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Ostrowsky et al.

[11] **3,726,444**

[45] **Apr. 10, 1973**

[54] **ACTUATOR MEANS FOR USE WITH AEROSOL DISPENSERS**

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[21] Appl. No.: **155,738**

[52] **U.S. Cl.**.....**222/402.11**, 222/505

[51] **Int. Cl.**.....**B65d 55/12**

[58] **Field of Search**.....222/505, 509, 402.1, 222/402.11, 402.13

[56] **References Cited**

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Assistant Examiner—Frederick R. Handren
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[57] **ABSTRACT**

Actuator means adapted for securement to an aerosol container, including a cap and a toggle-type actuator having a nozzle so that the application of manual pressure against the toggle-type actuator will operate the valve stem of the aerosol container to depress or move the valve stem inwardly and permit the contents of the aerosol container to be discharged therefrom, said toggle-type actuator having means cooperating with the cap to lock the actuator against relative movement with respect to said cap and to the valve stem to prevent any discharge of the contents of the aerosol container during shipment and during non-use of same and also prevent the accidental operation of the valve stem.

10 Claims, 10 Drawing Figures

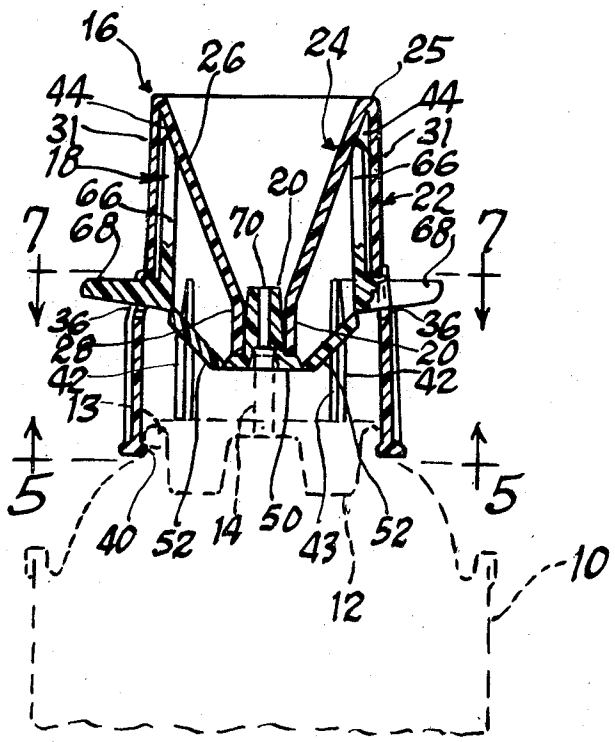


FIG. 1

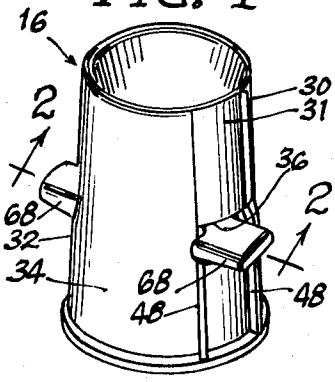


FIG. 2

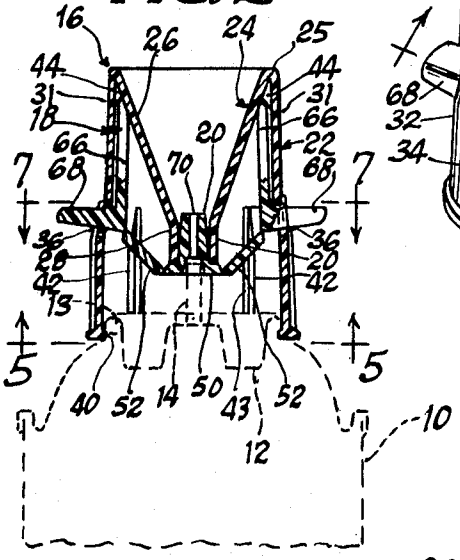


FIG. 3

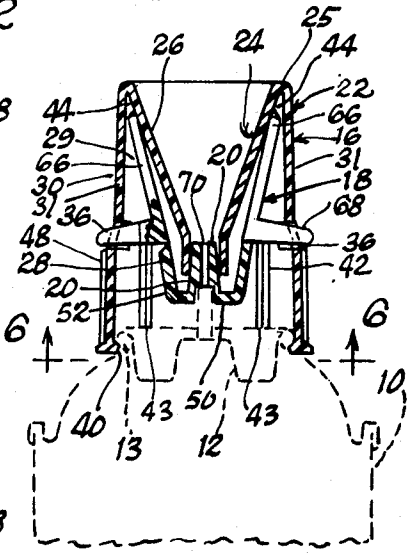


FIG. 4

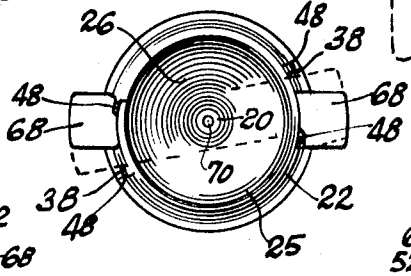


FIG. 5

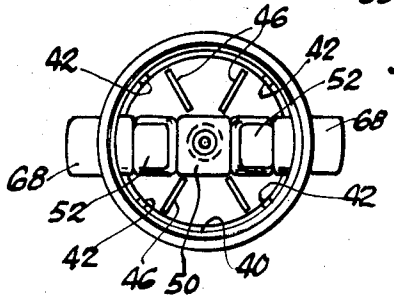


FIG. 6

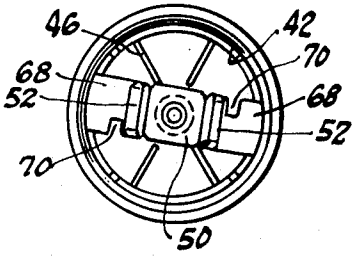


FIG. 8

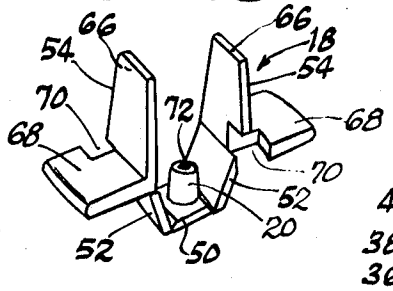


FIG. 7

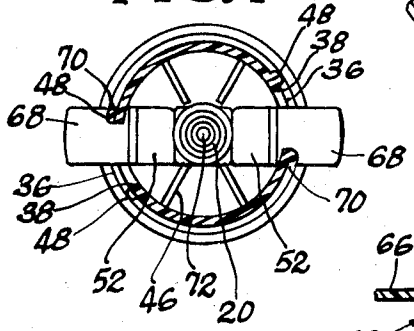


FIG. 10

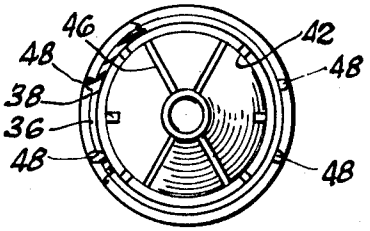
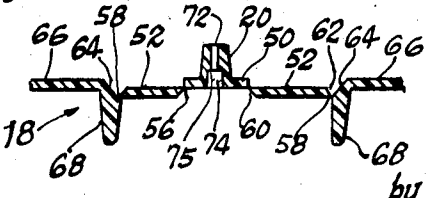


FIG. 9



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ACTUATOR MEANS FOR USE WITH AEROSOL DISPENSERS

BRIEF SUMMARY OF THE INVENTION

This invention relates to actuator means including a cap and a toggle-type actuator formed with a nozzle which is operatively connected to the valve stem of an aerosol unit so that by applying an inward manual pressure against the toggle-type actuator the valve stem will be depressed or moved inwardly relative to the aerosol container to permit the contents of the aerosol container to be discharged therefrom. The toggle-type actuator has means cooperating with the cap for positively locking the toggle-type actuator with respect to the cap and the valve stem and thereby prevents any discharge of the contents of the aerosol container through the valve stem during shipment and during non-use and also prevents the accidental operation of the valve stem.

Another object of this invention is to provide a device of the foregoing character which may be economically formed as two components, each of plastic material and injection molded, and may be readily applied and used in connection with aerosol dispensers.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a view showing the cap with the toggle-type actuator in a locked position relative to the cap.

FIG. 2 is a central sectional view taken on line 2—2 of FIG. 1, showing the actuator in a locked position as in FIG. 1, with the cap positioned on an aerosol container.

FIG. 3 is a view similar to FIG. 2 but showing the toggle-type actuator in actuated position to depress the valve stem to open position.

FIG. 4 is a top plan view.

FIG. 5 is a view taken on line 5—5 of FIG. 2.

FIG. 6 is a view taken on line 6—6 of FIG. 3.

FIG. 7 is a view taken on line 7—7 of FIG. 2.

FIG. 8 is a perspective view of the toggle-type actuator substantially in the position it occupies in the cap.

FIG. 9 is a central sectional view of the toggle-type actuator in a horizontal position, and

FIG. 10 is a bottom view of the cap.

This invention is adapted for use in connection with aerosol containers having a depressible valve stem. The conventional aerosol container, indicated by the numeral 10, is provided with a closure or mounting cup 12 which is peripherally clinched to the container in the conventional manner to provide an annular bead 13. The closure or mounting cup 12 has a central opening partially through which extends the conventional depressible valve stem 14 which is spring biased and which is normally maintained in its elevated or raised position to close the discharge outlet through said valve stem. When the valve stem 14 is depressed or pushed inwardly relative to the container and parallel to the axis of the container then the aerosol material in the container is discharged through the valve stem.

The unit forming this invention is formed of two components, namely, a cap generally designated by the numeral 16 and a toggle-type actuator generally designated by the numeral 18. Both the cap and the toggle-type actuator are each integrally molded by injection molding and are formed of a plastic material. The toggle-type actuator 18 is formed with an integrally formed dispensing nozzle generally designated by the numeral 20.

The cap 16 is provided with an outer annular body or shell 22 and an inner generally funnel-shaped portion 24 connected to the outer shell at the top as at 25. The inner funnel-shaped portion 24 has an inverted conical-shaped upper portion 26 which terminates in a tubular or sleeve-like portion 28 positioned axially of the cap. The inner funnel-shaped portion 24 of the cap is spaced from the inner wall of the shell 22 to provide a space 29 which accommodates the toggle-type actuator 18.

The body or shell 22 of the cap has an upper portion 30 and a lower portion or skirt 34, there being a slight draft for molding purposes. Approximately centrally of the height of the cap there is a pair of diametrically positioned alined rectangular-shaped slots 36 having opposite edges 38. Alined vertically in the upper portion 30 of the cap with the diametrically positioned slots 36 are stepped-in portions 31 extending from the top of the cap to the slots. From the stepped-in portion 31 to the skirt 34 there is an outwardly inclined portion, the difference being substantially the thickness of the wall of the shell. The draft, the stepped-in portions and the inclined portions are principally for expediting molding and reducing cost.

The lower end of the skirt of the cap has an inwardly extending annular lip or flange 40 which, as best shown in FIGS. 2 and 3, is adapted to engage the annular bead 13 on the container for the purpose of nondetachably securing the cap to the container.

The interior wall of the cap body or shell 22 is provided with a plurality of spaced vertically extending reinforcing ribs 42, the lower ends 43 of which terminate above the bottom of the cap to rest on the top of the bead 13 to properly seat the cap on the top of the can. The interior of the cap adjacent the top thereof has a plurality of downwardly extending inclined ribs 44, which ribs are between the outer shell 22 and the inner funnel-like wall 24 and the ribs are positioned in substantially vertical alinement with the slots 36. Extending between the outer and inner walls of the cap and connected to said walls are four radially extending fins or ribs 46, best seen in FIG. 7, which are in an offset position with respect to the slots 36. The fins or ribs 46 serve to rigidify the outside wall of the cap and to prevent any pressure applied thereagainst from pushing the outside wall inwardly. The skirt and the intermediate portion of the cap adjacent each of the opposite edges 38 of the slots 36 are provided with vertically extending ribs or bosses 48 which are engaged by the toggle-type actuator to effect a locking between the actuator and the cap.

The toggle-type actuator 18, best shown in FIGS. 8 and 9, is integrally molded of plastic material and comprises a central section 50 with an intermediate adjacent section 52 on each side of the central section and a generally L-shaped section 54 adjacent each of the intermediate sections 52. A hinge 56 is formed between the central and intermediate sections 50 and 52, and a hinge 58 is formed between the intermediate and the L-shaped sections 52 and 54, the material along the hinges 56 and 58 being of less thickness than the material of the sections. The ends of the sections

adjacent the hinges are tapered or inclined as indicated at 60, 62 and 64.

The L-shaped section 54 has an upwardly extending portion 66 with a laterally extending portion or extension 68 which is shorter than the upwardly extending portion 66 but is of a greater thickness. The laterally extending portion or extension 68 is provided with a cutout or recess 70 which is generally L-shaped so that at the cutout or recess there is an open space adjacent the juncture between the upwardly extending portion 66 and the lateral extension 68, there being two such cutouts or recesses 70, one on each of the extensions 68 but they face in opposite directions. As viewed in FIG. 8, one cutout 70 faces forwardly whereas the other cutout faces rearwardly. These oppositely facing cutouts serve to provide the means for locking the toggle-type actuator with respect to the cap to prevent actuation of the toggle-type actuator when in locked position, as best seen in FIGS. 1 and 2.

The central section 50 of the toggle-type actuator 18 is provided with a centrally positioned nozzle 20 having an axial bore 72 which communicates at the lower end with an enlarged recess 74 defining a shoulder 75. As best seen in FIGS. 2 and 3, the nozzle 20 is positioned on the valve stem 14 with the upper end of the valve stem within the recess 74 abutting against the shoulder 75. The interior of the valve stem is thus in direct communication with the axial bore 72 of the nozzle 20 through which the material discharged from the valve stem passes to be discharged from the nozzle.

In assembling the unit, the toggle-type actuator 18 is inserted into the cap from the bottom open end of the cap and the nozzle 20 is positioned in the tubular or sleeve-like portion 28 of the inner funnel-shaped portion of the cap. When inside the cap the lateral extensions 68 extend through the cap slot openings 36 with the upwardly extending portions 66 extending up into the interior of the cap and with the free ends thereof abutting against the inclined ribs 44 and against the inner wall of the funnel-shaped portion.

In normal nonoperative position, such as when in locked position, or even when unlocked but in nonactuating position, the toggle-type actuator will be positioned with the parts substantially as shown in FIG. 2, that is, the extensions 68 will extend outwardly of the cap slots 36 to their maximum extended position and the upwardly extending portions 66 will extend substantially parallel with the outside shell and with the intermediate sections 52 inclined between the central horizontal section 50 and the outer sections. When in this nonactuating position the toggle-type actuator may be locked relative to the cap by manually engaging the extensions 68 of the actuator and rotating the actuator slightly clockwise to that the oppositely facing recesses 70 in the extensions abut against the adjacent edges 38 of the slots 36, as best seen in FIGS. 1 and 7, wherein the recessed portion of the extension will engage the vertically extending ribs 48. This locks the toggle-type actuator 18 relative to the cap and serves to maintain the nozzle 20 of the actuator, as well as the central section 50 of the actuator in its most elevated position in the cap, as shown in FIG. 2. In this position the valve stem 14 is in its nondepressed position and the spring (not shown) within the valve assembly of the conventional valve stem will normally maintain the valve stem in its upper position, as indicated in dotted lines in FIG. 2, to close the valve stem and prevent any of the material within the container from passing through the stem. It is in this locked position of the toggle-type actuator that the aerosol container with the cap thereon may be shipped and in such position the valve stem 14 will not be operable to open position. With the toggle-type actuator in the position shown in FIGS. 1 and 2 where the nozzle on the actuator is locked against being depressed, or where the nozzle even when unlocked is in its elevated or nondepressed position, the valve stem will remain in closed position.

When it is desired to release some of the material from the container, the toggle-type actuator is rotated slightly counter clockwise or in the opposite direction from that previously rotated so that the cutouts 70 in the extensions 68 are clear from engagement with the edges 38 of the slots 36 and this will permit the extensions 68 to be manually engaged and pressed inwardly, as shown in FIG. 3. When pressed inwardly the parts of the toggle-type actuator will be positioned as shown in FIG. 3, with the free ends of the upwardly extending portions 66 bearing against the ribs 40 and causing the central portion 50 of the toggle-type actuator to assume a lowered position and correspondingly with it will cause the valve stem 14 to be depressed to thereby open the valve stem to permit the discharge of the material from the aerosol container.

As long as the extensions of the toggle-type actuator are maintained in the position shown in FIG. 3, wherein they are manually pressed inwardly, the valve stem 14 will be open and the material in the container will be discharged. However, when the extensions 68 are manually released the spring in the valve stem assembly 14 will return the valve stem to its closed position and at the same time will allow the toggle-type actuator to move to the position shown in FIG. 2 (except that it is unlocked) since the toggle-type actuator naturally tends to move towards its original "as molded" position providing a small amount of spring return action due to the "plastic memory" of the polyolefin material.

What is claimed is:

1. Actuator means for actuating the valve stem of an aerosol container for dispensing the material within the container, said means including a cap adapted to be secured to the container and extend over the valve stem, said cap having an opening in the side thereof, a toggle-type actuator having means extending within said cap and means extending outwardly of said side opening, said toggle-type actuator adapted to be operatively connected to the valve stem so that when the outwardly extending means is pressed inwardly the toggle-type actuator will depress the valve stem inwardly relative to the aerosol container to open the valve and discharge the contents from the aerosol container, said outwardly extending means comprising an extension which has a cutout adapted when in locked position to be moved against the edge of the side opening of the cap to prevent the extension from being moved inwardly to thereby lock the toggle-type actuator against operation.

2. A structure as set forth in claim 1 in which the toggle-type actuator comprises a central section having the nozzle formed as part of the central section, an intermediate adjacent section on each side of the central

section and a generally L-shaped section adjacent each of the intermediate sections with the intermediate section hinged to the central section and with the L-shaped section hinged to the intermediate section, and wherein the L-shaped section has an extension extending outwardly of the cap through the side openings of the cap to be manually engaged.

3. A structure as set forth in claim 1 in which the toggle-type actuator is integrally molded of a plastic material.

4. Actuator means for actuating the valve stem of an aerosol container for dispensing the material within the container, said means including a cap adapted to be secured to the container and extend over the valve stem, said cap having diametrically opposed side openings, a toggle-type actuator having means extending within said cap and a pair of diametrically positioned outwardly extending means extending outwardly of said opposed side openings, said toggle-type actuator adapted to be operatively connected to the valve stem so that when the outwardly extending means are simultaneously pressed inwardly the toggle-type actuator will depress the valve stem inwardly relative to the aerosol container to open the valve and discharge the contents from the aerosol container, each said outwardly extending means comprising an extension which has a cutout with the cutouts facing in opposite directions and whereby each of the cutouts is adapted to engage the adjacent edge of the side opening to lock the toggle-type actuator against any manual inward pressure.

5. A structure as set forth in claim 4 in which the toggle-type actuator is integrally molded of a plastic material.

6. Actuator means for actuating the valve stem of an aerosol container for dispensing the material within the container, said means including a cap adapted to be secured to the container and extend over the valve stem, said cap having diametrically opposed side openings, a toggle-type actuator having means extending within said cap and a pair of diametrically positioned means extending outwardly of said opposed side openings, said toggle-type actuator adapted to be operatively connected to the valve stem so that when the outwardly extending means are simultaneously pressed inwardly the toggle-type actuator will depress the valve stem inwardly relative to the aerosol container to open the valve and discharge the contents from the aerosol container, said toggle-type actuator comprising a central section having a nozzle integrally formed therewith with an intermediate adjacent section on each side of the central section and a generally L-shaped section adjacent each of the intermediate sections, with the intermediate section hinged to the central section and with the L-shaped section hinged to the intermediate section and wherein the outwardly extending means is an integral part of the L-shaped section and is an extension, each of the extensions having a cutout whereby each of the cutouts is adapted to engage the adjacent edge of the side opening of the cap to lock the toggle-type actuator against reciprocal movement relative to the cap.

7. A structure as set forth in claim 6 in which the L-shaped section has an upwardly extending portion positioned inside the cap between the outer shell body and the inner funnel-shaped portion with the free end of the upwardly extending portion adapted to engage an inclined rib inside the shell body to cause the central section to depress inwardly against the valve stem to actuate same.

8. Actuator means for actuating the valve stem of an aerosol container for dispensing the material within the container, said means including a cap adapted to be secured to the container and extend over the valve stem, said cap having an opening in the side thereof, a toggle-type actuator having means extending within said cap and means extending outwardly of said side opening, said toggle-type actuator adapted to be operatively connected to the valve stem so that when the outwardly extending means is pressed inwardly the toggle-type actuator will depress the valve stem inwardly relative to the aerosol container to open the valve and discharge the contents from the aerosol container, said outwardly extending means comprising an extension which extension has means as an integral part thereof adapted when in locked position to be moved and abut against the edge of the side opening to prevent the extension from being moved inwardly to thereby lock the toggle-type actuator against operation.

9. A structure as set forth in claim 8 in which the cap is provided with diametrically opposed side openings and in which the toggle-type actuator has a pair of diametrically positioned outwardly extending means extending outwardly of said opposed side openings which are adapted to be simultaneously pressed inwardly to operate the valve stem, each said outwardly extending means comprising an extension with at least one of said extensions having integral means to be moved and abut against the edge of one of the side openings when in locked position to prevent the extension from being moved inwardly to thereby lock the toggle-type actuator against operation.

10. A structure as set forth in claim 8 in which the toggle-type actuator is integrally molded of a plastic material.

* * * * *