Aug. 3, 1965 P. H. SAGARIN 3,198,399

HAND-HELD AEROSOL DEVICE

Filed Oct. 5, 1961

Fig. 1

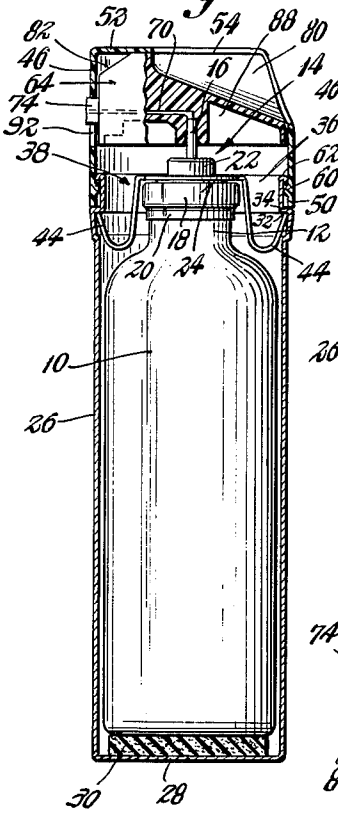


Fig. 2

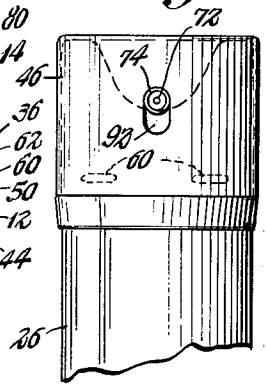


Fig. 3

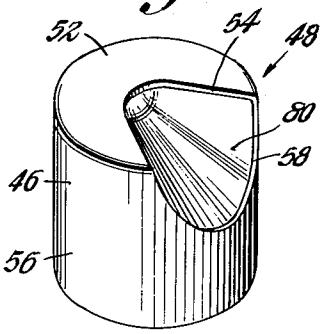


Fig. 4

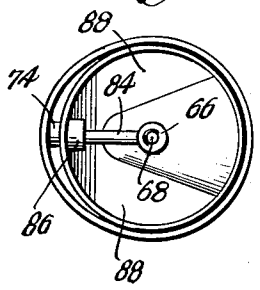


Fig. 5

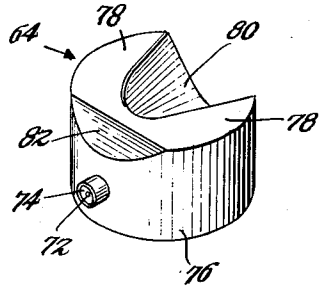
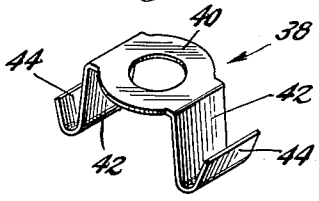


Fig. 6



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HAND-HELD AEROSOL DEVICE

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9 Claims. (Cl. 222—182)

This invention relates to small aerosol devices of the type having pressurized containers and which are adapted to be hand-held while dispensing the aerosol substance; more particularly, the invention relates to the cap and head or top construction of such aerosol devices.

An object of the invention is to provide a novel and improved hand-held aerosol device of the kind indicated, wherein the cap and valve actuator button are so organized and arranged that they together constitute to the greatest possible extent a single functional unit whose components are blended together, so to speak, and do not appear normally as separate items or parts while at the same time each contributes in the fullest measure to the ultimate operability and use of the device.

Another object of the invention is to provide an improved cap and valve actuator assemblage as above set forth, wherein an extremely effective guarding and nearly complete enclosure of the actuator is had while at the same time the operation of the same may be easily and quickly effected.

A further object of the invention is to provide an improved cap and valve actuator assemblage in accordance with the foregoing, wherein the cap and actuator are so constituted that the user, in order to operate the actuator, is required to automatically position the aerosol device correctly as regards the direction of the spray.

Still another object of the invention is to provide a novel and improved combination bottle, jacket and head construction in an aerosol device, which is characterized by simple and yet effective means for the retention of the bottle in the jacket.

A feature of the invention resides in the provision of a bottle, jacket and head construction as above set forth, wherein a simple jacket shape or configuration serves both to position the cap and to hold the bottle captive.

Yet another object of the invention is to provide an improved resilient plastic cap and valve actuator assemblage as above characterized, wherein the components are so organized and arranged that the actuator or button may be readily, easily inserted and positioned in the cap yet it will be securely retained in place after such positioning against inadvertent or accidental removal during subsequent handling and assemblage to the remainder of the aerosol device.

Other features and advantages will hereinafter appear.

In the drawings accompanying this specification, similar characters of reference are used to designate like components wherever possible throughout the several views, in which:

FIG. 1 is an axial sectional view of an improved hand-held type aerosol device as constructed in accordance with the invention.

FIG. 2 is a fragmentary front elevational view, showing the upper portion of the aerosol device of FIG. 1.

FIG. 3 is a perspective view of the cap and valve actuator assemblage of the aerosol device.

FIG. 4 is a bottom plan view of the cap and actuator assemblage of FIG. 3.

FIG. 5 is a perspective view of the valve actuator or button of the aerosol device; and

FIG. 6 is a perspective view of a resilient detent clip as provided by the invention, which retains the pressurized bottle or container captive in the outer jacket of the aerosol device.

Referring first to FIG. 1, the aerosol device as shown therein comprises a pressurized container 10 which may be of any usual or conventional type, such container having in its reduced neck 12 an aerosol valve and discharge assemblage which is indicated generally by the numeral 14. Details of the assemblage 14 are not given herein since they, per se, form no part of the present invention and are further well known to those skilled in the art.

FIG. 1 shows a vertically movable hollow valve stem 16 constituting a portion of the assemblage 14, such valve stem having a lower portion disposed within a metal closure cup 18 which latter is crimped at 20 under the shoulder or lip of the container 10. The closure 18 has an upwardly protruding valve housing portion 22 below which there is a transverse annular flat top wall or shoulder 24 constituting generally part of the top surface of the pressurized container 10.

Enclosing the container 10 is an outer ornamental jacket 26 which is preferably formed of metal such as aluminum, steel or the like, such jacket being of tubular configuration with a transverse bottom wall 28 between which and the bottom of the container 10 there is disposed a cushion pad 30 of foam rubber or similar composition.

In accordance with the invention, the upper or neck portion of the jacket 26 is constituted in a novel manner, by means of an inwardly off-set top edge, whereby inner and outer annular shoulder surfaces 32 and 34 are formed on opposite sides of a wall which is located below an inwardly off-set annular mouth portion 36. Also, for engagement with the inner annular shoulder surface 32 and with the top wall or surface 24 of the container 10 there is provided a resilient spring detent clip 38 having a flat circular apertured center portion 40 arranged to fit over and around the housing portion 22 of the closure 18 of the container. The resilient clip 38 has a pair of flexible U-shaped arms or legs 42 provided with end edges 44 which are engageable with the inner annular shoulder surface 22 as seen in FIG. 1, when the clip is in place. Each of the arms 42 comprises two upright portions connected at their bottoms by a flexible yoke, all as seen in FIG. 1.

In assembling the device as thus far described, the sponge pad 30 is first placed in the jacket 26, then the complete pressurized container 10 and its valve and closure assemblage 14 is placed in the jacket, after which the detent clip 38 is put in place, such operation being characterized by a yielding of the spring arms or legs 42 to enable the locking edges 44 thereof to bypass the reduced neck portion 36 and snap outward into locking engagement with the inner shoulder 32.

The outer shoulder 34 which is formed by the same wall portion that provides the inner shoulder 32 constitutes a positioning abutment for the cap portion 46 of a novel cap and valve actuator assemblage provided by the invention and which is designated generally by the numeral 48. As seen in FIG. 1, the cap 46 has a bottom annular edge 50 which engages and is positioned by the outer annular shoulder surface 34 of the jacket 26.

Thus, the portion of the jacket wall which provides the inner and outer annular shoulders 32, 34 serves a double important function and at the same time effects a simplification of the head construction of the aerosol device. Firstly, it constitutes a locking abutment or shoulder for engagement by the end edges 44 of the spring detent clip 38, thereby to securely retain the container 10 within the jacket 26. Secondly, it provides a positioning abutment for engagement with the bottom edge 50 of the cap 46, to position the latter on the jacket 26.

Considering now the details of the cap and valve actuator assemblage 48, it is seen that the cap 46 is in the form of a thin-walled cylindrical inverted cup having an

integral transverse top wall 52 provided with a substantially large or expansive, generally V-shaped cut or aperture 54. The cap 46 has cylindrical side walls 56 wherein there is also a relatively large, substantially V-shaped or semi-circular notch or aperture 58 which meets and is aligned with the notch or aperture 54.

The cap 46 is advantageously formed as a molded piece, of flexible or resilient plastic substance such as polyethylene or a similar formulation. By virtue of the cylindrical walls 56 being relatively thin, this portion of the cap 46 is flexible and readily distortable, and the purpose of such construction will be explained in detail below, since it concerns an important feature of the invention.

On the inside of the cylindrical wall 56 of the cap 46 small elongate detent nibs or projections 60, FIGS. 1 and 2, are provided, such nibs being engageable with an outturned curl or bead 62 on the lip of the jacket 26 to retain the cap 46 in the operative position shown in FIG. 1. This positioning of the cap 46 is effected by engagement of the bottom edge 50 thereof with the outer shoulder 54 of the jacket 26, as previously explained.

The cap and valve actuator assemblage 48 further comprises a valve actuator button designated generally by the numeral 64 as seen in FIG. 5, the said button being also preferably molded of flexible or resilient plastic substance.

As illustrated in FIGS. 1, 4 and 5, the depress button 64 has generally the appearance of a circular, flat plug or slab, as viewed from the top or side. However, the button 64 is of hollow construction and comprises a central depending boss or support 66 having a central bore 68 to receive and accommodate the projecting valve stem 16 of the container 10. A lateral discharge passage 70 in the button 64 communicates with the discharge orifice 72 of an orifice member 74 which is press-fitted or otherwise secured in a side recess in the button 64.

In addition to the cylindrical side wall 76 of the valve actuator or depress button 64, there is a generally flat or planar top surface 78 comprising two portions which are separated by a hollow or depression 80 which latter is so shaped that it readily accommodates a finger of the user, for the purpose of operating the button or depressing the same.

The button 64 may also have a sloping top surface 82 to reduce the wall thickness and curing time, for example, in connection with the support for the orifice member 74 and in connection with the discharge channel 70. As seen in FIGS. 1 and 4, the interior of the button has a rib 84 in which the channel 70 is disposed, and has a proturberance 86 in which the orifice member 74 is accommodated. The interior of the depress button 64 has appreciable space 88 as formed by suitable cores in the mold, to maintain small wall thicknesses and reduce curing time.

As will be understood from a consideration of FIG. 1, the button 64 is pressed over and carried by the depressible valve stem 16, and when the button 64 is depressed or moved vertically downward, it will actuate the hollow valve stem 16 and provide for a discharge of the aerosol substance through the valve stem, through the discharge channel 70 and out from the orifice member 74, such discharge issuing as a fine spray.

By the present invention, the cap 46 and the button 64 comprise a novel assemblage which is so organized and arranged that they together constitute to the greatest possible extent a single functional unit whose components are blended together, so to speak, and do not appear as separate items or parts, while at the same time each contributes in a large measure to the operability and use of the device. Further, the cap constitutes an extremely effective guard and also a nearly complete enclosure for the actuator button while at the same time the latter may still be easily and quickly depressed by the user. The juncture of the cap top wall 52 and side walls 56 comprise a corner portion which extends through an arc which is appreciably greater than 180°. Further, the organization is such that the user, in order to operate the actuator button, is required to position the aerosol device correctly as regards the direction or issuance of the spray.

Considering now FIGS. 1, 2 and 3 it will be noted that the cap 46 is relatively large in its diameter, and may be considered generally to be massive in relative size. The cap 46 preferably has substantially the same diameter as the jacket 26 so as to constitute in effect a continuation of the walls of the latter. The top wall 52 of the cap 46 is generally crescent-shaped and, in conjunction with the expansive or relatively large cylindrical side wall 56, effects nearly a complete enclosure of the actuator button 64 and effectively guards such button against inadvertent or accidental operation. Yet the user has ready access to the button to actuate the same, through the companion or meeting apertures or notches 54 and 58 of the cap, which are commensurate in size and as combined provide a finger access opening giving full access to the button 64 for a single finger. Moreover, the disposition of the notches 54, 58 and the arrangement of the hollow or recess 80 in the cap or head assemblage is such that the user, for the purpose of depressing or actuating the button, will be automatically required to correctly position the aerosol device in his hand so that the orifice member 74 is pointed away from him or her, and thus the positioning of aerosol device is a function of the arrangement of the cap access opening and finger hollow in the button. The foregoing organization constitutes an important feature of the invention, since it provides a number of advantages not heretofore fully had in a single aerosol device of the type under consideration.

Further, in accordance with the invention, the flexible cap 46 and the depress button 64 are so arranged and organized that the button may be readily and easily inserted or positioned in the cap yet it will be securely retained in place against accidental removal during subsequent handling, prior to positioning of the assemblage on the jacket 26.

The assembly or insertion of the button 64 in the cap 46 is illustrated in FIG. 4. From this figure it will be observed that the circumference of the flexible thin cylindrical side walls 56 of the cap is sufficiently great to accommodate completely the button 64 and also the slightly projecting orifice member 74 thereof. For such accommodation, the flexible walls 56 of the cap are distorted slightly as shown, so as to be somewhat oval. The button 64 may be readily applied to the cap 46 by merely inserting it in the latter from the bottom, in the manner indicated in FIG. 4, and as the button is made to approach the top wall 52 of the cap, the orifice member 74 will be received in a slot 92 provided in the side wall 56 of the cap, this enabling such side wall to resume its cylindrical configuration. Thereafter, the button 64 will have a somewhat loose, sliding fit in the cap 46 but under all circumstances of normal handling, etc. the button will be held captive in the cap by virtue of the presence of the orifice member 74 in the slot 92. By such construction the orifice member 74 may be preassembled to the button 64, prior to assembly being effected to the cap 46, whereby the various required assembly operations are simplified and speeded.

It will be seen from an inspection of FIGS. 1–3 that the groove 80 in the button 64 has appreciable depth and also relatively deep opposite side walls as a consequence, which side walls are adapted to confine the finger of the hand and to require said finger to occupy essentially but a single operating position in the groove, in effecting depressing of the button. The groove 80 extends at least half-way across the top of the button 64, as shown in FIG. 1, whereby the groove has an appreciable expanse to accommodate the finger. It is noted that the groove has a deeper portion which opens into a side wall of the button (at the outer periphery of the button), and that the marginal edges of the groove 80 and of the access

opening 54, 58 are coextensive and closely conforming one to the other. The width of the groove 80, as measured at the upper outer periphery of the button and the width of the access opening 54, 58 as measured at the upper periphery of the cap are greater than the radii of the button and cap respectively. The deeper portion of the groove opens into the side wall of the button, whereby the bottom of the groove slopes upward from the side wall toward the center of the button. The ends of the slot 54, 58 constituting the single access opening are rounded, and the end of the opening 54 which is disposed in the top wall 52 has a smaller radius than the end of the opening 58 which is disposed in the side wall 56. By such construction the finger of the user, whether it be the thumb or the index finger, is more readily accommodated and enabled to actuate the button.

Further, referring to FIG. 1, it is seen that the distance which the orifice member 74 projects from the side wall of the button 64 is greater than the thickness of the side wall of the cap 56 at a point adjacent the discharge aperture or slot 92.

It will now be seen from the foregoing that I have provided a novel cap or head construction for a small hand-held aerosol device, which has numerous advantages. The large or jumbo type cap constitutes in effect a continuation of the side walls of the ornamental jacket of the device, and further provides an effective guard for the actuator button, constituting nearly a complete enclosure for the latter. Moreover, in spite of this, ready access is had to the button, to effect a downward movement of the same for the purpose of obtaining a discharge of the aerosol substance. The nature of the access opening in the cap 46, in conjunction with the finger depression or hollow in the button requires the user to correctly position the aerosol device in order to apply the finger in the proper position for obtaining a discharge. Such position normally directs the discharge or spray from the device away from the user, without requiring any attention on the part of the user as to the position of the orifice member or the direction of spray. The cap 46 at all times prevents accidental operation of the button. The head construction of the aerosol device retains the container 10 in the jacket 26 by simple and effective spring detent means, and such means and the cap are engaged by a single shoulder-like wall portion of the jacket in effecting their functions, whereby a simplification of the jacket structure is obtained.

Variations and modifications may be made within the scope of the claims, and portions of the improvements may be used without others.

I claim:

1. An aerosol-type dispensing device comprising, in combination:

(a) a tubular, thin-walled jacket,

(b) said jacket having an inwardly off-set annular mouth portion providing an inner annular shoulder surface on the inside of the jacket wall,

(c) a container in said jacket, having a top shoulder surface, and

(d) a spring detent clip having a center portion engaged with the top shoulder surface of the container and having end edges engaged with the inner annular shoulder surface of the jacket to retain the container therein,

(e) said detent clip having an aperture in its center portion, through which part of the container extends, and having U-shaped, flexible arms extending in part downward from the center portion, said arms being provided with the said end edges and each comprising two substantially upright portions joined together at their bottoms by a curved yoke portion.

2. A valve-actuator and cap assemblage for an aerosol device comprising, in combination:

(a) a resilient plastic cap,

(b) said cap having a flexible thin annular side wall portion provided with a discharge aperture, said thin annular side wall being readily bendable and distortable radially at local points around its circumference and being substantially incapable of significantly stretching circumferentially without rupture,

(c) said cap further having a top wall extending transversely of the side wall portion,

(d) a depress button in the cap,

(e) said button having an annular side wall portion slidably fitting in and having a predetermined smaller circumference and diameter than the side wall portion of the cap,

(f) the side wall portion of the button having a projecting orifice member arranged to extend through the said discharge aperture to normally hold the button captive in the cap, and

(g) the side wall portion of the cap being distortable radially and being sufficiently larger in circumference than the button side wall to enable it to be forced over the button and orifice member carried thereby, for insertion of the button in the cap from the bottom of the latter,

(h) the distance which the orifice member projects from the side wall of the button being commensurate with the thickness of the side wall of the cap.

3. An assemblage as in claim 2, wherein the distance which the orifice member projects from the side wall of the button is greater than the thickness of the side wall of the cap at a point adjacent the said discharge aperture.

4. A valve actuator and cap assemblage for an aerosol device comprising, in combination:

(a) a cap in the form of an inverted cup having tubular and vertical, outermost side walls,

(b) said cup having a generally flat and generally crescent-shaped transverse top wall of appreciable expanse and said side walls being generally annular and having interior bearing surfaces,

(c) said top and side walls meeting and forming an upper corner portion of the cap which extends through an arc of more than 180°, and said walls having adjoining openings of substantially commensurate size, which meet and together constitute a slot comprising a single access opening large enough to admit the tip and ball portions of a finger, the opening in the top wall extending from the cap periphery to a point past the cap center,

(d) a depress button disposed and movable vertically in the cap, said button having a generally annular side wall provided with bearing surfaces slidably engaged with the bearing surface of the cap,

(e) said button having a top portion disposed adjacent and below said top wall and engageable therewith, and

(f) said top portion of the button having a transversely extending groove disposed adjacent and registering with the single access opening of the cap, said groove being adapted to receive said tip and ball portion of the finger whereby the button may be readily depressed, the button having a pair of opposed upright walls of appreciable height defining the sides of the said groove and having an upright front end wall defining the inner, front end of the groove, all of said upright walls being engaged by the finger which actuates the button,

(g) the top wall and side wall of the cap surrounding the button and constituting a guard therefor to prevent accidental actuation of the button,

(h) all marginal edges of the groove and access opening being coextensive and closely conforming to each other,

(i) and cooperable means on the cap and button, preventing relative turning movement therebetween while enabling the button to move longitudinally in the cap.

5. An actuator and cap assemblage as in claim 4, wherein the groove in the button has appreciable depth and the opposed walls are divergent, relatively deep and adapted to close confine the finger of the hand whereby the finger may occupy but a single position in the groove, in effecting depressing of the button.

6. An actuator and cap assemblage as in claim 4, wherein the groove in the cap has a deeper portion opening into a side wall of the button.

7. An actuator and cap assemblage as in claim 4, wherein the groove in the cap has a deeper portion opening into a side wall of the button, and wherein the width of the groove and width of the access opening as measured at the upper periphery of the button and cap are greater than the radii of the button and cap respectively.

8. An actuator and cap assemblage as in claim 4, wherein the groove in the button has a deeper portion opening into a side wall of the button, and wherein the bottom of the groove slopes upward from the side wall of the button toward the center of the same.

9. An actuator and cap assemblage as in claim 4,

wherein the ends of the slot constituting the single access opening are rounded, the end which is disposed in the top wall having a smaller radius than the end which is disposed in the side wall.

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