

[54] SAFETY ACTUATOR FOR AEROSOL
CONTAINERS

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[58] Field of Search . 222/153, 182, 402.11, 402.12,
222/402.13

[56] References Cited

UNITED STATES PATENTS

3,158,292	11/1964	O'Donnell.....	222/153
3,602,399	8/1971	Litman.....	222/153
3,608,785	9/1971	Durso	222/182
3,651,993	3/1972	Venus	222/153
3,749,286	7/1973	Douglas	222/153

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[57] ABSTRACT

A child-proof or safety actuator for operating the valve assembly of an aerosol spray can is held in position on the can by engagement with the top of the can. The actuator consists of a vertical wall section and top walls and a depressible actuator assembly positioned in an opening defined in the top wall. A horizontally biased slide is disposed within the actuator cap and accessible through the side wall. The slide defines an opening through which the actuator stem may pass when the slide is pressed to an operative position. The slide cooperates with the actuator to provide a two-step actuating operation requiring the sequential movement of the slide and depression of the actuator to dispense product through the simultaneous use of the thumb and index finger.

10 Claims, 8 Drawing Figures

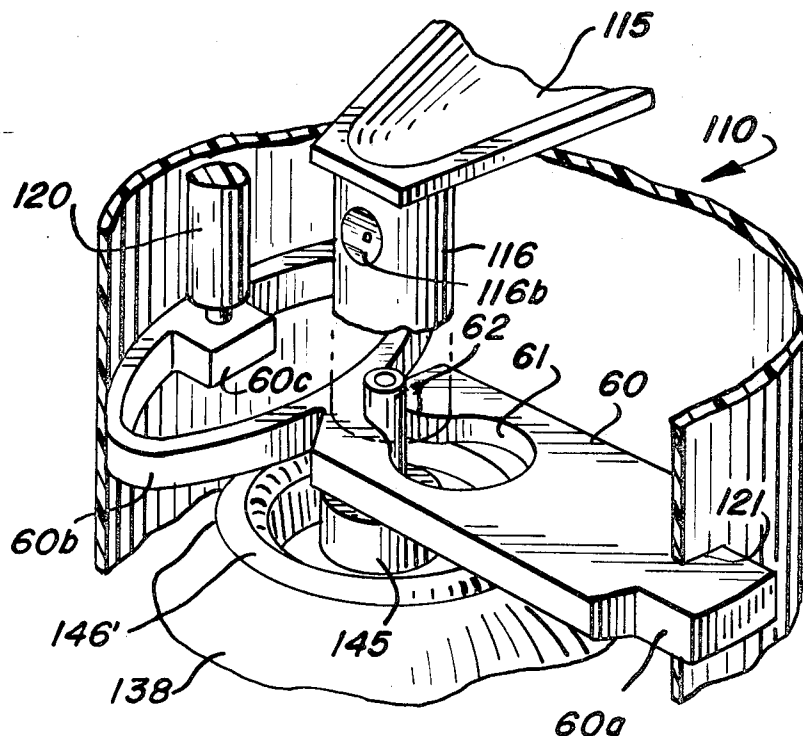


FIG. 1

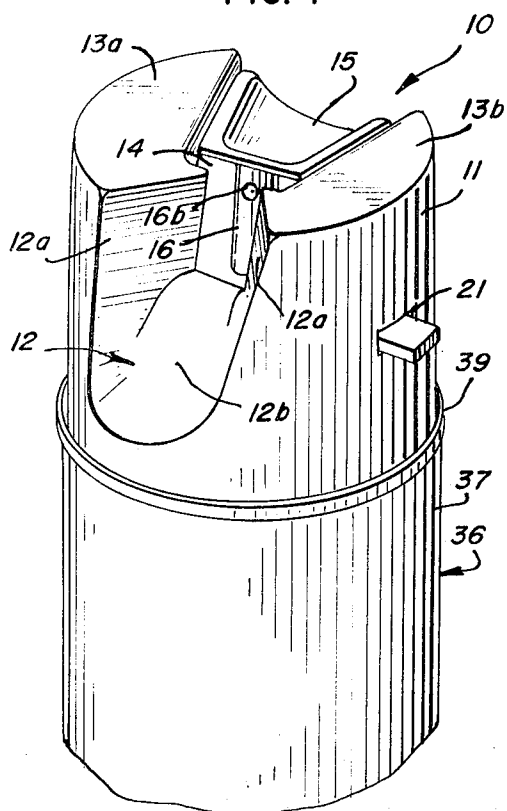


FIG. 3

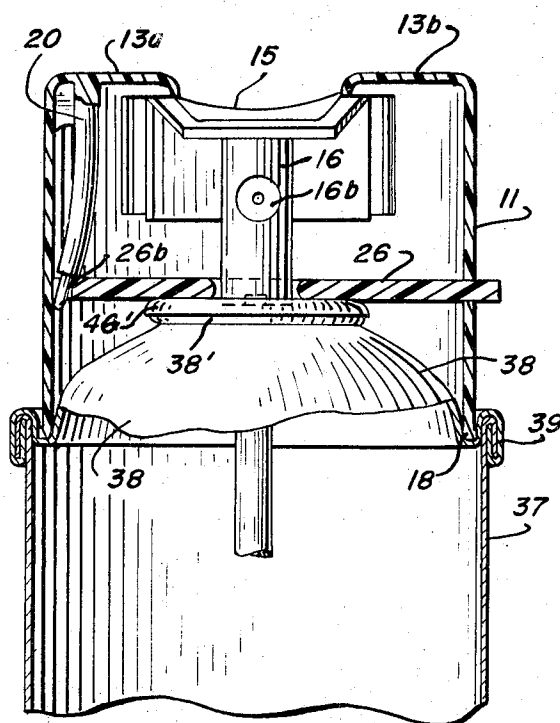


FIG. 2

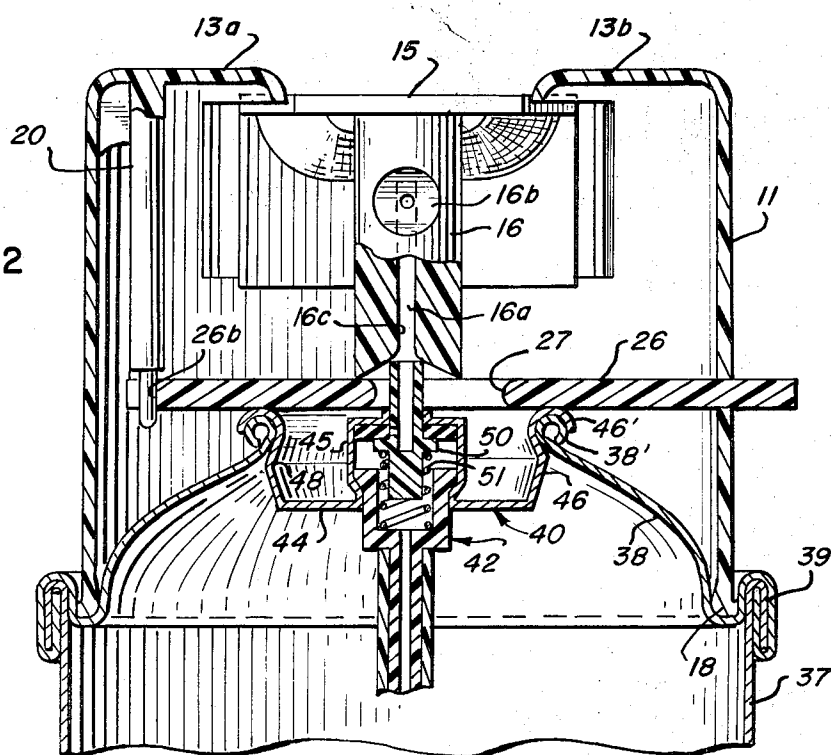


FIG. 4

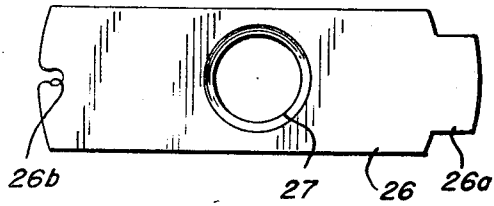


FIG. 6

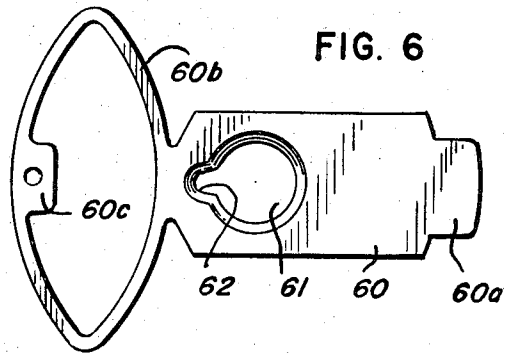


FIG. 5

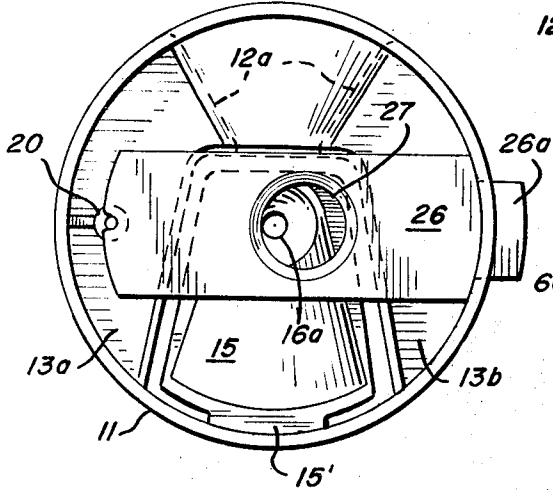


FIG. 7

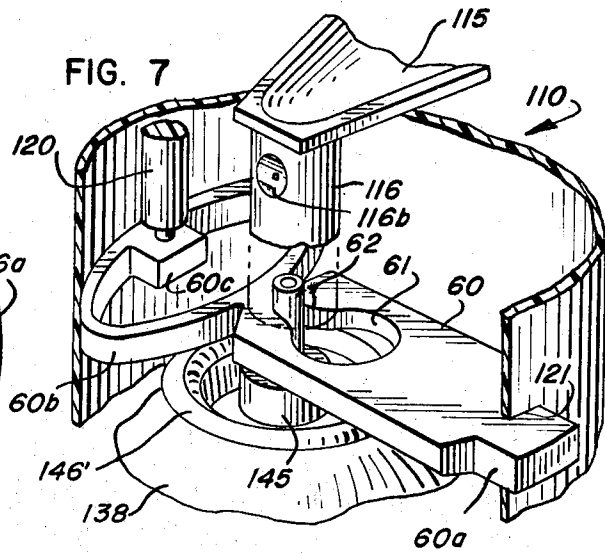
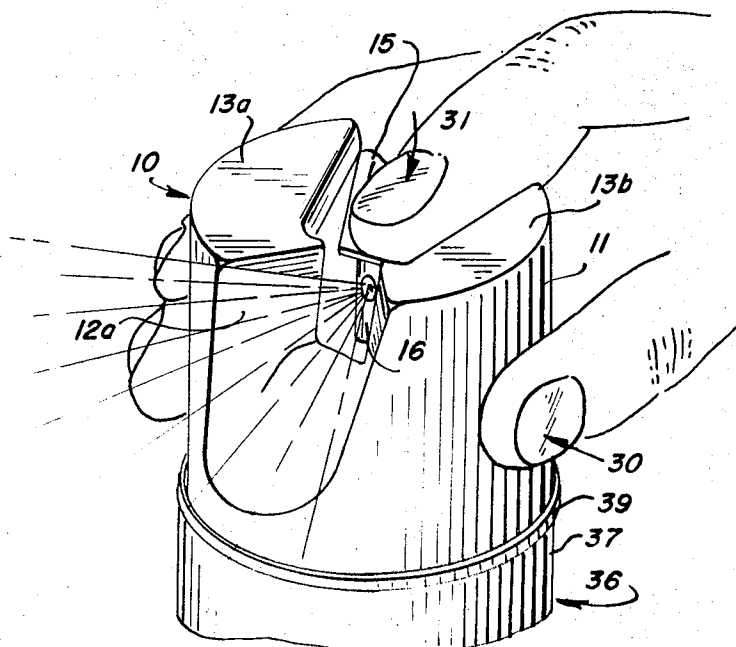


FIG. 8



SAFETY ACTUATOR FOR AEROSOL CONTAINERS

BACKGROUND OF THE INVENTION

This invention relates to actuator caps and more particularly to safety or child-proof actuator caps adapted to be engaged with the top of a pressurized spray can of the type commonly used to dispense pressurized products. With the ever increasing use of aerosol cans to dispense products in the home, the concern for providing a "child-proof" actuator which would militate against the use of the aerosol product by youthful, inexperienced users, has increased.

The conventional aerosol container comprises a cylindrical receptacle having an active fluid therein, which is maintained at a pressure above atmosphere by a propellant gas. The product is dispensed by exposing the interior of the container to the atmosphere by means of a valve assembly, which is normally supported on the top wall of the container. The valve stem assembly is usually operated by depressing the valve stem to unseat the valve. When the valve is unseated, the product passes through a tubular passage in the stem to be discharged to the atmosphere.

Various types of aerosol caps or actuators have been proposed and utilized in conjunction with containers having the aforementioned type of valve structure. One of the most common types of dispenser caps includes a cylindrical body, which is attached to the top of the container, and a valve-actuating lever mounted on the cap having a portion overlying the valve stem of the container. The lever has an actuator stem extending downwardly therefrom with a fluid passage adapted to be placed in communication with the valve stem such that when the lever is depressed, the valve stem will release product to flow through the actuator stem passage.

These hinge-actuated dispensers may be of various hinge types, such as, mounting the actuating lever on the cap at the periphery thereof for downward pivotal movement, the lever may be either integrally formed with the cap or be a separate piece hinged to the cap.

A second type of actuator which is quite common is the independent actuator type in which the cap consists of a body portion which is engaged with the container and a slidable actuator which is independent of the body portion and may be depressed relative to the body portion to dispense product.

Broadly speaking, the two types of dispenser caps referred to above, are species of a broad class of caps having a body portion which is fixed to the container and an actuator portion which is positioned by the body portion and is movable relative thereto to dispense product.

While these types of dispenser caps function quite well for the dispensing of products, they do not prevent the use of the aerosol by children since the actuator portion may be readily depressed by even the youngest child. Moreover, in some instances, the actuator stem may be accidentally depressed when the can is dropped on the cap, causing a discharge of product.

SUMMARY OF THE INVENTION

This invention relates to the field of dispenser caps having a body portion and actuator, and more particu-

larly to a hinge-type aerosol actuator cap, which is provided with a safety slide which permits operation of the actuator only by the sequential operation of the safety lever and depression of the hinged actuator.

Briefly described, the safety cap of this invention comprises a tubular body section, including skirt or side wall portions and top walls. The top walls define a radially-extending opening or passageway through which the hinged strip or lever actuator may be depressed. The hinged actuator may be integrally formed with the body section or may be a separate lever attached thereto to form a pivotal lever.

An actuator stem, having a fluid passage for dispensing the aerosol product, extends downwardly from the hinged strip and is adapted to unseat the container valve stem to dispense product when the hinged strip is depressed.

A safety slide, having a hole therein through which the actuator stem may pass, is positioned diametrically within the cap and accessible through the skirt portion at one end. The other end of the safety slide is attached to a column member extending downwardly from the top wall of the cap, and the slide is adapted to be supported and slide on the valve cup mounting rim when the cap is positioned on an aerosol container. The opening in the slide is positioned to be in eccentric relationship to the valve actuator stem of the hinged strip so that when the slide is in the inactive or safety position, the bottom of the actuator stem will bear against the safety lever, rather than depress the valve stem.

When the safety slide is moved to the active position, the opening therein is presented in coaxial relationship with the stem actuator so that the aerosol valve stem may be depressed and product dispensed.

Biasing means are provided to return the safety slide to the inactive position when the lever and hinged strip are released. In one embodiment, the biasing is provided by the cantilever spring effect produced by the column member formed in the cap.

In a second embodiment, the biasing means is provided by a double leaf-type spring formed integrally with the safety slide. In this embodiment, the safety slide further defines a notch opening into the actuator opening therein. This notch is designed to receive the container valve stem when the lever is in the inactive or safety position to provide a greater bearing surface for the bottom of the stem actuator.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the aerosol cap according to the present invention;

FIG. 2 is an elevation view partially in cross section, illustrating the internal structure of the aerosol cap in the inactive position;

FIG. 3 is an elevation view, similar to FIG. 2, illustrating the internal structure of the cap in the active position;

FIG. 4 is a plan view of a safety slide;

FIG. 5 is a bottom view, illustrating the internal structure of the safety closure of the present invention;

FIG. 6 is an elevation view of safety slide of a second embodiment;

FIG. 7 is a perspective view with certain portions broken away, showing the internal structure of a second embodiment of the present invention; and

FIG. 8 is a perspective view, illustrating the use of the present invention for dispensing aerosol products.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will herein be described in detail, a preferred embodiment of the invention and modifications thereto, with the understanding that the present disclosure is to be considered as an exemplification of the principle of the invention, and is not intended to limit the invention to the embodiments illustrated. The scope of the invention will be pointed out in the appended claims.

The safety aerosol dispenser cap 10 of the present invention is illustrated as the hinge-actuator type and includes a body formed of a generally cylindrical skirt portion 11, having a generally concave front wall 12. The top of the cap is formed to provide top-wall portions 13a and 13b which define a generally radially-extending passageway or opening 14, which extends down the front wall 12. The top walls merge with the cylindrical skirt portion and the concave front wall 12. The front wall 12 includes two radially-extending, vertical wall portions 12a, which merge smoothly at their bottom portions to form a generally concaved portion 12b.

An actuator in the form of a pivotal lever or strip 15 extends forwardly from the rear of the cap to be centrally positioned in passageway 14. Strip 15 may be molded integrally with the cap to form a hinge 15', FIG. 5, or may be attached thereto in suitable manner to provide a pivotal hinge therewith so that there can be relative movement between the strip and remaining portions of the cap. Extending downwardly from the underside of strip 15 is an actuator stem 16. Actuator 16 is positioned on strip 15 to engage the top of the valve stem 50. Actuator stem 16 includes a vertical passage 16a, a nozzle 16b for dispensing the aerosol product, and an annular recess 16c to engage the valve stem. The cap is adapted to be engaged with the top of the aerosol container by means of a bead 18, formed at the lower peripheral edge of the cap.

The spray can 36 has a cylindrical upright body 37 on which a domed top 38 is secured by means of an annular rib 39. A valve mounting cup 40, having a valve assembly 42 positioned therein, is crimped into the domed top 38 around a circumferentially-extending bead 38'. The valve mounting cup, as used with the present invention, is of the standard-type construction, having a bottom portion 44, a valve mounting wall 45, and a can mounting wall 46. The mounting cup is secured to the domed top by folding the top edge 46' of wall 46 around bead 38' formed in the domed top to form a rim and crimping wall 46 to provide a circumferential annular groove 48.

The valve assembly 42 includes a valve stem 50, which is biased to an inoperative position by valve spring 51, to seal the contents of the spray can.

Referring particularly to FIGS. 2 and 3, the cap 10 is provided with a column member 20, formed on the underside of top wall 13a, and extending downwardly therefrom. Wall 11 defines an access opening 21, diametrically opposite to column 20.

Referring to FIG. 4, an elongated flat safety slide 26 is shown which includes an attachment hole 26b at one end formed on the longitudinal median of the slide, and an access tab 26a at the other end.

Safety slide 26 is attached at one end to the lower portion of column 20, and tab 26a is positioned in access opening 21 for accessibility on the outside of the cap.

A chamfered opening 27, to allow the passage of stem actuator 16 therethrough, is formed in the safety slide. Opening 27 is positioned in slide 26 so that when the slide is placed in the cap, FIG. 2, the opening 27 is presented in eccentric relationship with the actuator stem 16 and valve stem 50, thereby causing the actuator stem to bear against the upper surface of the safety slide and prevent unseating of valve stem 50, unless the slide is moved into coaxial relationship therewith.

As is apparent from FIGS. 2 and 3, the safety slide is adapted to be supported on the valve mounting cup rim. When safety slide 26 is mounted to column 20, the safety slide is in the inactive or eccentric position with respect to the valve stem and actuator, and the column member, due to its cantilever attachment to the cap, acts as a spring to maintain the safety slide in its inactive position, FIG. 2.

Referring to FIGS. 3 and 8, to operate the valve stem 50, the safety slide 26 is pressed radially inwardly by force 30 against the biasing force of column 20, as by the thumb, to place the hole 27 in the safety slide in coaxial relationship with actuator stem 16 and valve stem 50. The hinged strip 15 is then pressed downwardly 31, as by the index finger, to unseat the valve stem to dispense product from the spray can. After the thumb and index fingers have been removed, the spring 51 (and the natural flexure of hinge 15') causes the actuator stem 16 to rise vertically and the valve stem 50 to seat in valve assembly 42. The cantilever column 20 then biases the safety slide 26 back to the inactive position shown in FIG. 2.

Referring now to FIGS. 6 and 7, there is shown therein a further modification to the safety slide. Slide 60 includes an access tab 60a at one end and an integrally formed double leaf spring 60b at the other end. The double leaf spring 60b also positions a mounting tab and hole 60c located on the longitudinal median of the slide. Similar to the above-described safety slide 26, slide 60 has an opening 61 adapted to permit the actuator stem to pass therethrough. In addition to this opening, a notch 62 is also provided to accept the valve stem 50 therein when the safety slide is in the inactive position.

Referring to FIG. 7, there is shown a safety cap 110, which is similar in construction to that described above in FIG. 1, with corresponding parts numbered by increasing their numerical designation by 100. The safety slide 60 is designed to be positioned within cap 110, with its access tab 60a protruding through access opening 121, and with tab 60c attached to the lower end of column 120. As with the previously described embodiment, the lower surface of safety slide 60 is positioned to ride on the upper surface of the valve cup rim 146' and be supported thereon.

The use of the double leaf spring 60b to provide biasing means permits a greater throw in the safety slide and increased biasing force to return the safety slide to the inactive position. The increased throw in the safety slide 60 allows the valve stem 150 to be partially enveloped in notch 60, and thereby presents a greater bearing surface immediately below the actuator stem 116 to prevent accidental discharge of contents from the container. Since the double leaf spring 60b of the safety

slide presents adequate biasing means to return the safety slide to the inactive position, the column member 120 need not be designed to act as a cantilever spring, although during formation of the column during molding, this type construction is most convenient.

In the operation of the cap 110, similar to that described above, a sequential application of forces, as by the thumb and index finger, must be applied to achieve dispensing of product. A radial force 30, FIG. 8, is exerted against tab 60a to move opening 61 into coaxial relationship with the actuator stem 116 and valve stem 150, so that the actuator 116 may be depressed downwardly by the index finger to dispense product from the container. Likewise, when the hinge portion 115 and safety tab 60a are released, the actuator moves upwardly to allow valve stem 50 to seat, and the safety slide slides back to the inactive position and partially envelops the valve stem 150 to prevent dispensing of product.

In the embodiments described, it is readily apparent that the operation of either cap dispenser requires the sequential operation of the safety slide and the valve actuator hinge portion 115 to dispense the product. While a child may be able to perform either of these operations in random order, their required sequence is not readily performed by the young child lacking the required dexterity. Thus, the dispensing cap of the present invention militates against the use of it by children or other inexperienced users to at least partially prevent accidental dispensing of toxic or poisonous products.

It will be understood by those skilled in the art that variations and modifications of the specific embodiments described above may be employed without departing from the scope of the invention, as defined in the appended claims.

What is claimed is:

1. A safety cap for an aerosol container, having a manually operable valve stem extending therefrom, said cap comprising: a body having a skirt portion and top wall, said top wall defining a radially-extending passageway therein; a depressible strip centrally positioned in said passageway, said strip being attached at one end to said body to form a hinge portion therewith and otherwise unattached to said body, said strip having a downwardly-extending actuator stem with a discharge passage formed therein; slide means extending across the interior of said cap and through said skirt portion; said slide means defining an opening to permit said actuator stem to pass therethrough; means for positioning the top surface of said slide means immediately below the lower end of said actuator stem; said slide means including an integrally formed double leaf spring for biasing said slide means to an inactive position, whereby said opening is disposed in eccentric axial relationship with said actuator stem to prevent depression of said actuator stem, said actuator stem being operable by pressing said slide means to an active position against said biasing means, whereby said opening is moved into coaxial relationship with said actuator stem.

2. A safety cap for an aerosol container, having a manually operable valve stem extending therefrom, said cap comprising: a body having a skirt portion and top wall, said top wall defining a radially-extending passageway therein; a depressible strip centrally positioned in said passageway, said strip being attached at

one end to said body to form a hinge portion therewith and otherwise unattached to said body, said strip having a downwardly-extending actuator stem with a discharge passage formed therein; slide means extending across the interior of said cap and through said skirt portion; said slide means defining an opening to permit said actuator stem to pass therethrough; means for positioning the top surface of said slide means immediately below the lower end of said actuator stem, said positioning means including a column member attached to the underside of said top wall, and extending downwardly therefrom, said column acting as a cantilever spring to bias said slide means to an inactive position, whereby said opening is disposed in eccentric axial relationship with said actuator stem to prevent depression of said actuator stem, said actuator stem being operable by pressing said slide means to an active position against said biasing means, whereby said opening is moved into coaxial relationship with said actuator stem.

3. The cap of claim 2, wherein said lever means further includes a notch opening into said slide means opening, said notch being adapted to receive said valve stem when the slide means is biased to the inactive position.

4. In combination with a container for dispensing product, having a manually operable valve stem projecting therefrom, said stem having a discharge opening therein for releasing the contents of said container; a cap assembly adapted to be retained on the top of said container by retaining means, comprising a body portion defining a radially-extending passageway in the top thereof; actuator means positioned in said passageway, said actuator means having a downwardly-extending actuator stem adapted to operate said valve stem when said actuator means is depressed, said actuator stem having a discharge passage formed therein adapted to be placed in communication with said valve stem to direct the dispensing of product when said strip is depressed; slide means positioned below said actuator stem and accessible through said body portion, said slide means defining an opening to permit said actuator stem to pass therethrough and including an integrally formed double leaf spring for biasing said slide means to an inactive position, whereby said opening is positioned in eccentric relationship with said actuator stem and said actuator stem will bear against said slide means; means for supporting said slide means against vertical movement; said actuator stem being operable by pressing said slide means to an active position against said spring, whereby said opening is moved into coaxial relationship with said actuator stem, said spring returning said opening to said eccentric relationship when said actuator means and slide means are released.

5. The combination of claim 4, wherein said slide means is supported against vertical movement by the top of said container.

6. The combination of claim 4, wherein said slide further defines a notch generally corresponding in shape to said valve stem, said notch being positioned adjacent to and opened into said opening, said notch being adapted to receive the upper portion of said valve stem when said slide means is in the inactive position.

7. The combination of claim 4 wherein said depressible actuator means includes a strip attached to said

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body at one portion to form a hinge therewith and otherwise unattached to said body portion.

8. The combination of claim 7 wherein said strip is integrally molded with said body portion.

9. The combination of claim 4, wherein said slide means is positioned within said cap by a column mem-

ber extending downwardly from the top of said body portion.

10. The combination of claim 9, wherein said column member acts as a cantilever spring to further bias said slide means.

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