Nov. 14, 1972 W. J. LANDEN 3,702,668

SAFETY DEVICE FOR AN AEROSOL OR THE LIKE DISPENSING CONTAINER

Filed Nov. 16, 1971

Fig.1.

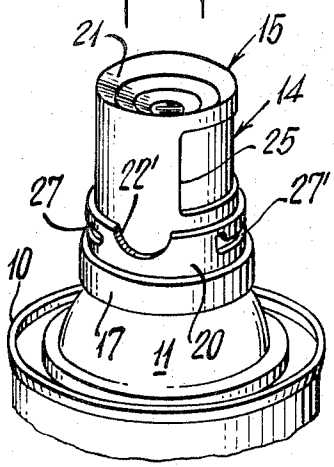


Fig.2.

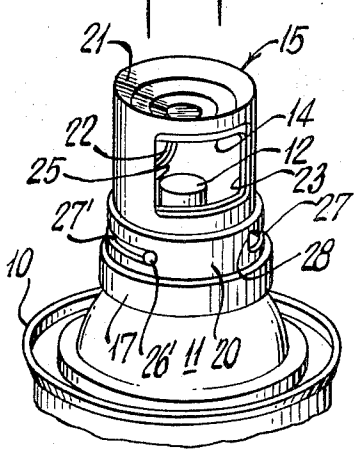


Fig.3.

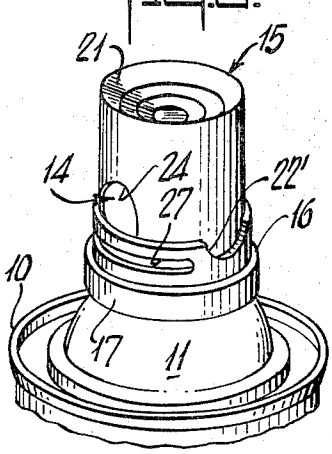


Fig.5.

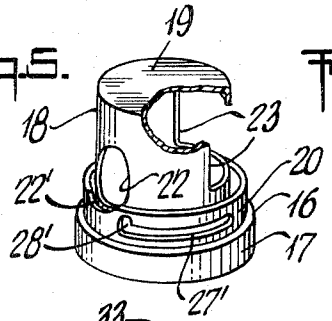


Fig.6.

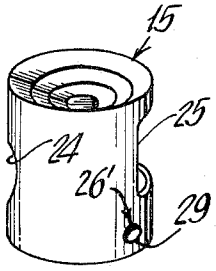


Fig.4.

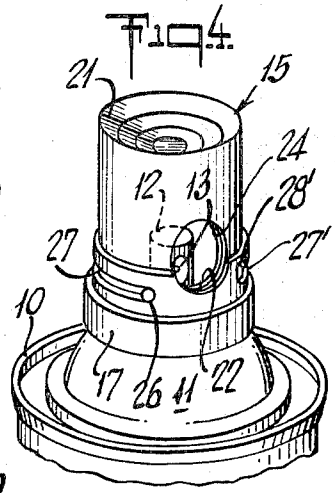


Fig.8.

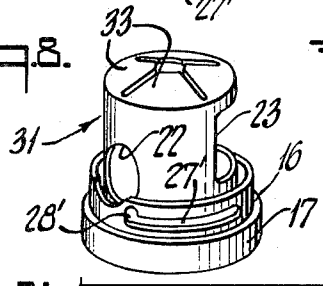


Fig.9.

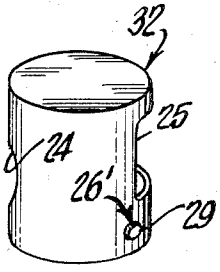


Fig.7A.

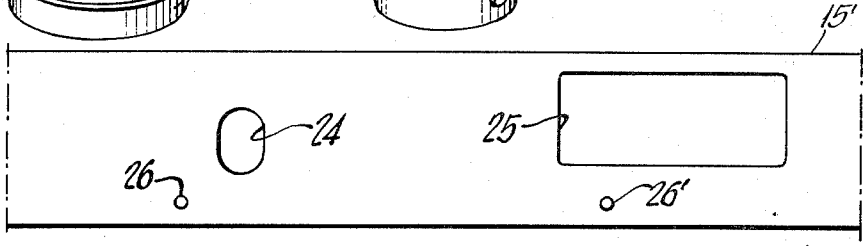
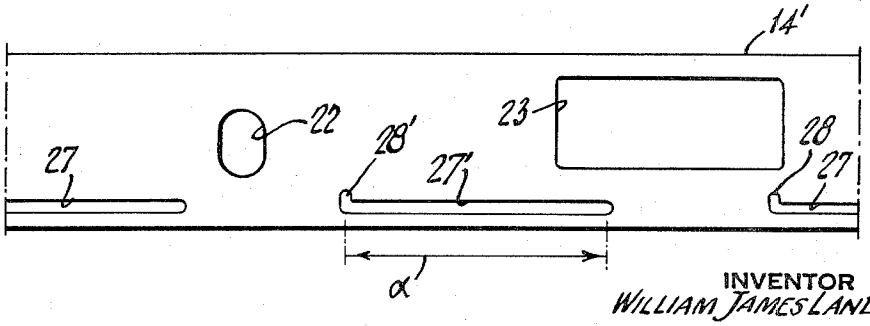


Fig.7B.



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SAFETY DEVICE FOR AN AEROSOL OR THE LIKE DISPENSING CONTAINER

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ABSTRACT OF THE DISCLOSURE

The invention contemplates simple means for safety closure of a dispensing container, such as an aerosol or other liquid dispenser, for particular use in protecting the container against access by young children. The device utilizes two concentric tubular or cup-shaped parts with window openings which register for one angular position and which do not register for another angular position, and interengaging means between these parts requires a correct sequence of two deliberate and different actuations, before the device will allow a dispensing actuation. In the form described, the safety device may be a unit-handling assembly of the two parts, said assembly being thereafter assembled to a standard aerosol container.

The invention relates to child-resistant safety closure devices, and in particular to such devices for preventing access to liquid-dispensing containers such as aerosol cans containing harmful ingredients.

It is an object of the invention to provide an improved closure with child-resistant features, for an aerosol or other liquid-dispensing container.

Another object is to provide an improved aerosol or other liquid-dispensing container with a child-resistant safety-closure feature.

A further object is to meet the above objects with structure which protects against direct access to the dispensing nozzle and to the dispensing actuator of such containers.

A general object is to achieve the above objects with structure of elemental simplicity and low cost and yet requiring at least two distinct and different particular displacements before access can be acquired to dispense the contents of a container of the character indicated.

Other objects and various further features of novelty and invention will be pointed out or will occur to those skilled in the art from a reading of the following specification, in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred forms of the invention:

FIG. 1 is a perspective view of the dispensing end of a conventional aerosol container, secured against child-access by structure of the invention;

FIG. 2 is a view similar to FIG. 1, but with parts actuated to the open, or access, position, for the actuating aspect of the access;

FIG. 3 is a view similar to FIG. 1, for another aspect of the secured condition;

FIG. 4 is a view similar to FIG. 3, with parts actuated as in FIG. 2, but depicting the dispensing aspect of the access;

FIGS. 5 and 6 are perspective views of the respective parts of the security device applied to the container of FIG. 1;

FIGS. 7A and 7B are diagrammatic lay-outs of the size and angular location of window openings in the cylindrical bodies of the respective parts of FIGS. 5 and 6; and

FIGS. 8 and 9 are perspective views as in FIGS. 5 and 6, respectively, to show a modification.

In the drawings, the invention is shown in application to safety-closure of a standard liquid-dispensing container such as an aerosol can, having a cylindrical body **10**, closed at its upper end by an end bell or dome **11**, complete with dispensing mechanism comprising a push button **12** and a discharge orifice **13**. The safety device or feature of the invention is provided by two relatively rotatable concentric cylindrical members **14–15**, being the inner and outer cup-shaped members shown separately in FIGS. 5 and 6.

The inner cylindrical member **14** is fashioned with a radially outward flange or base **16**, having an axial skirt **17** which is sized to engage and securely mount, as by detent or bonding means or both, to a neck formation (not shown) conventional in aerosol-container constructions. Thus, the inner member **16** may be viewed as part of the container end **11**, with the actuating and discharge means **12–13** projecting upwardly and within the included volume of the primary cylinder or shell **18** of member **14**. As shown, member **14** is cupped, being closed by a wall **19** at its upper end; and an integral upstanding sleeve portion **20** rises from the flange **16**, being radially spaced from sleeve portion **18** to an extent appropriate for concentrically guided rotary support of the skirt or open end of the outer cylindrical member **15**.

The outer cylindrical member **15** has a body shell with a bore sized for rotational support by the cylindrical shell **18**, and the upper end is closed by a wall **21**. Angularly spaced window openings **22–23** characterize the inner shell **18**, and similarly spaced window openings **24–25** characterize the shell of the outer member **15**; as best seen in FIGS. 7A and 7B, where **14'** and **15'** schematically show the flattened equivalent of the cylindrical shells, in terms of angular displacement about their common axis, the size and location of the corresponding openings **22–24** and **23–25** substantially conform to each other, being spaced approximately 180 degrees on their respective centers, as noted by legend. When members **14** and **15** are relatively rotated into a position of window registry (suggested by the placement of FIGS. 7A and 7B, and specifically shown in FIGS. 1 and 3), the registering large rectangular openings provide finger-access to and over the push button **12**, while the registering small oval or circular openings **22–24** provide unobstructed exposure for spray discharge on the axis of nozzle **13**; in the latter connection, an arcuate depression **22'** in sleeve **20** at window **22** completes the operativeness of the opening **22**.

In accordance with a feature of the invention, interengaging means on the relatively rotatable members **14–15** determine a pattern or program of locking and unlocking action designed to deter access by children. As shown, the interengaging means comprises like equally spaced integral lugs **26–26'**, extending radially outwardly from the open end of the shell of outer member **15**, and like equally spaced slots **27–27'** of limited circumferential extent characterizing the sleeve portion **20**. The lugs **26–26'** are always engaged in the respective slots **27–27'** and thus determine an angle α of permissible rotation of outer member **15** with respect to inner member **14**, this angle being sufficient to shift from the full open-window condition (FIGS. 2 and 4) to the fully closed condition (FIGS. 1 and 3); for the embodiment shown, windows **22–24** and **23–25** are approximately 36 and 95 degrees wide, respectively, and the angle α is approximately 110 degrees. As an additional feature, the interengaging means provides for releasing limited axial displacement of outer member **15** in the outward direction, i.e., in the direction away from container **10**, as permitted by a locally offset lobe **28–28'** in the respective slots **27–27'**, at the ends thereof for which full window closure is assured. And biased spring means coacting between members **14–15** continuously axially

urges the same in the direction of release, wherein lugs **26–26'** resiliently locate in the respective offsets **28–28'**; such spring action can be integrally built into the configuration of one or both of the closed ends **19–21**, being shown as a stiffly compliant concave diaphragm of concentric undulations in the end wall **21**, in central axially preloaded contact with the relatively stiff end wall **19**.

The members **14–15** may be of any appropriate material but are preferably of injection-molded plastic, such as polypropylene or ABS, with lug, slot, sleeve and other described formations integrally molded, to provide merely the two molded parts **14–15**. For ease of axial assembly of parts **14–15** to each other, the outer face **29** of the lugs (such as lug **26'** in FIG. 6) is conical or slubbed off, for local radially outward camming engagement with sleeve **20**; the inherent limited radial deformability of sleeve **20** (together with such small radial clearance as enables free rotation of the shells on each other) allows lugs **26–26'** to pass within sleeve **20** and to be permanently received in there respective slots **27–27'**, as will be understood.

In use, the safety device of the invention is normally in the secure or fully closed position (FIGS. 1 and 3), being held by lugs **26–26'** axially preloaded into their non-rotatable engagement with offsets **28–28'**, by the stiffly compliant interaction between end walls **19–21**. Preferably, the design of the parts is such that an axial force in the range of 8 to 15 lbs. is necessary, in order to axially displace the lugs of outer member **15** into axial registry with the plane of slots **27–27'**; it is preferred that this axially displaced condition be limited and determined by abutment of the open-end edge (bottom edge) of shell **15** with the radial flange **16**, so that compliant and lug and slot portions cannot be overloaded in the axial-compression phase of obtaining access to the container. Thereupon, the outer member **15** is rotated until lug abutment with the other end of slots **27–27'**, at which point the corresponding windows **22–24** and **23–25** are in full registry, so that both finger access to button **12** and open clearance for liquid or mist discharge on the axis of nozzle **13** are as available as if there had been no safety provision. After use of the container, the safety device is simply closed by reverse rotation of member **15** until lugs **26–26'** snap into the secure position afforded by offsets **28–28'**.

It will be seen that the invention meets all stated objects. It is simple in action, inexpensive to construct, and lends itself to mass-production, including mass-production assembly to containers of presently standardized construction.

It will be understood that the invention is susceptible to modification without departing from the overriding principle. For example, the non-rotated member **14** may be integrally formed as part of the end closure of the container, the rotatable member being merely then axially assembled (by snap action) to the container. Also, the axially compliant action may derive from suitable formations on the end wall **19** of the inner member **14**, or a separate axial spring may be captive between (and axially compressionally react between) relatively rigid end walls of the two members **14–15**; such a modification is suggested by FIGS. 8 and 9 which show inner and outer cupped sleeve members **31–32** which may be similar in all respects to members **14–15** except that, on the inner member **14**, a radially slitted convex frusto-conical end wall (thus comprising tabs **33**) provides the axial compliance, while the end wall **34** of the outer member **32** is relatively rigid. Still further, the finger-access and/or discharge-axis openings in the members **14–15** may be of other configuration, including location of one or the other of such openings in the end walls **19–21**, as long as the openings are offset from the common rotary axis of these members.

What is claimed is:

1. A container-closure protective device, comprising concentric relatively rotatable inner and outer cylindrical members with interengaging means operative at a first relative angular relation of said members to determine a limited axial displacement of said members between a first axial relation and a second axial relation, said interengaging means being also operative at only one of said axial relations to predetermine a limited relative angular displacement of said members between said first angular relation and a second angular relation, said inner and outer members having window openings which register at said second angular relation and which do not register at said first angular relation and prestressed compliant means reacting between said members and resiliently urging said members in the axial direction from said first axial relation to said second axial relation, whereby to open said protective device for access via the window openings, two different and deliberate actuations are required, namely, first an axial displacement and then a rotary displacement through said limited relative angular displacement.

2. A protective device according to claim **1**, in which said compliant means is an integral formation of one of said members.

3. A protective device according to claim **1**, in which both said members are cup-shaped, each with an open end and with a closed end, said open ends facing in the same direction and said compliant means reacting between the closed ends of said members.

4. A protective device according to claim **3**, in which said compliant means is an integral formation in the closed end of one of said members.

5. A protective device according to claim **1** in which said predetermined relative angular displacement is less than 180 degrees and in which said interengaging means is provided in multiple at equal angularly spaced locations about said members, said spacings being less than said predetermined angle.

6. A protective device according to claim **1**, in which the number of window openings in each of said members is two, both openings of one member being in register with both openings of the other member when said members are in said second angular relation.

7. A safety container comprising a body with a discharge nozzle and a dispensing-valve actuator at one end, said nozzle having a discharge axis fixedly related to the container body, and a safety closure over said valve actuator and nozzle; said closure comprising a first tubular member fixed to the container body and surrounding said actuator and nozzle, and a second tubular member surrounding said actuator and nozzle, said first and second members being coaxial and relatively rotatable about an axis offset from the nozzle-discharge axis and having interengaging means operative at a first relative angular relation of said members to determine a limited axial displacement of said members between a first axial relation and a second axial relation, said interengaging means being also operative at only one of said axial relations to predetermine a limited relative angular displacement of said members between said first angular relation and a second angular relation, said members having window openings which register with said discharge axis at said second angular relation of said members and which do not register at said first angular relation of said members, and prestressed compliant means reacting between said members and resiliently urging said second member in the direction from said first axial relation to said second axial relation.

8. A safety container according to claim **7**, in which each of said members has two angularly spaced openings which register for said second angular relation and which do not register for said first angular relation, the registering second openings of said members providing manual access to said actuator when said members are in said second angular relation.

9. A safety container according to claim **7**, in which said first member is the radially inner one of said members.

10. A safety container according to claim **9**, in which said first member includes radial-outwardly directed base-

mounting flange means at the container-mounting end thereof, the direction from said first axial relation to said second axial relation being away from said flange means, and said interengaging means being at substantially said first axial relation and therefore in register for axially retained relative rotation when said second member is displaced into axially limiting abutment with said flange means.

11. A safety covering assembly for bodily assembly to an aerosol container over the nozzle and valve-actuator region thereof, comprising concentrically nested relatively rotatable closed cups with interengaging means operative at a first relative angular relation of said cups to determine a limited axial displacement of said cups between a first axial relation and a second axial relation, said interengaging means being also operative at only one of said axial relations to predetermine a limited relative angular displacement of said cups between said first angular relation and a second angular relation, the walls of said cups having window openings which register for nozzle and actuator access when in said second angular relation of said

cups, and axially biased spring means reacting between the closed ends of said cups and urging said cups in the direction from said first axial relation to said second axial relation.

12. An assembly according to claim **11**, in which said spring means is an integral compliant formation in the closed end of one of said cups and having preloaded contact with the closed end of the other of said cups.

13. An assembly according to claim **12**, in which the compliant formation is on the inner of said cups.

14. An assembly according to claim **12**, in which the compliant formation is on the outer of said cups.

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