April 27, 1965 W. C. BEARD, JR., ETAL 3,180,531

OVERCAP AND ACTUATING BUTTON FOR AEROSOL CONTAINERS

Filed Feb. 18, 1964 2 Sheets-Sheet 1

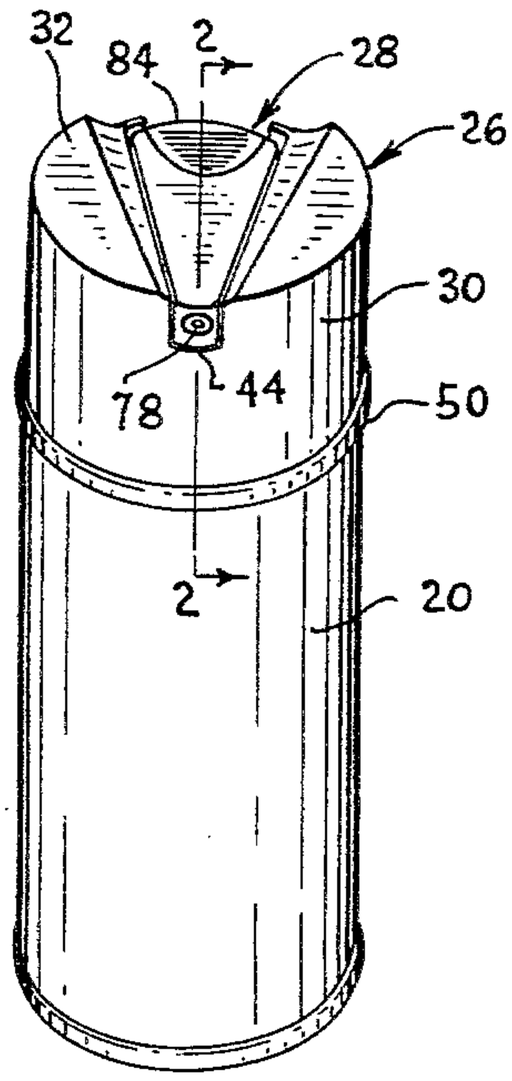

Fig. 1

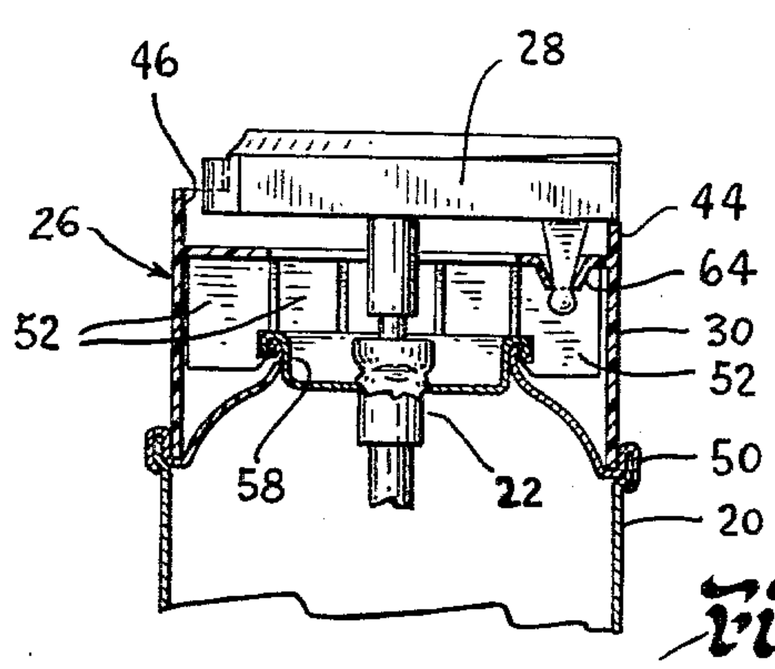

Fig. 2

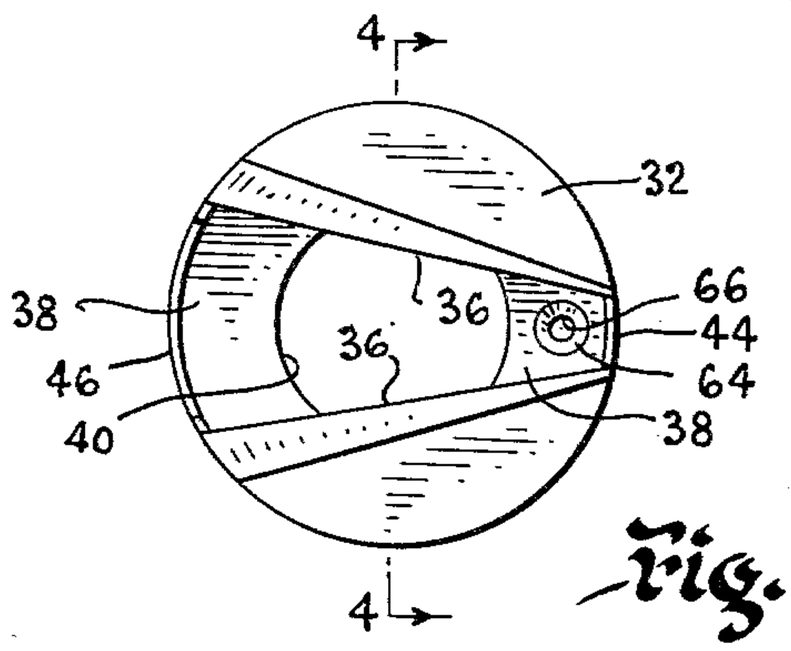

Fig. 3

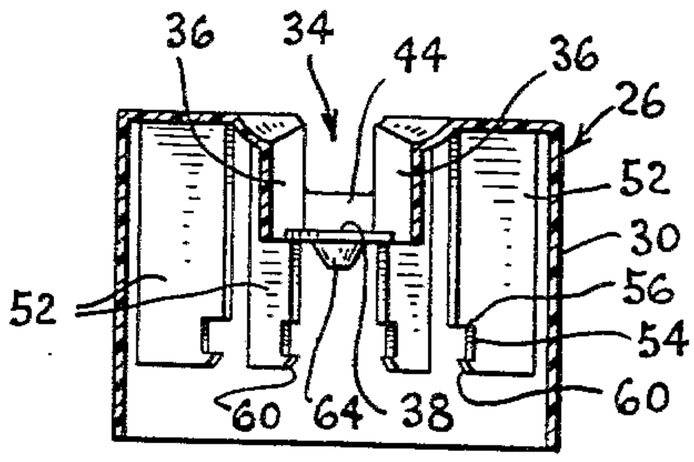

Fig. 4

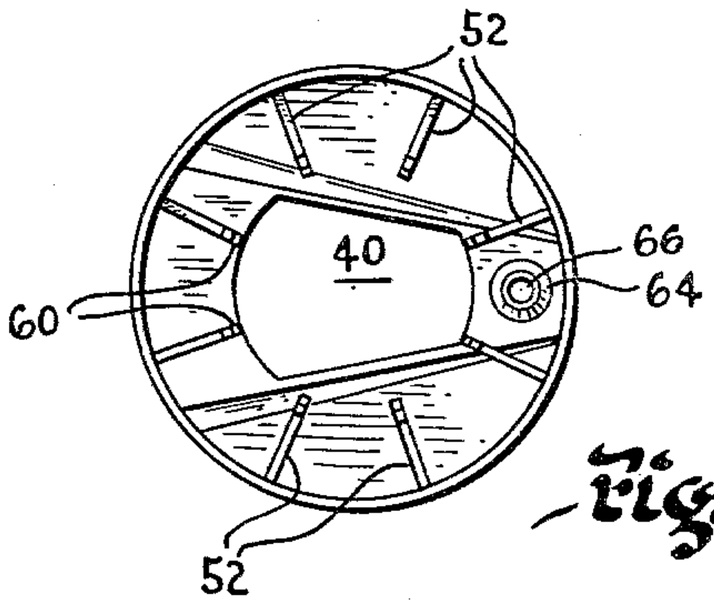

Fig. 5

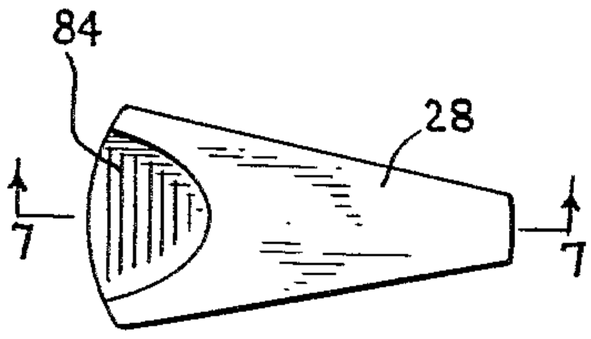

Fig. 6

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OVERCAP AND ACTUATING BUTTON FOR AEROSOL CONTAINERS

Filed Feb. 18, 1964 2 Sheets-Sheet 2

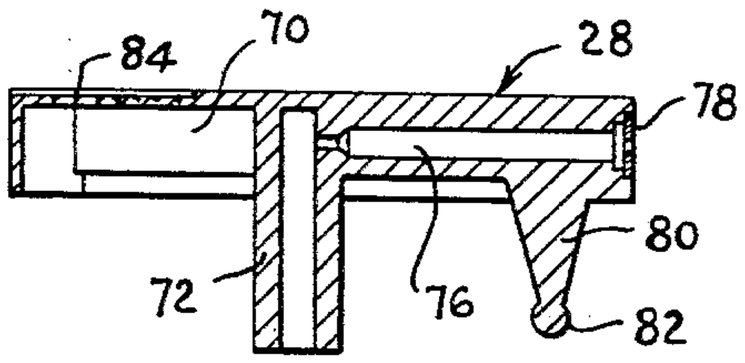

Fig. 7

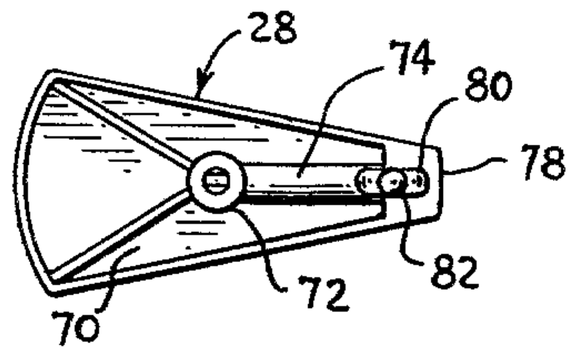

Fig. 8

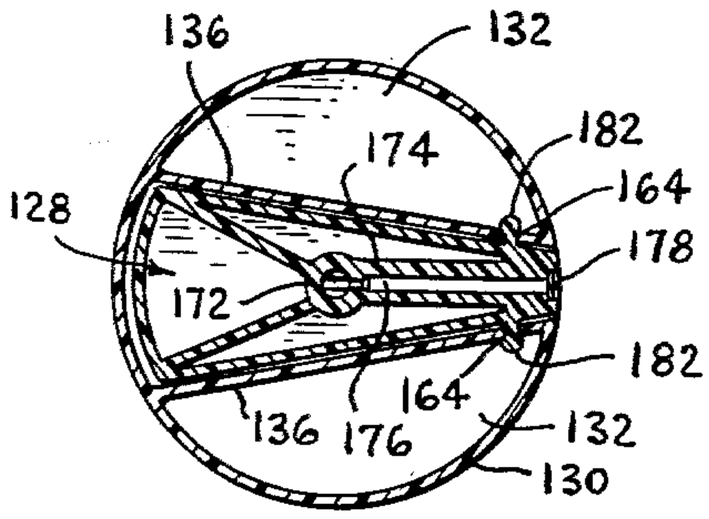

Fig. 10

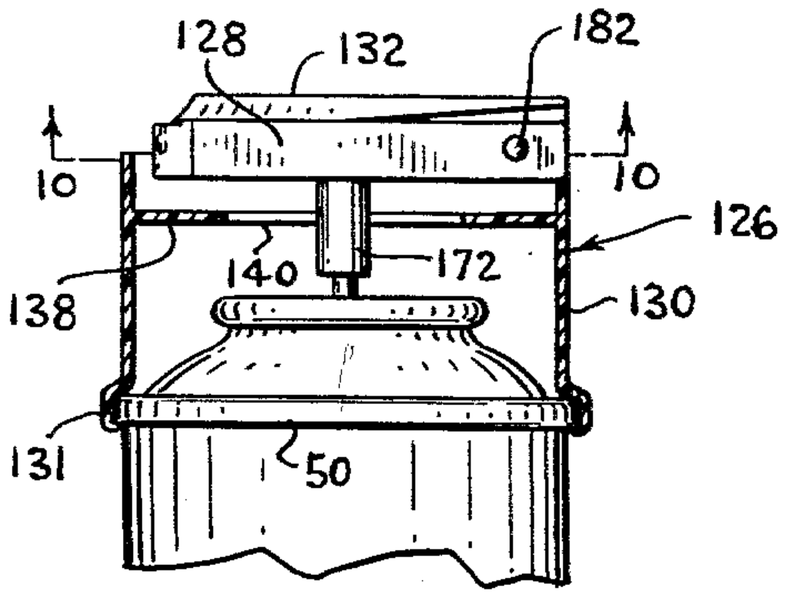

Fig. 9

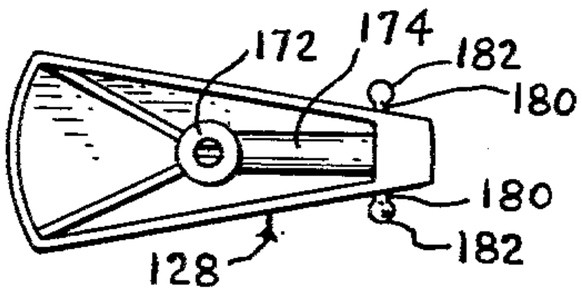

Fig. 11

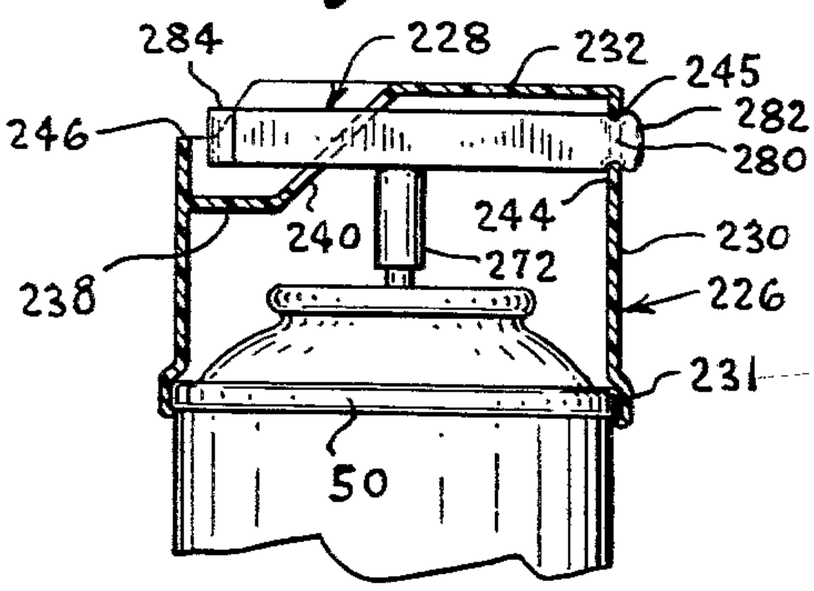

Fig. 12

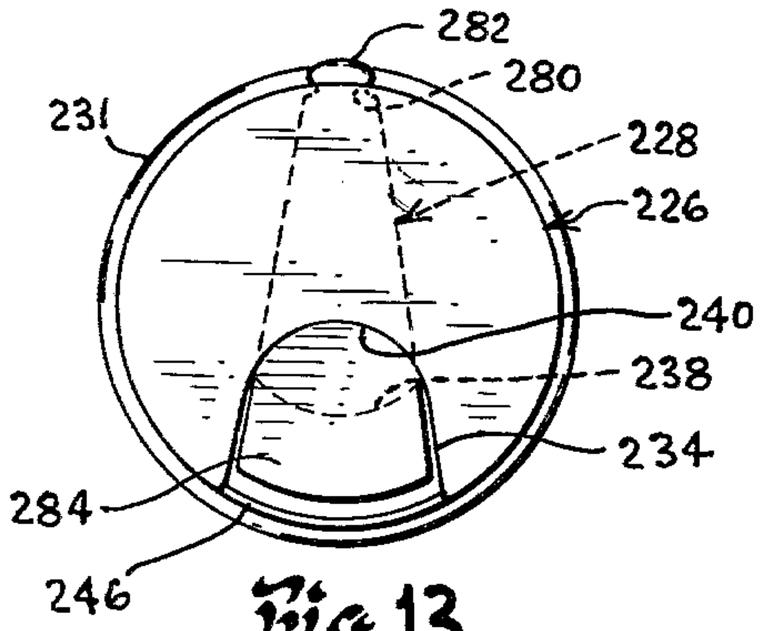

Fig. 13

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OVERCAP AND ACTUATING BUTTON FOR AEROSOL CONTAINERS

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Filed Feb. 18, 1964, Ser. No. 345,627
9 Claims. (Cl. 222—182)

This invention pertains to valved aerosol containers, and more particularly to an overcap and valve actuator assembly for such containers.

The packaging in aerosol dispensers of various products in fluent state has gained wide acceptance in the consumer trade, owing largely to the convenience of dispensing, prevention of product deterioration and other advantages afforded thereby. Many of these aerosol packages employ cylindrical metal containers, similar to the conventional crown top can, in which a valve assembly is mounted in the crowned end of the container. The typical valve assembly includes a protruding hollow stem through which the product in the container is dispensed upon depression of the stem to open the valve. An actuating button connectable to the valve stem and providing a duct for delivering the product in a controlled form, e.g. as a spray, solid stream or as a foam, is conventionally employed to facilitate the actuation of the valve and to orient the direction of discharge.

It is a primary purpose of this invention to provide an improved valve actuating button and protective overcap assembly constituting an integral unit for attachment to the valved end of an aerosol container and facilitating the operation of the valve thereon. The overcap member of the novel assembly is designed to frictionally or otherwise detachably engage the valved end of the aerosol container and serves to protect the actuating button against accidental operation thereof, while permitting immediate and ready access thereto without removal of the cap when dispensing of the product is desired. It is a further purpose of the invention to provide an actuator button and overcap assembly which constitutes an integrated structure that can be supplied to aerosol loading plants for subsequent attachment by them to loaded containers in a facile manner. To this end, the overcap and valve actuating button are detachably interconnected not only to permit valve actuation when subsequently mounted on the aerosol container, but also to cause the cap and button to be self-aligning with the wall of the container and the stem of the valve, respectively, when superimposed on the valved end of the container.

The present structure is also designed to facilitate columnar stacking of aerosol containers equipped with the cap and actuator of the invention, by reason of an essentially smooth upper surface formed by the overcap and actuator button, thereby affording a stable platform for nesting of a superimposed container, without danger of accidental operation of the valve and unwanted dispensing of product.

The structure of the invention further lends itself to providing a clear and positive indication to the user of the direction of discharge of product upon actuation of the valve button. In addition, the construction facilitates maintenance of a sanitary condition of the aerosol container at the valve end thereof and in general provides a pleasing, decorative appearance to the composite aerosol package.

These and other objects of the invention will be more fully apparent from the explanation hereinafter, with reference to several specific embodiments illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a perspective view of a complete aerosol package, including a container, overcap and valve actuating button in assembled condition;

FIG. 2 is a cross-sectional view in side elevation, partially broken away, taken on line 2—2 of FIG. 1;

FIG. 3 is a top plan view of the overcap without the valve actuating button assembled thereto;

FIG. 4. is a cross-sectional view in side elevation taken on line 4—4 of FIG. 3;

FIG. 5 is a bottom plan view of the overcap shown in FIG. 3;

FIG. 6 is a top plan view of the valve actuating button;

FIG. 7 is a cross-sectional view in side elevation taken on line 7—7 of FIG. 6;

FIG. 8 is a bottom plan view of the actuator button shown in FIGS. 6 and 7;

FIG. 9 is a view in side elevation, partly in section, showing a modified form of overcap and valve actuator assembly in mounted position on an aerosol container;

FIG. 10 is a plan view in cross-section on line 10—10 of FIG. 9;

FIG. 11 is a botom plan view of the actuator shown in FIGS. 9 and 10;

FIG. 12 is a cross-sectional view in side elevation, partly in section, of a further modification of overcap and valve actuating button; and

FIG. 13 is a top plan view of the overcap and actuating button assembly shown in FIG. 12.

A conventional aerosol metal container 20 and valve assembly 22 are shown in FIGS. 1 and 2. This is equipped with an overcap 26 and actuating button 28 assembly embodying the present invention. Preferably the overcap and button are molded of linear polyethylene or similar high strength plastic, and the particular design illustrated is especially adapted to be formed of such material.

Overcap 26 has a cylindrical peripheral wall 30 forming substantially, a continuation of the wall of container 20 when superimposed upon the valve end of the container, as illustrated. Cap 26 is closed at its upper end by an integrally formed wall 32 which has molded in it a central depression 34, as seen more particularly in FIGS. 1 and 3. The planar projection of this depression is generally trapezoidal, resembling a blunt-nosed arrowhead. Depression 34 is laterally enclosed by walls 36 constituting integral, depending panels formed in top 32, and is additionally closed by a floor or partition 38 extending between the lower edges of the panels. Partition 38 is apertured centrally at 40, to provide access to the stem of valve 22, as will appear more fully hereinafter. At the nose or narrow end of recess 34, peripheral wall 30 of the cap is notched to form an aperture, leaving only a small segment 44 of the wall projecting above the horizontal partition 38 at this point. Similarly, at the heel or wider portion of recess 34, wall 30 is likewise notched, leaving only a low wall segment 46 above partition 38. The recess thus defined is adapted to receive actuating button 28 in relatively closely conforming fit to provide a substantially continuous upper surface on the cap and actuator assembly.

Cap 26 is mounted on container 20 with the skirt of the cap making a snug fit within the chime 50 of container 20. It is important of course that the engagement of the overcap with the container be adequate to prevent axial separation of these members when the valve actuing button 28 is depressed to operate the container valve. In the embodiment illustrated in FIGS. 1 through 5, retention of the overcap on the container is effected by means of shouldered fins 52. These are molded integrally with, and depend from, end and side walls 32, 30 respectively of cap 26 and extend radially toward the

center of the cap. Fins **52** are spaced circumferentially around the cap interior, and each has a notch **54** in its lower free edge, as seen best in FIG. 4. Each notch provides a shoulder **56** adapted to abut on the mounting flange **58** of valve assembly **22** and to position the cap positively with reference to the projecting end of the valve stem. Each notch **54** is likewise provided with a lip or tooth **60** which projects into gripping engagement beneath the edge of the mounting flange **58**. A snap fit of the overcap **26** onto the valved end of the container **20** is thus provided, the resilience of the plastic material from which the caps and fins **52** are formed being utilized to permit forcing of the lips **60** over the flange **58** into gripping engagement therebeneath. In order to facilitate the alignment of cap **26** on container **20**, the lower edge of detent lips **60** is flared outwardly. This not only assists in preliminary centering of the cap on the container, but facilitates the temporary deformation of lips **60** in effecting engagement with the mounting flange **58**.

Partition **38** of the toe or narrow end of recess **34** is formed with a conical seat **64** in the bottom of which there is a restricted opening or entry port **66** (see FIGS. 3 and 5). Seat **64** constitutes a socket for the reception of a pivot post or trunnion on button **28** whereby the button is pivotally joined to overcap **26**.

As seen in FIGS. 6 through 8, actuator button **28** has an essentially plate-like body **70** whose planar outline conforms closely with that of recess **34** but with sufficient clearance to allow vertical reciprocation of the button. On the underside of body **70** there is a socket, shown here as an integral hollow boss **72**, which depends centrally of the button. Boss **72** is adapted to receive telescopingly, and to make a fluid-tight fit with, the projecting end of the tubular stem of valve assembly **22**. (See FIG. 2.) A duct **74** in the actuator body **70** provides a communicating passage **76** leading from the interior of hollow boss **72** to a final discharge orifice **78** located in the nose of actuator button **28**. Button **28** is mounted on and attached to overcap **26** by means of a trunnion or post **80** which projects downwardly from the body of the button at a point adjacent the forward tip or nose thereof. Trunnion **80** is provided with an enlargement **82** at its tip which makes a snap fit in the restricted opening **66** of socket **64**. (See FIG. 2.)

In the actuating button just described, the discharge orifice **78** is shown as a simple restricted opening formed in the end of the button. If desired, of course, other discharge orifice arrangements may be substituted as needed for the type of product to be dispensed, and in such cases a separate orifice plate or equivalent may be inserted into the discharge end of duct **76**. It should accordingly be understood that the term "two-piece assembly" as used in the description and claims herein does not have reference to or take into account the possible use of a separate orifice plate in the actuating button. Rather, the term as used here refers to the overcap and actuating button as being separately formed members.

Prior to assembling the overcap **26** and actuator button **28** to an aerosol container, the aforesaid socket and trunnion members are engaged simply by snapping the ball-like protuberance **82** into the aperture **66** of the conical seat, whereby a unified structure, ready for placement on a valved aerosol container, is provided. Subsequent attachment of the overcap and articulated actuator assembly to an aerosol container is likewise readily accomplished simply by placing the assembly on the top of the container and then applying downward pressure on the cap and actuator button simultaneously until shoulders **56** of fins **52** are forced into abutment with the valve flange **58**. In the process, teeth **60** of the fins become engaged under the edge of the mounting flange to retain the cap in place, while at the same time the tubular stem of the valve assembly **22** is received in hollow boss **72** of the actuator button **28**.

Dispensing of the product in the container **22** is thereafter accomplished by the user simply by depressing on the finger tab portion **84** of actuator button **28**. This acts as a second class lever, pivoting about conical seat **64** and depressing the stem of valve assembly **22** to open the valve. Product then flows from the container through the valve into the hollow boss and outwardly through passage **76** to the discharge orifice **78**.

As seen in the drawings, the overcap and actuating button assembly presents a substantially flat, smooth upper surface which is ideally suited for stacking of additional aerosol packages in columnar form, facilitating bulk shipment of loaded aerosol containers and subsequent display of them for sale purposes without danger of accidental operation of the valve assembly. The design specifically illustrated in FIGS. 1 through 8 of the drawings actually places the upper surface of actuator button **28** slightly below the top surface of overcap **26**. Also, the arrowhead shape of actuator button **28** serves to indicate immediately to the user the direction in which the discharge of the product will take place and the pivot arrangement of the button on the cap makes it impossible for the user to actuate the valve assembly **22** by depressing at the wrong end of the botton **28**.

A modified form of overcap and actuator button is illustrated in FIGS. 9, 10 and 11 of the drawings. Overcap **126** differs in the following respects from its corresponding member **26** of the first embodiment described. The peripheral wall **130** of cap **126** is formed in its skirt with an integral lip or flange **131** adapted to grip chime **50** of the aerosol container and resiliently secure the cap assembly on the container. This arrangement takes the place of the fins **52** in the previously described construction. And in place of the single vertically oriented conical seat for pivotal connection of the actuator button and cap, the embodiment illustrated in the overcap of FIGS. 9 and 10 employs two horizontally oriented conical seats, one located in each of the lateral walls **136** closely adjacent the tip or nose of the actuator button and overcap recess. To this end, actuating button **128** has molded integrally on it a pair of trunnions **180** projecting laterally from the sides of the button adjacent its nose, and each of these trunnions is provided with ball-like protuberance **182**. Due to the resilience of the plastic material from which the parts are formed, assembly of actuator button **128** with its overcap **126** may be readily effected by initially inserting the nose of the button in the wider portion of the cooperating recess **134** in overcap **126** and then forcing the actuating button forwardly, using the tapering walls **136** of the recess to compress trunnions and protuberances **180**, **182**, respectively, until they snap into their respective sockets **164**.

The operation of this construction to effect dispensing of product is then identical with that for the previously described unit.

Still another modification of overcap and actuator assembly is illustrated in FIGS. 12 and 13. The arrangement here used for securing the overcap **226** to the aerosol container is essentially similar to that shown in FIG. 9 described, that is, peripheral wall **230** of overcap **226** is formed with a gripping flange **231** in its skirt at the lower edge thereof for resilient securement to the chime **50** of the aerosol container. The pivotal connection of the overcap and actuator in this instance, however, makes use of the nose itself of actuator button **228** to form a pivotal member for connecting the button to the cap. In this arrangement actuator **228** is formed in is nose with a bulbous tip **282**, immediately behind which there is a necked section **280** of reduced diameter, as seen best in FIG. 12. Peripheral wall **230** is apertured to provide a restricted opening **245** for tip **282** of the actuator which forms a snap fit therein, with the apertured wall portion **244** lying in the plane of necked section **280** of the actuator in final assembled position and serving as the fulcrum point for the unit. The depression **234** in the top or end wall **232** of cap **226** in this instance ex-

tends only part way across the diameter of the overcap, in a generally semi-eliptical form from a point adjacent the peripheral wall 230 at the heel or wider point of the recess to about the midpoint of the cap. The horizontal partition 238, constituting the floor of depression 234 for receiving the actuator is again provided with a generally centrally located aperture 240 to accommodate projecting boss 272 of the actuator.

Assembly of actuator 228 in overcap 226 is accomplished by first inserting the heel portion 284 of the actuator upwardly through the lower open end of overcap 226 so that the heel portion passes through aperture 240 of the partition 238 and enters into the recess 234 of the overcap. The nose of actuator 228 may then be pushed upwardly toward end wall 232 of the cap until it is aligned with aperture 245 in the peripheral wall. Forcing the actuator button forwardly then causes the bulbous tip 282 to snap through aperture 245 and to lock the actuator in assembled position. Final assembly of the overcap and actuator to an aerosol container and valve is then the same as previously described, and the operation to effect dispensing the product from the container is likewise the same as before.

The several constructions of overcap and articulated valve actuating button shown and described here are of course intended to be illustrative of the invention and in general represent constructions which are presently preferred. Other modifications and equivalent constructions incorporating the concept thus illustrated are obviously possible. For example, the snap-fit connection of the actuating button and overcap incorporated in the pivot arrangements shown and described above can be replaced by a bayonette or other type joint or may be omitted in favor of a simple pin and abutment therefor on the respective members to define a definite pivot point. Still further simplification is possible, as for example by eliminating the bulbous tip 282 of actuating button 228 in FIGS. 12 and 13. In this event, the tip of the actuating button is held in pivoting position relative to the overcap by engagement of the valve stem in the receiving socket of the button, and the wall of the cap provides the fulcrum point about which the actuating button pivots in operating the container valve. Such latter construction would not provide the advantage of an integrated assembly, ready for immediate placement on the aerosol container, but would otherwise function in the same manner as the devices illustrated. So also the substitution of metal for plastic as the material of construction for the members, and particularly the overcap, is an obvious modification and is readily possible. The following claims are accordingly intended to be interpreted with such modifications and equivalents in mind.

What is claimed is:

1. An overcap and articulated valve actuating button assembly for a valved aerosol container,

said overcap having a peripheral wall and an end wall substantially closing the upper end of said peripheral wall;

means formed in said overcap for resiliently gripping the valved end of the aerosol container to restrain axial separation of said overcap from such container when mounted thereon;

said top wall of said overcap defining a recessed portion and said valve actuating button having an elongated body at least part of which is received in and conforms closely with the planar outline of said recessed portion to provide a substantially continuous upper surface on the assembled overcap and actuating button;

said overcap and button making engagement adjacent one end of said button to provide a fulcrum point for articulation of said button relative to said overcap;

said actuating button having a socket on its underside

to receive and make fluid-tight connection with the projecting stem of a valve assembly of a container;

a discharge orifice in said actuating button at the end thereof adjacent said fulcrum point;

and a duct in said body communicating the interior of said socket with said discharge orifice.

2. A two-piece molded plastic overcap and articulated valve actuating button assembly for a valved, generally columar aerosol container;

said overcap having a peripheral wall forming a substantially smooth continuation of the wall of the container on which it is adapted to be mounted;

gripping means molded integrally in said overcap adapted to position said overcap relative to the valved end of a container to secure said overcap thereon;

and end wall on said overcap integral with said peripheral wall and substantially closing the upper end thereof, said end wall having a recessed portion extending from a point adjacent the peripheral wall transversely across at least a part of said cap;

an aperture in said peripheral wall at a point opposite said first point on said peripheral wall;

said end wall also having an aperture aligned generally with the valve stem of an associated container;

said valve actuating button having a body consituting a lever closely approximating in length the diameter of said overcap and comprising heel and toe portions;

said button being received in the upper end of said overcap adjacent said end wall with at least the heel portion thereof overlying said recessed portion of the end wall and closely conforming in its overlying portion with the planar outline of said recess, providing a substantially smooth upper surface on said overcap and actuating button assembly;

means formed respectively adjacent the toe of said button and in cooperating position on said overcap providing pivotal connection between said members to permit articulation of said button axially of said overcap;

said actuating button having a socket formed in its underside positioned to receive through said apertured end wall of the overcap, and make fluid-tight fit with, the tubular valve stem of the valve assembly of the container;

a discharge orifice in the toe of said actuating button;

and duct means formed in said button communicating the interior of said socket with said discharge orifice.

3. An overcap and actuating button as defined in claim 2, wherein the toe of said button is formed with a bulbous tip surrounding said discharge orifice, and said aperture in said peripheral wall forms a restricted entry socket in which said bulbous tip is received with a resilient snap-fit to retain said button in said overcap while permitting articulation relative thereto.

4. A molded plastic overcap and articulated valve actuating button assembly for a valved, generally columnar, aerosol container;

said overcap having a peripheral wall forming a substantially smooth continuation of the container wall when mounted on the container;

and means formed in said overcap for resiliently gripping the valved end of the container;

said overcap having an integral top wall substantially closing the upper end of said peripheral wall, said top wall defining a laterally closed recess extending transversely of and intersecting said peripheral wall of the overcap at least at one point;

said valve actuating button having an elongated body conforming closely with the planar outline of said recess and adapted to be received therein to form a substantially continuous upper surface on the assembled overcap and actuating button;

said overcap and button being formed respectively with interlocking members located adjacent said periph-

eral wall and constituting a protuberance on one and a socket therefor in the other, said members being interengageable to restrain relative shifting of the members but allow pivotal movement thereof in interengaged condition;

said actuating button body having a valve stem receiving socket on its underside positioned to receive and make fluid-tight engagement with the projecting stem of a valve assembly mounted in a container;

a discharge orifice in said body disposed at the end thereof adjacent the point of pivotal attachment of said ball and socket members;

and a discharge duct in said body communicating the interior of said hollow boss with said discharge orifice.

5. An overcap and valve actuating button assembly as defined in claim 4, wherein said interlocking members on said overcap and button consist of a ball-like protuberance on one and a restricted socket therefor in the other, said members being interengageable with a snap-fit to restrain subsequent separation of the members.

6. A two-piece molded plastic overcap and valve actuating button assembly for a valved, generally columnar, aerosol container;

said overcap having a peripheral wall forming a substantially smooth continuation of the columnar wall of the container on which it is adapted to be mounted;

shouldered gripping means integrally molded in said overcap, adapted and arranged to position and resiliently secure said overcap on a container at the valved end thereof;

said overcap having a top wall integral with said peripheral wall and substantially closing the upper end thereof, said top wall being depressed centrally to form a laterally closed, elongated recess extending transversely of and intersecting said peripheral wall, said recess being narrower adjacent one end than the other;

said valve actuating button having an elongated body conforming closely with the planar outline of said recess and being received therein to form a substantially continuous upper surface on said overcap and button assembly;

said actuating button being articulated in said overcap, and resiliently detachable interconnecting members on said button and overcap located at a point adjacent said narrower end of said top wall recess, whereby said button is pivotally movable axially of said overcap;

said button having an integrally formed hollow boss on its underside positioned to receive and make a fluid-tight fit with the upper end of a tubular valve stem of the valve assembly of the container;

a discharge orifice in the narrow end of said button;

and duct means formed integrally in said button communicating the interior of said hollow boss with said discharge orifice.

7. An overcap and valve actuating button assembly as defined in claim 6, wherein said resiliently detachable interconnecting members on said overcap and button consist of a trunnion member having an enlargement at its free end, and a socket having a restricted entry in which said trunnion enlargement is received and resiliently retained, while permitting articulation of said button relative to said overcap.

8. An overcap and valve actuating button assembly as defined in claim 7, wherein said trunnion member is formed integrally on the underside of said button adjacent the narrow end thereof and said socket is formed integrally in a portion of said top wall subadjacent the narrow end of said button.

9. An overcap and valve actuating assembly as defined in claim 7, wherein said button is formed with integral trunnion members projecting laterally from its opposite sides adjacent the narrower end thereof and said overcap is provided with respectively mating sockets for said trunnions, said sockets being formed in portions of said top wall laterally adjacent the narrower end of said button.

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