

[54] SAFETY OVERCAP FOR AEROSOL
CONTAINER INCORPORATING
CONTINUOUS SPRAY MECHANISM

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[51] Int. Cl. B65d 55/12

[58] Field of Search..... 222/153, 402.11, 402.14;
251/111, 113

[56] References Cited

UNITED STATES PATENTS

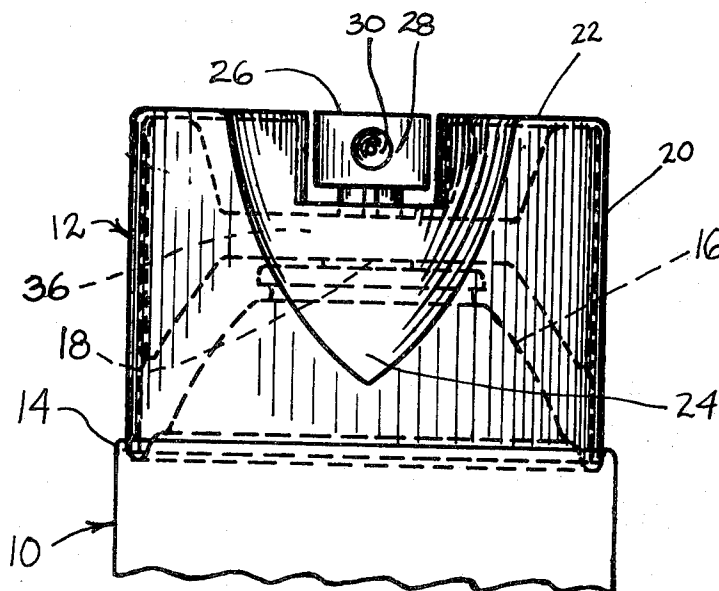
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[57]

ABSTRACT

A safety overcap for aerosol spray containers incorporating a locking device to prevent unwanted discharge of the product is described. The locking device automatically returns to the locked position when the container is not in use and also provides for a continuous spray operation when desired.

9 Claims, 10 Drawing Figures



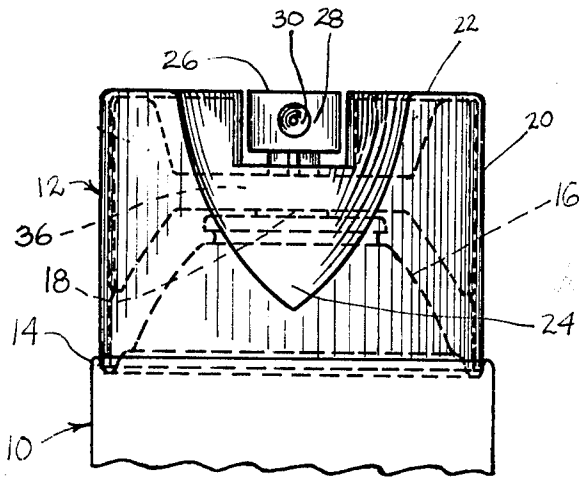


FIG. 1

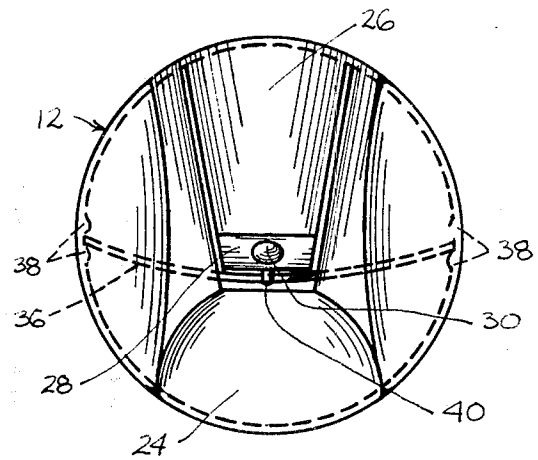


FIG. 2

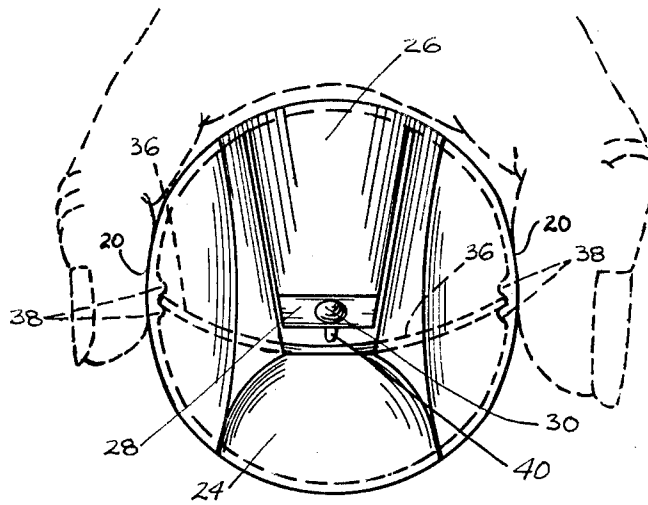


FIG. 3

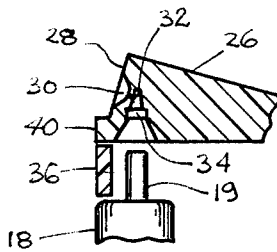


FIG. 4

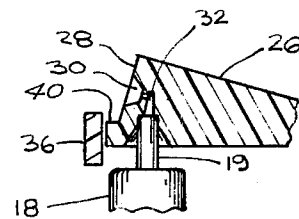


FIG. 5

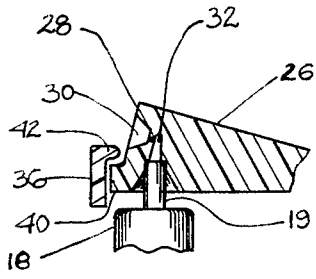


FIG. 6

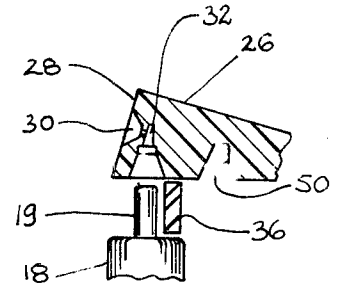


FIG. 7

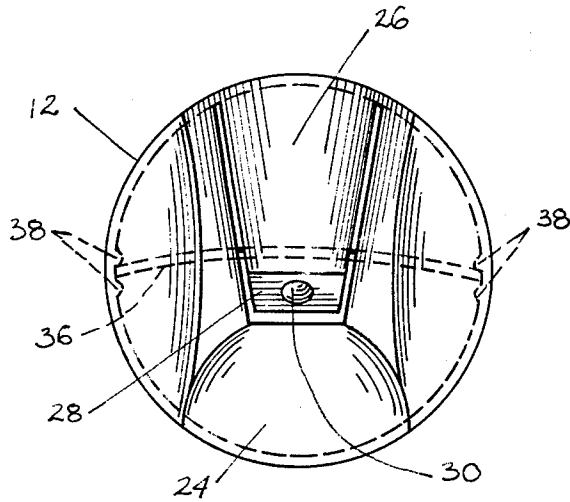


FIG. 9

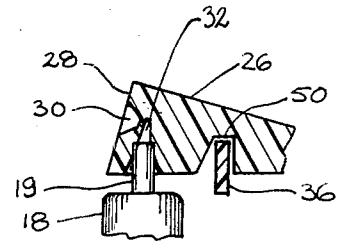


FIG. 8

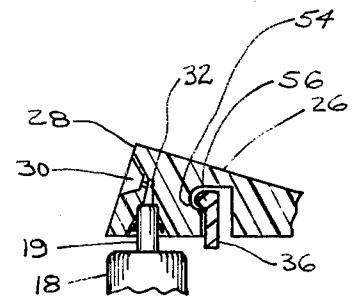


FIG. 10

SAFETY OVERCAP FOR AEROSOL CONTAINER INCORPORATING CONTINUOUS SPRAY MECHANISM

BACKGROUND OF THE INVENTION

This invention relates to an improved safety cap of the type used on hand held aerosol spray cans incorporating non-removable spray-through overcaps. More particularly, this invention relates to a locking device in an actuator overcap combination that prevents unwanted spray actuation and also provides a continuous spray operation. Further, the locking mechanism, while very effective, is quickly and easily released to allow depression of the actuator for normal spraying and automatically returns to the locked position when spraying is discontinued.

The unwanted actuation of aerosol spray cans is a problem the industry is well aware of. There have been a number of safety mechanisms devised to prevent the unwanted dispensing of products from aerosol cans by uninformed users such as children or premature dispensing during shipping and storage of the container. See Venus U.S. Pat. No. 3,651,993, Wakeman et al U.S. Pat. No. 3,722,748, Sette, U.S. Pat. No. 3,729,119, Gach U.S. Pat. No. 3,734,354, Blank U.S. Pat. No. 3,744,682, Blank U.S. Pat. No. 3,754,689 and Mead U.S. Pat. No. 3,802,607 for examples of safety overcap devices designed to prevent unwanted discharge of products from aerosol cans.

Many of these devices, although workable, were in some cases tedious to operate, would not return to a locked position automatically, or once activated would no longer serve to act as a lock. Thus some protective devices were difficult and cumbersome for even an adult to operate. Others, were a one-time locking mechanism in that once activated the actuator could no longer be locked. This solved most shipping and point-of-sale shelving problems, but does not provide continuous protection for uninformed users such as children. Further, many devices although providing for repetitive locking of the container actuator, require the user to remember to do some positive act in order to relock the actuator. Thus, if a person forgot to correctly position the locking device, it is ineffective and the danger still exists of unwanted spraying or discharge of the aerosol can's product.

Other objections of some of the prior arrangements have been that they did not lend themselves to available automated capping equipment used in standard aerosol filling operations, or required special valve constructions to accept the locking arrangement.

I have substantially overcome these locking problems with my present invention, in addition to providing in the locking device a capability for a continuous spray function, and the invention is fully applicable to standard capping machines in the aerosol filling line.

Thus it is the main object of this invention to provide a locking device for an aerosol container actuator that can quickly and easily be released by informed users to allow discharge of the product, but automatically returns to a locked position when the spraying is completed so as to effectively prevent accidental discharge by uninformed persons. In addition, the locking device is capable of working in combination with the actuator to provide for continuous spraying.

Further features and other objects and advantages of this invention will become more apparent from a study

of the following detailed description with reference to the drawings.

SUMMARY OF THE INVENTION

Briefly, one embodiment of the present invention provides a resilient strut to be located in an actuator overcap construction such that a portion of the upper edge of the strut is juxtaposed to the underface of the valve actuating tab. In its normal position, this portion of the strut is located directly under the valve actuating tab and prevents the tab from being depressed, thus acting as a block and preventing the discharge of the product. However, by simply applying pressure to the side walls of the actuator overcap, the strut is flexed or bowed such that its blocking portion moves from under the valve actuating tab and allows the tab to be depressed.

When the tab is then released and the pressure is released from the side wall of the overcap, the strut automatically unflexes and assumes its original position under the actuator tab thus providing an automatic relocking.

This cooperation of the strut and actuating tab to block operation of the latter is supplemented in the assembled aerosol dispenser by designing the height of the strut to essentially fill the gap between the underface of the actuating tab and the valve pedestal in the normal unactuated condition of the tab, so that more positive blocking of the tab is assured.

Thus, this quick and simple locking device allows positive locking of the actuator tab, easy unlocking and dispensing of the product and automatic relocking. In addition, by designing the strut with a nib construction the strut can, when in intermediate flexed position, permanently hold the actuator tab in depressed or actuating position to provide for continuous spraying until the strut is unflexed and the nib-tab engagement released.

Further features of this invention will become more apparent from the following description making reference to the following drawings.

FIG. 1 is a fragmentary front elevational view of a one-piece actuator overcap construction with hidden lines showing the locking mechanism as taught by this patent;

FIG. 2 is a top plan view of the overcap with hidden lines showing the flexible locking strut located by a pair of ribs in the normal locking position in which the actuator tab cannot be depressed;

FIG. 3 is the same top plan view of the overcap as shown in FIG. 2 with the hidden lines showing the flexible locking strut in fully flexed position in which the actuator can be depressed due to the pressure exerted on the side wall of the overcap by the user causing the strut to bow radially outwardly;

FIGS. 4, 5 and 6 are fragmentary cross-sectional side elevational views showing the flexible strut, respectively, in the unflexed and flexed positions, as well as locked position providing for continuous spraying;

FIGS. 7, 8 are fragmentary cross-sectional side elevational views similar to FIGS. 4, 5 and 6, showing a modified strut arrangement;

FIG. 9 is a top plan view of the cap showing the modified strut of FIG. 8; and

FIG. 10 is a fragmentary cross-sectional view showing a further strut modification.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In particular, and with reference to the foregoing drawings, a portion of a typical aerosol container 10 is illustrated with a molded plastic actuator overcap 12 mounted on the valved end, as shown in FIG. 1. The container is of conventional construction with an upper chine or lip 14 formed at the juncture where a domed top wall 16 is secured to the container body 10. In addition, a valve assembly 18 is located in the opening provided in the domed top wall 16 of container 10. A tubular valve stem 19 (see FIG. 4) projects axially upward above the upper end of the dispensing container. The container and valve arrangement thus far described are conventional and any appropriate form of valve having a tubular stem which, when reciprocated axially will open and close the valve to allow aerosol product to discharge through the stem, may be employed. A number of such valves are well known and commercially available.

The actuator overcap 12 takes the general form of an inverted cup having side wall 20 and an end or bottom wall 22. Side wall 20 of cap assembly 12 constitutes a generally smooth but inwardly stepped extension of the side wall of the container, with the lower edge of the cap being frictionally engaged in the annular recess formed adjacent chine 14 of the container. The cap body 12 is formed with a curved reentrant surface 24 intersecting the side and end walls to form a flared opening giving access for spray discharge of aerosol product. The end wall of the cap is slotted to provide an elongated actuator tab 26 located directly over the valve stem 19 and hingedly joined at its rear portion to the side wall of the cap body opposite reentrant surface 24. Tab 26 is thus free for limited flexural movement of its free end transversely of end wall 22. At its free end it has a laterally exposed face 28 and a discharge orifice 30 opens onto face 28, being connected internally of the tab by a passage 32 which leads into a valve stem receiving socket 34 formed in the underside of tab 26. Depression of tab 26 at its unhinged end will thus serve to depress valve stem 19 and allow aerosol product to be discharged through the stem and out through discharge orifice 30.

In order to prevent unwanted operation of the dispenser, a resilient locking strut 36 is located by means of supporting ribs 38 in the upper portion of the overcap, being disposed thereby generally diametrically of the cap but being slightly longer than the cordal dimension between ribs 38 so that it is slightly pre-bowed in a direction radially outward of the cap axis. Strut 36 is positioned such that the upper edge of the bowed center portion is juxtaposed to the underface of the actuator tab 26. In the locked position, FIGS. 2 and 4, the center portion of the locking strut is located directly under a narrow projecting nose 40 of the actuator tab thus preventing the tab from being depressed. This locking function is supplemented by making the center of the strut of a height substantially equal to that of the gap between the valve post and actuator tab, whereby the strut forms a positive block between the post and actuator.

In order to put the dispensing cap 12 in operative condition, all that is required is to apply finger pressure to the side wall 20 of the overcap as shown in FIG. 3. This pressure distorts the cap side wall and causes the

locking strut 36 to increase its bowed condition, thus moving its center portion from under the nose 40 of the actuator tab 26. The result of this, as shown in FIG. 5, is that actuator tab 26 is then free to be depressed to open valve 18 and allow the discharge of the aerosol product. When the tab is released and the pressure no longer applied to the side walls of the overcap, the resilient strut returns to its original shape and position under the nose of the tab, thus automatically relocking the actuator tab. This locking device, although quick and simple for an adult to operate, is efficient in preventing small children from discharging the contents of the container.

Further, by designing resilient strut to incorporate a small detent lip 42 at the rear upper edge of its central portion, as shown in FIG. 6, the actuator tab may be latched in depressed position to allow continuous spray discharge without requiring the user to maintain finger pressure on the actuator. The latching is effected by first squeezing the sides of the overcap to release the lock formed by strut 36, as already described, and then the actuator is depressed to bring the upper edge of nose 40 beneath lip 42. At this point, the lateral or squeezing pressure on the overcap is released before releasing the finger pressure on the actuator tab. This continuous spray condition is readily interrupted simply by again squeezing the sides of the overcap, thus bowing the locking strut out of engagement with the nose of the actuator tab, allowing the latter to resume its normal non-depressed position.

It will be apparent that the interengageable arrangement between the strut and tab just described, wherein the strap is located adjacent the lateral face in the unlocked condition, can be accomplished in other ways. For example, a hub or boss can be formed on the under surface of the tab at some point which is clear of the valve pedestal, and the locking strut positioned so as to normally underlie such boss but capable of being flexed out of underlying position in the manner described. The continuous spray function may also be incorporated in this arrangement by suitable formation of the side wall of the boss to provide a detent for a latching nib on the strut. Other similar modifications are illustrated in FIGS. 7 through 10. Thus in FIGS. 7 and 8, a transverse recess or slot 50 in the underface of tab 26 is positioned to receive strut 36, and here the strut is designed to bow inwardly from its normal blocking position as seen in FIG. 7 to its unlocked position seen in FIG. 8. FIG. 9 shows a strap (dotted line) pre-bowed in such condition. FIG. 10 illustrates how recess 50 can be formed with a latching lip 54 to engage a complementary latching lip 56 of the strut to provide the continuous spray discharge condition mentioned above.

In order to improve the bowing action of the strut it may preferably be formed in H-shape, as viewed in plan. (See dotted line showing in FIG. 1). With this strut oriented so that its plane is generally axial of the cap, the upper portion of the legs of the strut help to locate it in proper position in the cap, while the lower leg portions provide contact with the lower skirt area of the cap which is more flexible and thus easier to squeeze, and these lower leg portions transmit the action to the central bowed portion of the strut. Other similar modifications are believed obvious to those experienced in the design of actuator overcap structures for aerosol packaging.

Having thus described the invention in detail and with sufficient particularity as to enable those skilled in the art to practice it, what is desired to have protected by Letters Patent is set forth in the following claims.

What is claimed is:

1. A molded plastic overcap and actuator device for a valved aerosol dispensing container having an axially projecting valve stem, comprising in combination:

a cap body in the form of an inverted cup having side and end walls, means on said cap for securing it to the valved end of the container in enclosing relation thereto;

an integral valve actuator formed in said cap end wall by slotting said end wall to define a generally diametrically disposed tab hingedly connected at one end to said cap adjacent said side wall and free at its opposite end for resilient flexing movement toward and away from the plane of said end wall;

said tab having a laterally exposed face at its free end and a discharge orifice opening onto said face, said cap body being configured to complement said laterally exposed end face to give access for unimpeded spray discharge from said tab face;

a socket formed in the underside of said tab adjacent its free end for fitted reception therein of a valve stem, and internal conduit means in said tab intercommunicating said discharge orifice and socket; interengagable locking means carried by said cap body and tab, respectively, said locking means comprising a resilient strut extending generally diametrically of the cap internally thereof beneath said tab, said strut being retained in the cap in pre-bowed condition to dispose its central portion under the free end of said tab and engagable thereby to block depression of the tab, said strut being capable of further bowing in the same direction upon application of manual pressure to opposite side walls of the cap at the points of attachment of the strut thereto, said further bowing causing displacement of said central portion of said strut to a non-blocking position relative to said tab to permit depression of said tab free end out of the plane of said cap end wall.

2. An overcap and actuator device as defined in claim 1, wherein said cap is provided at generally dia-

metrically opposed points on its inner wall with rib means, and said resilient strut is engaged and retained in said cap by said rib means to dispose it normally in pre-bowed condition.

3. An overcap and actuator device as defined in claim 1, wherein said resilient strut has a central portion configured to substantially fill the gap normally present between the underface of said actuator tab and the adjacent face of the valve assembly in the dispenser on which said overcap and actuator device is adapted to fit.

4. An overcap and actuator device as defined in claim 1, wherein said resilient strut is configured to provide a detent lip and said actuator tab is configured to provide a complementary detent formation, said detent lip and detent formation being interengagable in a depressed position of said actuator tab to latch said tab in such position.

5. An overcap and actuator device as defined in claim 1, wherein said tab has a forward projection on its free end, and said central strut portion normally underlies said projection but can be bowed further by lateral pressure on said cap side wall so as no longer to be engagable by said projection upon depressing said tab.

6. An overcap and actuator device as defined in claim 1, wherein said tab is formed in its underface with a transverse recess adjacent said tab socket, said recess being positioned and adapted to receive said strut portion in its displaced position only, whereby to permit depression of said tab.

7. An overcap and actuator device as defined in claim 1, wherein said strut locking position is located between the free end of said tab and its valve stem receiving socket and said strut is pre-bowed away from the hinged end of said tab.

8. An overcap and actuator device as defined in claim 1, wherein said strut locking position is located between said valve stem receiving socket and the hinged end of said tab, and said strut is pre-bowed toward the hinged end of said tab.

9. An overcap and actuator device as defined in claim 1, wherein said strut is of H-shape when viewed in plan and is oriented in said cap so that its plane is generally axially of the cap.

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