May 3, 1966 C. CARRION, JR., ET AL 3,249,267

ACTUATOR FOR AEROSOL VALVE HAVING A VALVED PASSAGE DOWNSTREAM OF SAID VALVE

Filed Nov. 25, 1964 2 Sheets-Sheet 1

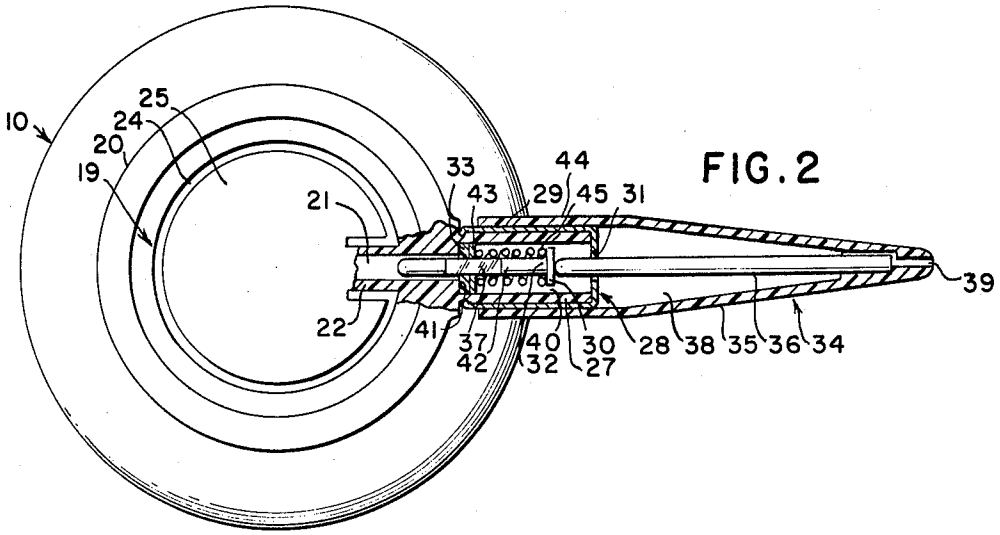


FIG. 2

FIG. 1

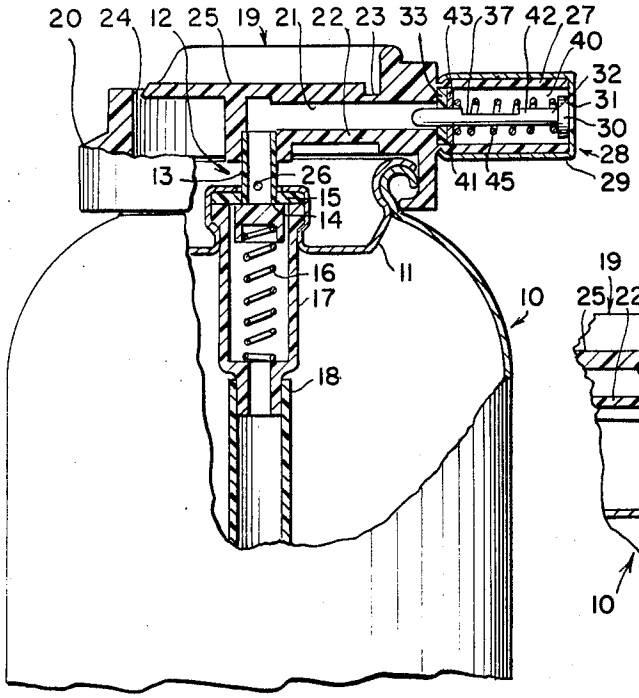
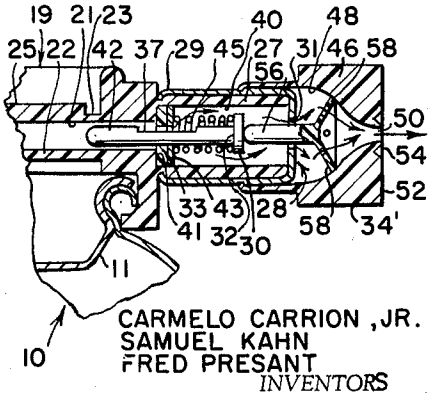


FIG. 3



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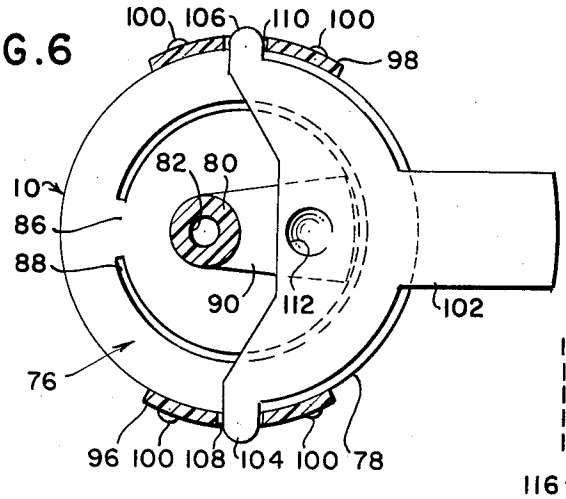
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Filed Nov. 25, 1964 2 Sheets-Sheet 2

FIG.6



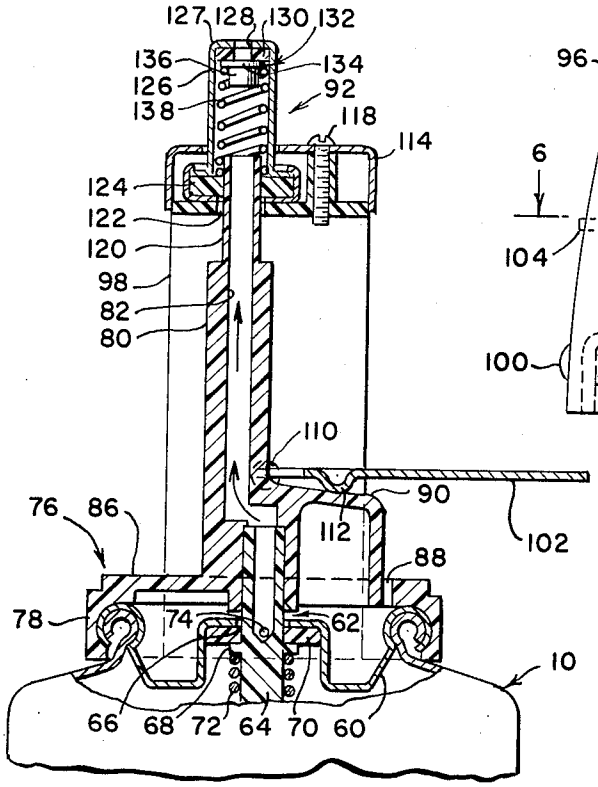


FIG.4

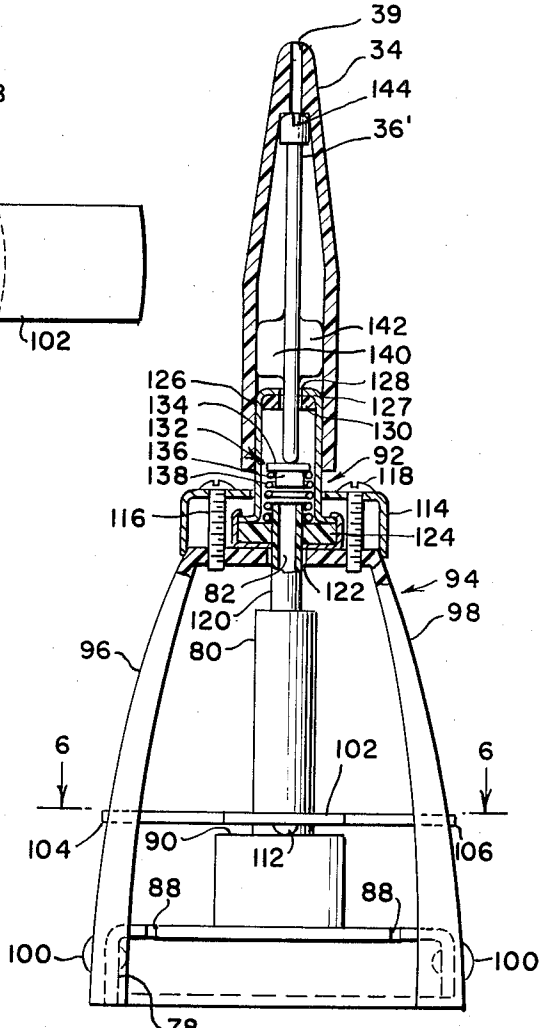


FIG.5

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ACTUATOR FOR AEROSOL VALVE HAVING A VALVED PASSAGE DOWNSTREAM OF SAID VALVE

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11 Claims. (Cl. 222—294)

Our invention relates to dispensers for self-propelling compositions, commonly known as aerosol dispensers, and more particularly to a novel construction which insures safe dispensing.

Some self-propelling compositions must be handled with care and accidental discharge of the contents prevented. For example, with compositions containing toxic ingredients, such as insecticides, accidental discharge can cause serious harm. Further, where any dispenser is intended to be used by children extra care is warranted since skin irritation and even frostbite can be caused by exposure to propellent.

We have devised a novel arrangement for an aerosol dispenser providing safety features designed to prevent accidental discharge. Our novel arrangement includes a conventional container for the self-propelling composition including a normally-closed container valve member and actuating means for the container valve including a passage for discharge of the container contents. In accordance with out invention we provide a second normally-closed sealing valve means located on the discharge side of the container valve and positioned in the path of discharge flow from the container valve through the actuator passage. The second valve provides effective sealing and prevention of dispensing even if the container valve is accidentally or purposely actuated. For dispensing of the contents, when the user so desires, we provide detachable actuating means for opening the second valve comprising a body fixedly positioned with respect to the actuating means for the container valve and including means engaging and holding open the second normally-closed sealing valve to permit flow of the container contents therethrough. As long as the detachable actuating means is in place, but only then, the contents can be dispensed by actuating the container valve.

The arrangement provides effective prevention of unwanted discharge of container contents, a feature of importance in aerosol applications such as toxic insecticides, pharmaceutical products, oven cleaners, and paint removers, for example. The arrangement is particularly useful in connection with a propellable toy. In that case the detachable actuating means for the second sealing valve is the toy itself which includes an internal pressurizable chamber which, when sufficient pressure builds up, propels the toy off the valve actuator causing the second valve to close, thus preventing dispensing and particularly preventing children from spraying themselves with propellent.

Our invention will be further illustrated by reference to the attached drawings of which:

FIGURE 1 is an elevation, partly in section, of an aerosol dispenser constructed according to our invention with the detachable actuating means for the sealing valve removed;

FIGURE 2 is a plan view of the dispenser shown in FIGURE 1 with the detachable actuating means, in the form of a toy rocket, for the second valve in place;

FIGURE 3 is a fragmentary section of the dispenser shown in FIGURE 1 showing another embodiment of the detachable actuating means useful for general aerosol application;

FIGURE 4 is an elevation, partly in section, of a dispenser similar to that shown in FIGURE 1 (without the detachable actuating means for the second valve in place) but designed for dispensing vertically;

FIGURE 5 is a side view partly in section of the dispenser attachments shown in FIGURE 4 with the detachable actuating means for the second valve in place;

FIGURE 6 is a sectional view taken along lines 6—6' in FIGURE 4.

Referring to FIGURE 1 the numeral 10 designates a container for the self-propelling composition. The container 10 is provided with a cup member 11 for holding a pressure-sensitive, normally-closed, container valve member 12 in the top of the container; the container valve member 12 can be of conventional construction. The illustrated valve member 12 comprises a hollow stem 13 with the valve 14 normally seated against gasket surface 15 by means of spring 16 located in housing 17, to which a dip tube 18 is attached. In FIGURE 1 the valve is shown in the closed or non-dispensing position.

As shown in FIGURE 1, a standard commercial valve actuator 19 made of flexible plastic material is mounted on the top of container 10. Actuator 19 includes a skirt 20 which frictionally engages the sides of valve mounting cup 11 and contains a passage 21 which fits snugly over valve stem 13 and leads through horizontal spout 22 thereby providing a conduit for discharge of the contents of dispenser 10. Immediately above passage 21 top surface 25 is surrounded, except at one point 23, by an annular groove 24 thereby making the top surface 25 rotatable about point 23. By applying pressure on top surface 25 rotation about point 23 is produced and pressure is applied by the sides of passage 21 to valve stem 13 which moves downward actuating container valve member 12 by unseating the valve 14 which permits flow of the contents of container 10 through stem orifice 26 into hollow stem 13 and thence into passageway 21.

Actuator 20 has a spout member 27 projecting beyond skirt 20. Spout member 27 includes a central passage 40 which has a slightly larger diameter than passage 21 with which it registers, the junction of the two passages defining a shoulder 41. A second pressure-sensitive, normally-closed sealing valve member 28 is provided in passage 40. Valve member 28 includes a cylindrical housing 29 affixed about spout 27 with an aperture 31 in its outer end, aperture 31 being of lesser diameter than passage 40 with which it registers. A pin 32, having a centrally notched stem 42 and a round head 30 of greater diameter than aperture 31 is located within passage 40. When head 30 abuts the edges of aperture 31 the round portion of stem 42 is in sealing contact with a ring shaped gasket 33 positioned in passage 40 between shoulder 41 and a washer 43. A coil spring 45 is positioned about stem 42 between washer 43 and head 30 urging the latter outward against aperture 31 and the former inward against gasket 33 and shoulder 41. Valve member 28 is opened by applying pressure to head 30 which moves pin 32 inward compressing spring 45 until the notched portion 37 of stem 42 is adjacent gasket 33 allowing material to flow through passage 40. As illustrated in FIGURE 1, container valve 12 and sealing valve 28 are normally closed, and discharge of the contents from the spout 27 requires concurrent opening of both valves. This requirement greatly reduces the likelihood of an accidental discharge.

Referring to FIGURE 2, detachable actuating means 34 are provided comprising a hollow, conical body 35 having a cylindrical base portion 44 which frictionally engages the valve housing 29. The body illustrated is that of a toy rocket. Located inside the body 35 is a rod 36 which, when the means 34 is in place, engages pin head 30 forcing it back from aperture 31 and moving pin 32 inward within passage 40 a distance sufficient to

open sealing valve 28 by bringing notched portion 37 of stem 42 adjacent sealing gasket 33 permitting flow past the gasket and out through passage 40 and aperture 31. With the actuating means 34 in place and valve member 28 open, actuation of container valve 12 permits discharge of the container contents through the spout 27 into the chamber 38 of the body 35; when sufficient pressure is built up in chamber 38 the body 35 is propelled off the spout. Once the means 34 has been propelled off spout 27 sealing valve 28 is closed by spring 45 thereby sealing the spout and preventing further discharge of container contents, even if the container valve is actuated, until the means 34 is again placed on the spout. This is particularly advnatageous in that the child operating the toy cannot spray himself or others with propellent.

The toy rocket illustrated is advantageously provided with a small orifice 39 at the apex as we have found that this increases substantially the distance the toy is propelled. The rocket can, of course, be made in various shapes. While the rod 36 is shown as a separate member it can also be made as an integral part of the body 35.

Referring to FIGURE 3 an alternate embodiment of the detachable actuating means 34' consists of a solid body 46 defined about a central passage 48. One end of passage 48 is cylindrical and frictionally engages the housing 29 of sealing valve 28, while its other end is conical terminating in a small orifice 50 in the outer face 52 of body 46. Face 52 includes a small depression 54 which encircles orifice 50. Located within passage 48 is a rod 56 which, when means 34' is attached to valve housing 29, engages pinhead 30 forcing it back from aperture 31 and moving pin 32 inward within passage 40 a distance sufficient to open sealing valve 28 by bringing notched portion 37 of stem 42 adjacent sealing gasket 33. This permits flow past the gasket and out through passage 40 and aperture 31. Rod 56 is supported within passage 48 by apertured arms 58 which permit discharge of the container contents through orifice 50 when container valve 12 is actuated while detachable actuating means 34' is in place holding valve member 28 open. This type of actuating means is useful in general aerosol applications such as spraying of toxic insecticides, oven cleaners, paint removers, etc.

An alternate embodiment of the present invention, shown in FIGURES 4, 5, and 6, permits vertical discharge of the contents of the aerosol container. As will be seen from FIGURE 4, container 10 includes a valve mounting cup 60 which holds a pressure sensitive, normally closed, container valve member 62. Container valve 62 consists of a stem 64 which extends through an aperture 66 in valve mounting cup 60 in sliding, sealing relationship with an annular sealing gasket 70. A flange 68 is affixed about stem 64 within container 10 and is urged upward against sealing gasket 70 by a helical spring 72. Stem 64 is hollow from the top down to a point immediately above flange 68 and a small orifice 74 communicates the hollow center of stem 64 with the interior of container 10 when stem 64 is pressed downward compressing spring 72 until orifice 74 passes below sealing gasket 70. Container 10 is fitted with a standard vertical valve actuator 76 made of flexible plastic material which includes a skirt 78, which frictionally engages the sides of valve mounting cup 60, and a vertical spout 80 having a central passage 82, which fits snugly over stem 64 thereby providing a conduit for discharge of the contents of container 10. Spout 80 is surrounded except at one point 86 by an annular groove 88. On the outside of spout 80 remote from point 86 a ledge 90 is provided upon which pressure can be applied to cause rotation of spout 80 which thereby applies pressure to valve stem 64 and actuates valve 62.

In the practice of the present invention a second pressure sensitive, normally closed, sealing valve member 92 is provided affixed to the top of passage 82. Sealing valve member 92 is held in position atop spout 80 by a

U-shaped body member 94 having curved legs 96 and 98 which extend downward engaging the sides of skirt 78 of actuator 76. Body member 94 can be made of a plastic or metal and can be held in place by screws 100 or by frictional engagement between legs 96 and 98 and skirt 78. Since body member 94 substantially reduces access to actuator 76 actuation is facilitated by a lever 102. Lever 102, extending outward from between legs 96 and 98, has a rectangular external portion which is substantially narrower than the space between legs 96 and 98. The central portion of lever 102 is somewhat semi-circular with a large central cut-out to provide clearance for spout 80 and a small tab 104, 106 on each side which passes outward through holes 108 and 110 in legs 96 and 98, respectively. Holes 108 and 110 are coaxial at a height slightly above ledge 90 of actuator 76. As will be seen from FIGURE 4 lever 102 is rotatable about the axis of holes 108 and 110 and it is important that the central cut-out be shaped in such a manner that a portion of lever 102 will contact ledge 90 of actuator 76 as the external rectangular portion of lever 102 is rotated downward. We prefer to provide a slight bump 112 on the underside of lever 102 to effect contact with ledge 90 at the most desirable point. Contact between lever 102 and ledge 90 imparts a vertical pressure to actuator 76 sufficient to actuate the discharge valve 62 discharging the contents of container 10 through passage 82.

Valve member 92 is held atop body member 94 in a circular housing 114 affixed to body member 94 by a pair of screws 116 and 118. Vertical spout 80 includes a necked-down portion 120 at its top which extends into circular housing 114 through an aperture 122 in the top of body member 94. Valve member 92 engages portion 120 of spout 80 within circular housing 114 in sealing relationship therewith through gasket 124.

Valve member 92 consists of a cylindrical casing 126 which fits over portion 120 of spout 80 and gasket 124 and provides a further conduit for discharge of the contents of container 10. Casing 126 includes a flat end portion 127 having a central aperture 128. Within casing 126 an annular sealing gasket 130 surrounds aperture 128 held against the end portion 127 of casing 126 by a suitable means such as gluing. Valve 132 is located within casing 126 and consists of a disc 134 having a diameter substantially less than the diameter of casing 126 but greater than the diameter of aperture 128, and a stem 136 affixed to disc 134 on the side opposite aperture 128 and having a diameter somewhat less than the diameter of disc 134. Valve 132 is urged upward against sealing gasket 130 by a helical spring 138 which closely surrounds stem 136 and portion 120 of spout 80 resting in the bottom of casing 126 on gasket 124.

Valve member 92 is operated by applying pressure to the top of disc 134 which moves valve 132 downward compressing spring 138 and allowing the contents of the container to pass from passage 82 through casing 126 around valve 132 and out through aperture 128.

As will be seen from FIGURE 4, both the container valve 62 and sealing valve member 92 are normally closed so that dispensing of the contents of container 10 can only be accomplished by the concurrent opening of valve members 62 and 92. This requirement greatly reduces the likelihood of accidental discharge.

Referring to FIGURE 5, the detachable actuating means 34 suitable for use in connection with the embodiment of the invention shown in FIGURES 4 through 6 are similar in every way to those used with the embodiment of the invention shown in FIGURES 1 through 3. The detachable actuating means shown in FIGURE 5 includes a minor modification to that shown in FIGURE 2 in that rod 36' includes supporting arms 140 and 142 at a point slightly above the portion of rod 36' which extends into valve casing 126. Arms 140 and 142 are intended to hold rod 36' centrally positioned within detachable actuating means 34 without interfering with

the passage of the self-propelling compositions throughout chamber **38**. Rod **36'** further includes a slot **144** at its upper extremity to facilitate communication between chamber **38** and orifice **39**.

It will be obvious that the detachable actuating means shown in FIGURE 3 can be used in association with the embodiment of the present invention shown in FIGURES 4 through 6. Additional detachable actuating means to those shown in the drawings are within the scope of the present invention and will be suggested to persons familiar with aerosol dispensers. It is only necessary that such an alternate be adapted to be fixedly and detachably positioned with respect to the container valve actuator and that it include structure capable of opening the sealing valve member (i.e. valve member **28** or **92** in the drawings) when so positioned.

We claim:

1. A dispenser for a self-propelling composition comprising a container for the composition to be dispensed including a normally-closed valve member associated with the container, actuating means for the container valve including a passage communicating with the container valve for discharge of the container contents, a second normally-closed valve means located on the discharge side of the container valve and positioned in the path of discharge flow from the container valve through the container valve actuating means and detachable actuating means for the second valve comprising a body adapted to be fixedly positioned with respect to the actuating means for the container valve and including means engaging and holding open the second normally-closed valve to permit flow of the container contents therethrough.

2. The dispenser of claim **1** in which the second normally-closed valve means includes a notched pin and sealing gasket.

3. The dispenser of claim **1** in which the second valve means includes a disc and sealing gasket.

4. The dispenser of claim **1** wherein the detachable actuating means for the second valve is attached to the second valve.

5. The dispenser of claim **4** in which the detachable actuating means for the second valve is a toy rocket.

6. The dispenser of claim **1** in which the passage of the actuating means is horizontal when the dispenser is in the normal upright position.

7. The dispenser of claim **1** in which the passage of the actuating means is vertical when the dispenser is in the normal upright position.

8. A dispenser according to claim **7** wherein the second valve is positioned in the path of the discharge flow through the container valve actuating means by a U-shaped body member attached at its extremities to the container valve actuating means.

9. The dispenser of claim **8** which further includes a lever mounted to rotate through a vertical arc on the U-shaped body member and having a portion of said lever which contacts the valve actuating means during rotation whereby pressure can be applied to said actuating means.

10. A device comprising a container containing a propellent composition and including a normally-closed valve member associated with the container, actuating means for the container valve including a passage for flow and discharge of the container contents, a second normally-closed valve located on the discharge side of the container valve and positioned in the path of discharge flow from the container valve through the container valve actuating means and a propellable member attached to the container valve actuator comprising a body including an internal pressurizable chamber adapted to fit releasably on the second valve and including means engaging and holding open said second valve to permit flow of the container contents therethrough into the pressurizable internal chamber.

11. The device of claim **10** wherein the propellable member is a toy rocket.

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