

July 7, 1970

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3,519,173

SELF-HOLDING ACTUATOR CAP FOR AEROSOL DISPENSERS

Filed Feb. 13, 1968

2 Sheets-Sheet 1

Fig. 1

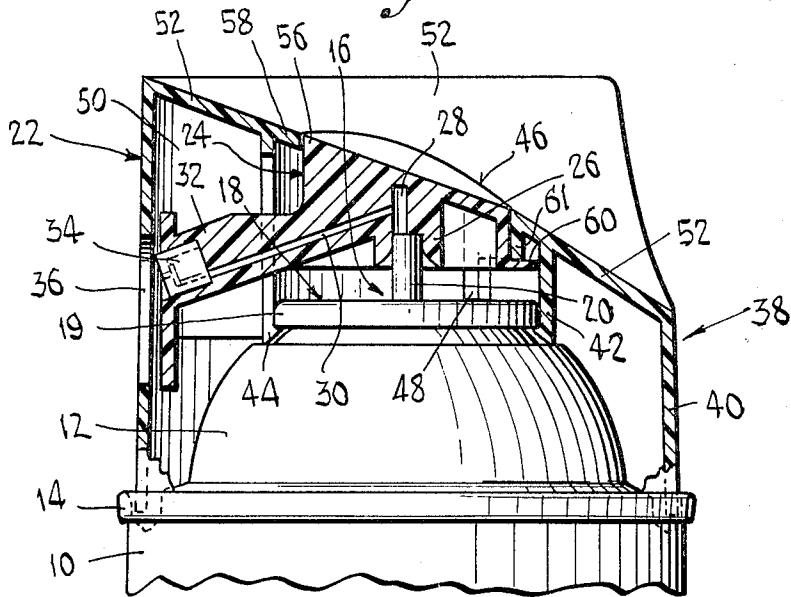
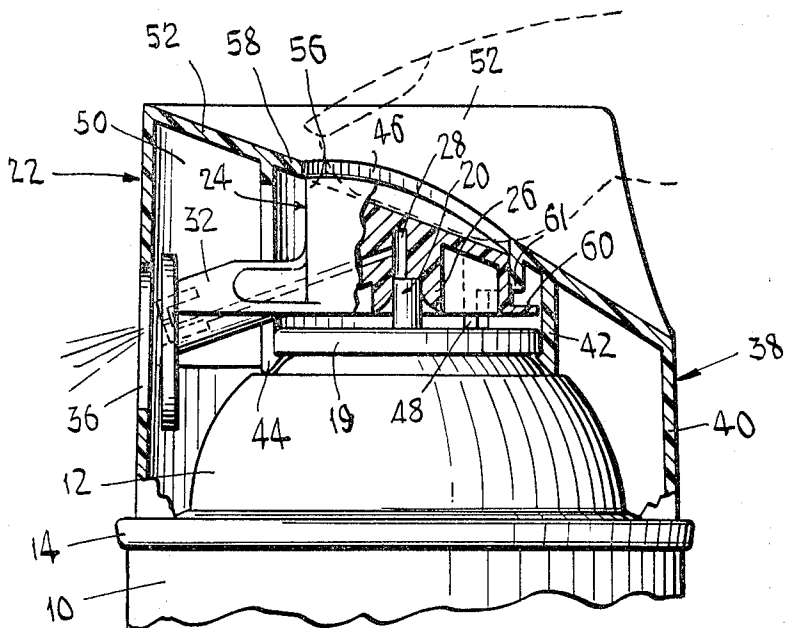


Fig. 2



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Fig. 4

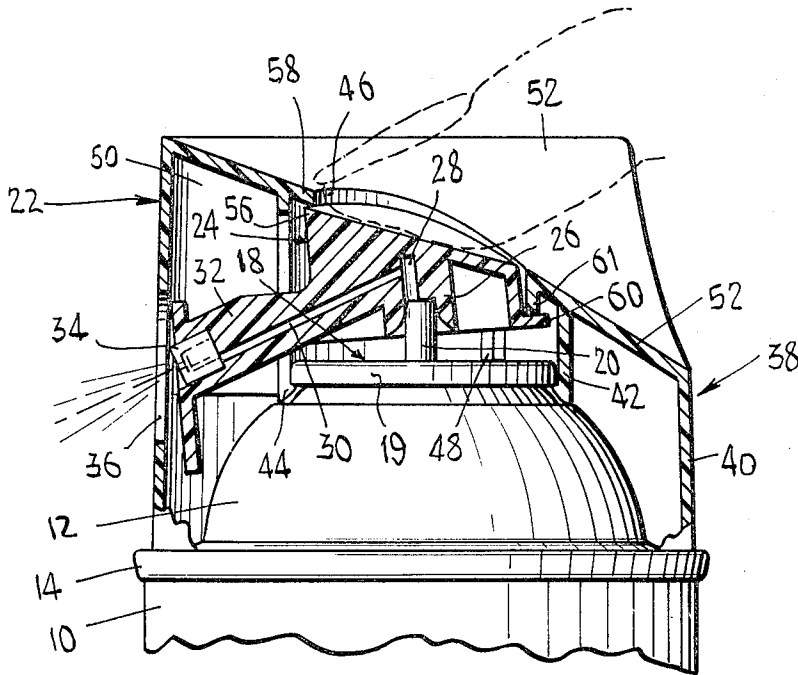


Fig. 3

Fig. 5

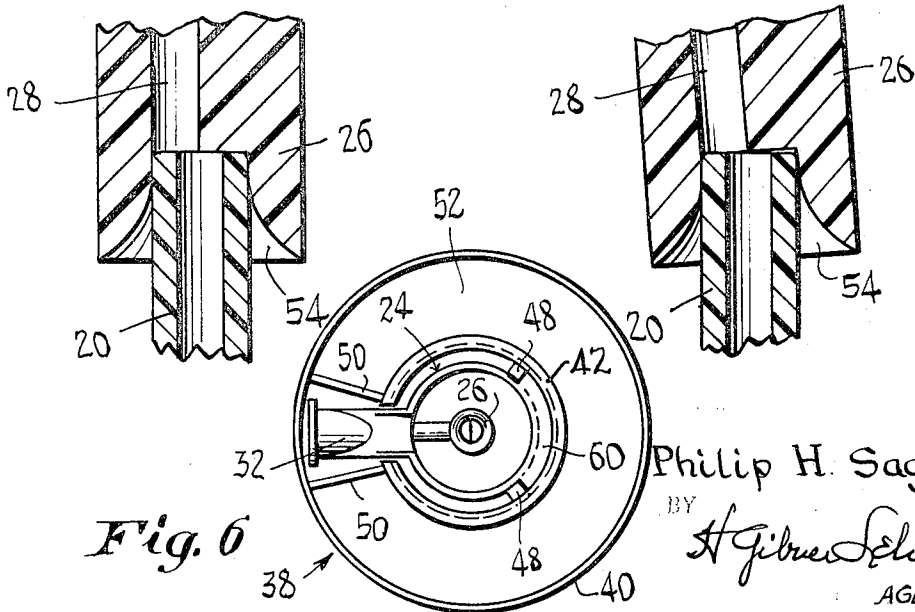


Fig. 6

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SELF-HOLDING ACTUATOR CAP FOR AEROSOL DISPENSERS

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Filed Feb. 13, 1968, Ser. No. 705,185

Int. Cl. B65d 83/14

U.S. Cl. 222—402.13

8 Claims

ABSTRACT OF THE DISCLOSURE

A self-holding actuator cap for aerosol dispensers, wherein a centrally located depress button is guarded against accidental operation by a high, surrounding stationary guard cap. The button has a rockable connection with the depressible valve stem of the dispenser, and when depressed and rocked it effects an interference engagement with the cap whereby it is retained in the depressed, discharging position. A reverse rocking releases the button to its non-discharging position.

PRIOR ART PATENTS OF INTEREST

- (1) 3,081,918, Scoggin et al., Mar. 19, 1963
- (2) 3,110,426, Bishop, Nov. 12, 1963
- (3) 3,178,077, Benedetto, Apr. 13, 1965

BACKGROUND

This invention relates to actuator caps for small hand-held aerosol dispensers and the like. Heretofore a number of self-holding depress button constructions have been proposed and produced for aerosol dispensers of the kind having a spring-biased or charged, hollow valve stem through which the aerosol substance was discharged. These prior devices involved small conventional finger pieces or buttons which were of the unguarded type, usually projecting out in the open from the top of the valve stem of the dispenser. They were fixedly attached to the stem, and only rocked if the stem was of the rocking or tilting type. Aside from being unguarded and thus susceptible to accidental operation, the constructions could hardly be considered of a stylish or attractive appearance and in fact were in some instances unprepossessing if not actually unsightly. In some cases additional pieces were involved, entailing an extra cost and requiring careful orientation or positioning of the lock-down components.

SUMMARY

The above disadvantages of prior self-holding or lock-down actuator caps for aerosol devices are obviated by the present invention, and one object of the invention is to provide a novel and improved especially simple self-holding or hold-down actuator cap for aerosol and like dispensers, wherein the depress button is fully guarded against accidental depressing movement yet is easily operated by the finger in the usual manner when this is desired. This is accomplished by the provision of a central depress button surrounded by a stationary cap body or guard which prevents accidental button operation, and by a novel rockable or pivotal leak-proof connection between the button and valve stem in conjunction with cooperable control lip or shoulder portions of the button and cap body. When the button is depressed and at the same time tilted or rocked with respect to the valve stem and cap body or guard, the cooperable shoulder portions become engaged by an interference action which then prevents return of the button to the raised, non-discharge position. Thus the button stays in the depressed position to effect a continuous discharge until

released by a counter rocking or tilting movement given it, to disengage the control lips.

Another object of the invention is to provide an improved hold-down actuator cap as above set forth, wherein the self-holding action is optional and wherein the button may be as well actuated in the normal, non-self-holding manner whenever this is desired. This is accomplished by arranging the control lips so that they do not engage each other for purely translational or vertical movement of the button, and by retaining sufficient guide means to make feasible such translational, purely vertical movement with as much ease as the rocking, hold-down movement.

Other objects and advantages of the invention reside in an improved actuator cap as characterized, which does not involve extra parts, which is extremely simple and economical to fabricate, and which is easy to operate and reliable in service.

Still other features and advantages will hereinafter appear.

In the drawings:

FIG. 1 is an axial vertical sectional view through an actuator cap made according to the invention and shown in the non-discharging position.

FIG. 2 is a view like that of FIG. 1 but showing the discharging condition with the depress button of the cap temporarily depressed.

FIG. 3 is a fragmentary vertical sectional view, enlarged, of the upper portion of the valve stem and the cooperable rocker connection between the same and the depress button. The relative positions shown are for the non-discharging condition of FIG. 1 and for the temporary discharging condition of FIG. 2.

FIG. 4 is another axial sectional view of the actuator cap, shown with the button in the depressed, discharging and self-holding position.

FIG. 5 is a fragmentary sectional view, enlarged, similar to that of FIG. 3, showing the relative positions of the rocker connection parts as they exist for the discharging condition of FIG. 4.

FIG. 6 is a bottom plan view of the actuator cap of FIG. 1.

As shown, the aerosol dispensing device and improved actuator cap of the invention comprises a usual type of pressurized container 10 having a crowned top closure portion 12 joined to cylindrical side walls by an annular seam 14. The crowned top 12 carries a spring-biased valve assemblage designated generally by the numeral 16, said assemblage including a mounting cup 18 whose periphery 19 is crimped over a corresponding portion of the top closure 12 in the usual manner. The valve assemblage 16 has the usual hollow upright tubular valve stem 20 through which the discharge of aerosol substance occurs when the stem is depressed, as illustrated by the positions shown in FIGS. 2 and 4. In the position of FIG. 1, the stem 20 is raised and no discharge occurs, as is well understood in the art.

In accordance with the present invention a simplified, extremely effective and easily operated self-holding guard-type actuator cap is provided on the dispenser 10, said cap being designated generally by the numeral 22. The improved actuator cap comprises a centrally disposed depress button 24, shown as of circular configuration, having a central hollow depending boss 26 including a socket adapted for rocking, sealing engagement with the upper end of the valve stem 20. The boss 26 has a vertical bore 28 which communicates with a horizontal bore 30 disposed in the button body and also in a laterally extending orifice portion 32 integral therewith. A cup-shaped orifice piece 34 is carried by the orifice portion 32 of the button, and is adapted to direct the discharge of aerosol substance through a side opening 36 in an inverted cup-like station-

ary guard-type cap body designated generally by the numeral 38.

The cap body 38 has an outer cylindrical skirt 40 adapted at its bottom edge to rest in the shoulder seam 14 of the container 10. The cap body 38 also has a cylindrical discontinuous inner skirt portion 42 provided with a detent ledge 44 adapted to engage the underside of the periphery 19 of the mounting cup for the valve assemblage, thereby to securely hold the cap 38 in place on the upper portion of the container 10 and in operable relationship with respect to the depress button 24.

The cap 38 is provided with a central opening 46 wherein the depress button 24 is slidably received and guided. The inner skirt 42 of the cap 38 has a pair of vertical interior guide means or ribs 48 engaging the outer periphery of the button 24 and constituting vertical guides therefor. As seen in FIG. 6, the inner skirt portion 42 of the cap 38 is connected to the outer skirt 40 by a pair of substantially radially extending ribs 50, as well as by the top surface or wall 52 of the cap. Referring to FIGS. 1 and 3 it will be noted that the depress button 24 is centered in the opening 46 of the top wall 52 of the cap, with its axis vertical and aligned with the axis of the valve stem 20.

Further, in accordance with the present invention there is provided a rockable or tiltable connection between the hollow depending boss 26 of the depress button 24 and the top portion of the valve stem 20, said connection comprising a special socket whereby the button 24 can be readily tilted in the manner illustrated in FIGS. 4 and 5 while still retaining a sealing engagement with the valve stem whereby there is during discharge effectively prevented any leakage between the stem and the boss 26. Such rockage connection is clearly illustrated in FIGS. 3 and 5, and comprises a flared bore or mouth 54 constituting said socket, located at the bottom of the boss 26 and adapted to engage the top edge of the valve stem 20 along a continuous relatively wide circular line or small area. The wide line or small-area engagement is clearly shown in FIG. 3, and for the tilted position of the boss illustrated in FIG. 5 such engagement is maintained by virtue of the flared configuration of the mouth surface 54. The socket 54 is seen to have an innermost portion or surface which is substantially cylindrical and which tightly frictionally grips and holds the uppermost side portions of the valve stem, resulting in a slight binding of the stem in the socket during tilting of the button.

Also, in accordance with the invention, the depress button 24 and the guard-type cap body 38 are provided with cooperable control shoulder or lip portions 56, 58 respectively as well as shoulder portions 60, 61, said portions being paired and the pairs being disposed at diametrically opposite locations thereon as seen in FIGS. 1 and 4. The said shoulder portions are capable of interfering engagements upon the depress button being forced downward and rocked, as in FIG. 4.

The arrangement is such that the user of the aerosol dispenser can apply an operating finger to the forward portion of the top surface of the button 24 to simultaneously force the button downward and at the same time in a counterclockwise direction, all as clearly illustrated in FIG. 4. Upon removal of the finger pressure, the tilted button will be held in the depressed, discharging position by virtue of the interference or engagement between the lips or shoulders 56, 58 and 60, 61 thereby to effect a continuous discharge of the aerosol substance. It will be noted that in conjunction with the forward interference or engagement between the lips 56, 58 there is needed the engagement between the rear, sector portion 60 of the depress button and the adjoining underside or lip 61 of the top wall 52 of the stationary cap 38, as will be clearly seen. The rear, sector portion 60 of the button as shown in FIG. 6 occupies a curved clearance space between the vertical ribs 48 of the stationary cap 38. Thus, as illustrated in FIG. 4 there is a three point engagement of the depress button 24. One point of engagement is where the sector-

shaped portion 60 engages the top wall 52; the second point of engagement is between the boss 26 and the top of the valve stem 20; and the third point of engagement is between the interfering lips or shoulders 56, 58. Accordingly the actuator construction is such that the button 24 can be self-holding in the discharging position when it is depressed and tilted or rocked counterclockwise about the top portion of the valve stem 20.

Alternatively, a temporary or self-returning actuation of the depress button 24 can be effected by applying finger pressure to a different top area, namely to the rear button surface as shown in FIG. 2. When this is done, the button 24 due to the guidance of the vertical ribs 48 of the cap, will remain in an untilted position under the action of the ribs and valve stem so that instead it will have purely translational movement, shifting straight downward and forcing the valve stem 20 downward all as illustrated. This will effect a discharge of the aerosol substance through the side opening 36 as shown.

Upon removal of the finger pressure, the button 24 and valve stem 20 will again shift upward to the non-dispensing position under the action of a spring (not shown) conventionally provided to yieldably hold the valve stem 20 in the raised non-discharging position.

It will now be understood from the foregoing that I have provided a novel and improved optionally self-holding actuator cap construction wherein the depress button is fully guarded against accidental operation, and wherein at the option of the user the button may have a temporary discharge action or else a self-holding discharge action depending on whether or not the button is tilted as it is being depressed. The control of the tilting depends on where the finger pressure is applied, as well as on the guiding action provided by the vertical ribs 48 engaging adjoining portions of the depress button 24. The actuator cap is seen to be especially simple in construction, foolproof in its operation, and to involve only two parts, namely the button part and the stationary surrounding guard or cap part. The said parts may be economically molded of plastic substance in accordance with well established procedures.

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

I claim:

1. A self-latching actuator cap for aerosol dispensers of the kind having an upstanding hollow vertically depressible valve stem comprising, in combination:

- (a) a depress button having at its underside means including a socket adapted to receive the upper end portion of the valve stem of the dispenser, for tiltably mounting the button on said stem,
- (b) a stationary cap surrounding the depress button,
- (c) said cap and button having releasable latching means including a pair of cooperable juxtaposed shoulder portions at the tops of the cap and button, said shoulder portions being normally disengaged when the button is moved without tilting between a depressed discharging position and a raised, non-discharging position,
- (d) said cooperable juxtaposed shoulder portions being normally substantially at the same level and sufficiently above the tiltable mounting means of the button so that the shoulder portion of the button has appreciable movement laterally of the axis of said valve stem when the button is tilted in one direction thereon,
- (e) said cooperable shoulder portions being in addition so closely spaced as to be engageable with each other when the button is tilted in said one direction,
- (f) said shoulder portion of the button being engageable with the underside of the shoulder portion of the cap when the button is depressed without tilting and thereafter tilted in said one direction, whereby the button is latched in its depressed discharging position.

5

2. An actuator cap as in claim 1 wherein:
 (a) the tiltable mounting means comprises a depending hollow boss at the end of which the said socket is disposed,
 (b) said socket comprising a flared bore surface in the boss. 5
3. An actuator cap as in claim 2, wherein:
 (a) the flared surface of the bore has a bell shape.
4. An actuator cap as in claim 1, wherein:
 (a) the latching means comprises a second pair of cooperable shoulder portions of the button and cap, disposed substantially diametrically opposite the said first pair and at a lower level with respect thereto. 10
5. An actuator cap as in claim 4, wherein:
 (a) the second pair of cooperable shoulder portions is in overlapping engagement when the depress button is raised and in its non-tilting position of the valve stem, thereby to prevent removal of the button upwardly of the cap. 15
6. An actuator cap as in claim 1, wherein:
 (a) the cooperable shoulder portions of the button and cap comprise a forward top edge of the button and an adjoining edge of an opening in the cap, in which the button is disposed. 20
7. An actuator cap as in claim 1, wherein:
 (a) the cap and button have cooperable coengageable guide means which, when the button is depressed,

6

- prevents tilting of the same on the valve stem in directions other than said one direction of tilting which causes engagement of said shoulder portions, thereby to confine any tilting to that effecting said engagement of said shoulder portions.
8. An actuator cap as in claim 7, wherein:
 (a) said cooperable guide means tending to maintain the button in non-tilting condition as it is depressed by finger pressure applied in a downward direction which maintains engagement of said guide means, thereby to enable instant return of the button upon the removal of said finger pressure.

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U.S. Cl. X.R.

222—402.14, 402.2