellent therein and being longitudinally movable inwardly of the container in the inverted refilling position of the latter to a position in which the interior of said container is communicated outwardly thereof for direct connection with said source of material under pressure for filling said container therefrom, said valve stem having means for operably connecting it to said venting means for operating the same to vent the head space only upon movement of said valve stem inwardly of the container when in the refilling position thereof, whereby the head space is vented when and as required to reduce the pressure therein and enable the container to be substantially completely filled with material and liquid propellent.

5. A refillable dispensing package as defined in claim 1, wherein said venting means comprises a hollow cup-shaped member movably disposed in said opening in said wall of said container with the hollow interior thereof open to the interior of said container through the open end thereof, said cup-shaped member being formed with a transverse opening through a side wall thereof and being movable from a non-venting position in which said transverse opening is disposed within the interior of said container to a venting position in which said transverse opening is disposed outwardly of said container, resilient sealing means cooperable between said cup-shaped member and said wall of said container for sealing said opening in said container wall around said cup-shaped member, and resilient means normally biasing said cup-shaped member to said non-venting position; and in which said means for operably connecting said valve stem to said venting means comprises a link member movable by said valve stem against said cup-shaped member for moving the latter to said venting position, whereby said head space is vented through said hollow cup-shaped member and said transverse opening therein to the atmosphere.

6. A refillable dispensing package as defined in claim 5, wherein said cup-shaped member is an elongate cylindrical member having a closed outer end formed with outwardly projecting flange means cooperable with the wall of said container for limiting the movement thereof inwardly of the container under the force of said resilient biasing means.

7. A refillable dispensing package as defined in claim 5, in which said link member movable by said valve stem against said cup-shaped member for operating said venting means comprises a rod connected to said valve stem for movement therewith, said rod being of a length to engage said cup-shaped member and move the latter to venting position on movement of said valve stem inwardly of the container beyond filling position to a venting position thereof.

8. A valve stem operator for use in a dispensing valve for controlling the discharge of material from a container under pressure, said valve stem being movable for operating the valve to discharge the material or facilitate filling of the container from an outside source and including an end portion adapted to project outwardly of the valve and having a passage therethrough for passing material, said end portion having thereon an annular resilient sealing means for frictionally and sealably engaging the dispensing outlet of said source of the material under pressure during a filling operation, said engaging means retaining said end portion in predetermined relationship with the dispensing outlet and operably aligning said passage therewith.

9. The invention as defined in claim 8 wherein the sealing means on the end portion of the valve stem comprises a recess in the end of the stem having a resilient washer at the bottom thereof adapted to receive and seal the said dispensing outlet.

10. The invention as defined in claim 8 wherein the said sealing means on the end portion of the valve stem comprises a tubular sleeve secured in said passage in the valve stem to project therefrom and having a resilient annular gasket surrounding said sleeve whereby said valve stem and said dispensing outlet are aligned and sealed during a refilling operation.

11. The invention as defined in claim 10 wherein said sleeve is formed integrally with said valve stem.

12. A refillable dispensing package as defined in claim 1, in which said valve means includes a valve housing defining a measuring chamber therein of known capacity, said valve housing being formed with an inlet port means and an outlet port means at opposite ends thereof, the inlet port means communicating the measuring chamber with the interior of the container and the outlet port means communicating the measuring chamber to the atmosphere, means cooperable with said inlet port means for directly communicating the same with the interior of the container below the level of the material therein when the container is in upright dispensing position, and a longitudinally reciprocable valve stem movably mounted by said valve housing and having an inner end disposed in and cooperable with said inlet port means for opening and closing the same and an outer end disposed in and cooperable with said outlet port means for opening and closing the same, said valve stem being normally biased to project outwardly of said valve housing to a valve closing non-discharging position wherein said inlet port means is open and said outlet port means is closed, said valve stem being longitudinally movable from valve closing position inwardly of the valve housing in the upright dispensing position of the container to discharging position wherein said inlet port means is closed for trapping a predetermined quantity of material in the measuring chamber and said outlet port means is opened for communicating the measuring chamber to the atmosphere and discharging the trapped material therefrom, said valve stem being longitudinally movable inwardly of the valve housing in the inverted filling position of the container to a filling position in which both said inlet port means and said outlet port means are opened for directly communicating the interior of the container with the atmosphere through the measuring chamber to facilitate filling the container from a source of material under pressure, said valve stem having means for operably connecting it to said venting means for operating the same to vent the head space on movement of the valve stem inwardly of the valve housing beyond the initial filling position thereof, whereby the head space is vented when and as required to reduce the pressure therein for enabling the container to be substantially completely filled with material and liquid propellent.

13. A refillable dispensing package as defined in claim 1, wherein said venting means comprises a hollow cup-shaped member movably disposed in said opening in said wall of said container with the hollow interior thereof open to the interior of said container through the open end thereof, said cup-shaped member being formed with a transverse opening through a side wall thereof and being movable from a non-venting position in which said transverse opening is disposed within the interior of said container to a venting position in which said transverse opening is disposed outwardly of said container, resilient sealing means cooperable between said cup-shaped member and said wall of said container for sealing said opening in said container wall around said cup-shaped member, and resilient means normally biasing said cup-shaped member to said non-venting position; and in which said means for operably connecting said valve stem to said venting means comprises a member connected to and movable by said valve stem against said cup-shaped member for moving the latter to said venting position, whereby said head space is vented through said hollow cup-shaped member and said transverse opening therein to the atmosphere.

14. A refillable dispensing aerosol device including a container having a material under pressure therein, said

material including at least in part a highly volatile liquid and filling a portion of said container, the remaining portion of the container defining a head space having the vapor phase of the volatile liquid therein; a metering valve means having a housing mounted on one end of said container and communicating with the interior thereof for dispensing a predetermined quantity of material from the housing, said valve means having a valve stem reciprocating therein for controlling the flow of material to and from the container, said stem having a normally closed outer position, a dispensing position, a filling position and a refilling position depending upon its movement inwardly from said outer position, said container having an upright dispensing position and an inverted refilling position; and normally closed venting means disposed in an opening in a wall at the other end of the container for communicating the interior of said container with the atmosphere to facilitate refilling thereof, means on said valve means for operating said venting means only when the container and valve stem are in the refilling position and the valve is connected to a source of material under pressure for refilling the container and for opening said head space to the atmosphere, whereby the vapor phase

of said volatile liquid is vented to reduce the pressure in the head space and enable a greater quantity of the material to enter said container from the source.

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