

[54] AEROSOL METERING BUTTON

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[51] Int. Cl. B65d 83/14

[58] Field of Search 222/402.2, 444, 523, 222/453, 513

[56] References Cited

UNITED STATES PATENTS

3,575,322	4/1971	Jordon et al.	222/402.2
2,892,576	6/1959	Ward	222/402.2
2,989,217	6/1961	Focht	222/402.2
2,667,991	2/1954	Boyer	222/402.2 X

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[57] ABSTRACT

The specific disclosure provides an aerosol metering

button comprising interfitting upwardly opened and downwardly opened members. The upwardly opened member is adapted to receive an aerosol valve stem through its closed lower end. The downwardly opened member has means spaced a predetermined distance from the valve stem for sealing the opened end of the valve stem. An orifice is formed in each of the upwardly opened and downwardly opened members, and the orifices are spaced apart by the predetermined distance. Means are provided for biasing the upwardly opened and downwardly opened members to maintain the predetermined distance between the sealing means and the opened end of the valve stem, and between the orifices when the button is in an unactuated state. The button is actuated by applying an external pressure to the top of the downwardly opened member to overcome the bias of the biasing means and move the downwardly opened member relative to the upwardly opened member. The external pressure also initiates flow of aerosol contents through the opened end of the valve stem, and the flow continues until the downwardly opened member is moved the predetermined distance such that the sealing means abuts the opened end of the valve stem. At this time, the two orifices are aligned and a metered flow of aerosol contents is exhausted from the button.

8 Claims, 4 Drawing Figures

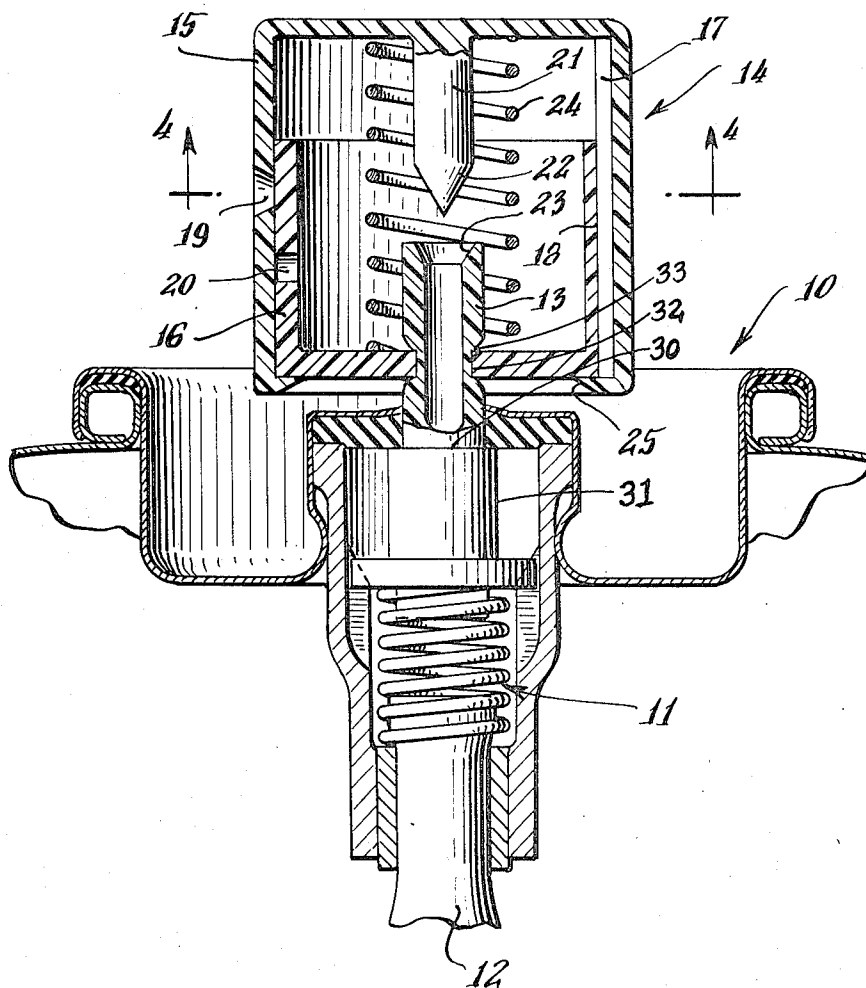


Fig. 1.

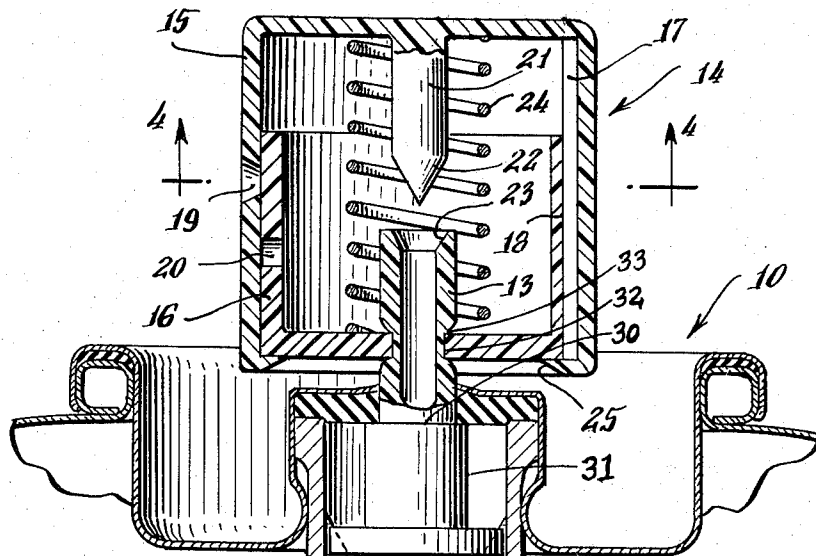
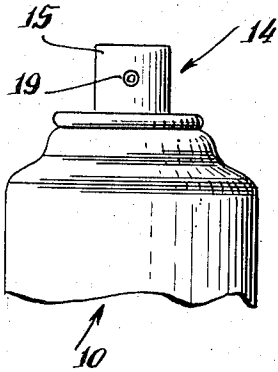


Fig. 2.

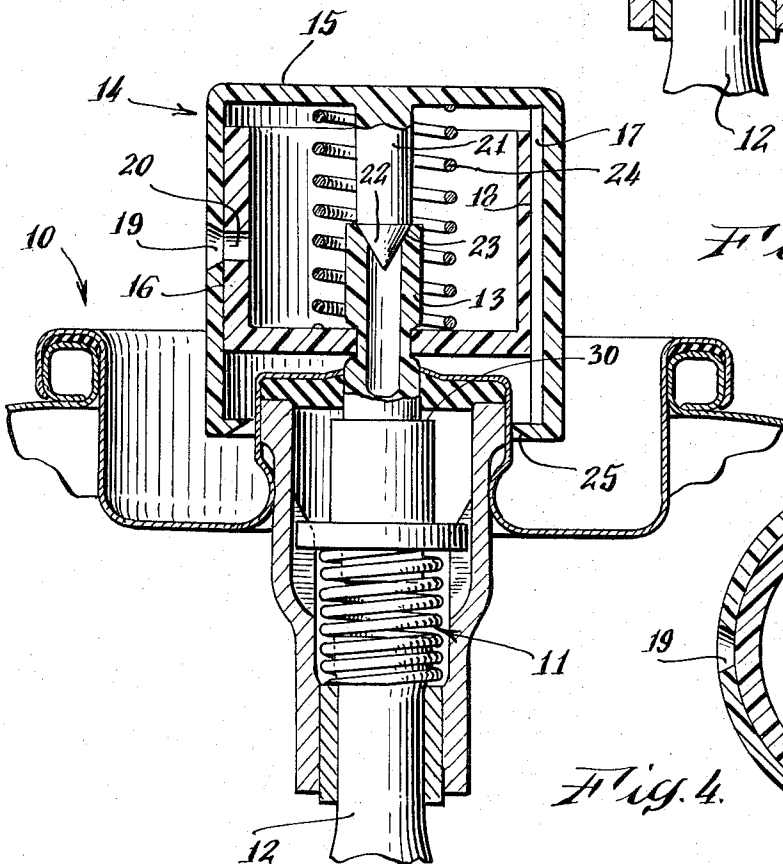
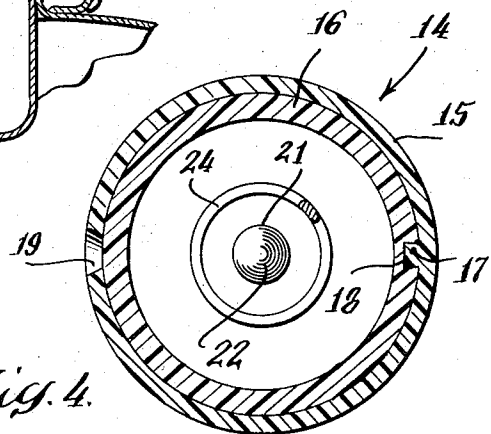


Fig. 3.

Fig. 4.



AEROSOL METERING BUTTON

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to aerosol dispensing devices. More particularly, the present invention relates to an aerosol metering button wherein the metering means are hermetically sealed when not in use.

2. Description of the Prior Art

Aerosol dispensing systems generally comprise a container for a pressurized aerosol formulation having an active ingredient, which may be in the form of a liquid or a powder, and a propellant. The container has a valve structure having a valve stem extending upwardly from the container and actuable to discharge the aerosol formulation from the container. Means are generally provided on top of the container for actuating the valve stem and for guiding the aerosol formulation from the valve stem to a point of intended use.

Some dispensing systems provide for dispensement of the aerosol formulation in a predetermined metered amount with each separate actuation of an aerosol metering button. Generally, such metering buttons have a metering cup which is moved into communication with the contents of the aerosol container and which is sealed from the atmosphere during a downstroke actuation of the button. When pressure is removed from the button, the cup is moved out of communication with the contents of the container and discharges the aerosol contents in the cup to the atmosphere. Since the metering cup in this type of button is exposed to the atmosphere when not in use, there is a strong possibility that the residue in the cup will be adversely affected by such exposure. For example, the residue from an antiperspirant formulation may solidify in the cup and cause dispensement of solid particles along with the antiperspirant when the button is again actuated.

U.S. Pat. No. 3,575,322 provides an aerosol metering button wherein the contents of the button are sealed from the atmosphere when the button is not in use. However, this patent provides a button having a relatively complex structure for two metering chambers and means for selectively controlling aerosol content flow between the chambers.

SUMMARY OF THE INVENTION

The aerosol metering button of the present invention is structurally uncomplex, and provides a hermetic seal for contents in the button when the button is not in use. Further, the button of the present invention is readily adaptable for use with presently available aerosol container structures.

In accordance with the present invention, there is provided an aerosol metering button comprising a first section having a closed end adapted to be secured to a stem of an aerosol can and an opened end opposite the closed end. A second section is sealably fitted to and movable with respect to the first section and has a closed end and an opened end opposite the closed end for receiving the first section therein. An orifice is formed in each of the first and second sections which are separated by a predetermined distance, and closure means spaced from the opened end of the stem by the predetermined distance is formed on the second section for sealing the opened end of the stem. Means are provided for biasing the closed ends of the first and second sections to maintain the predetermined distance

between the two orifices, and between the closure means and the opened end of the stem. The second section is movable by an external pressure greater than the biasing pressure of the biasing means to actuate the aerosol content flow through the opened end of the valve stem into the button. Movement of the second section relative to the first section for the predetermined distance under the external pressure causes the closure means to seal the opened end of the valve stem and to align the orifices such that the aerosol contents in the button are exhausted through the aligned orifices.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary side elevation view of the top end of an aerosol container or can having an aerosol metering button associated therewith to show the general environment of the invention;

FIG. 2 is a sectional view of an aerosol metering button embodiment of the present invention shown in an unactuated state and installed on a container or can like that of FIG. 1 with portions broken away;

FIG. 3 is a sectional view of the FIG. 2 embodiment showing the button in a fully actuated state for a metered discharge of aerosol contents therefrom; and

FIG. 4 is a sectional view of the button taken along lines 4-4 of FIG. 2.

DESCRIPTION OF SPECIFIC EMBODIMENTS

With reference to the figures, an aerosol metering button 14 is shown in combination with an aerosol container or can 10. The button 14 comprises a first cylindrical member or section 16 having an upper opened end and a closed bottom end. The first section 16 is sealably fitted in a second cylindrical member or section 15 having a radial flange 25 for abutting engagement with the outer surface of the bottom end of the first member 16 when the button 14 is in the position shown in FIG. 2. A spring 24 biases the closed end of the second member 15 upwardly to maintain the radial flange 25 in abutting engagement with the outer surface of the closed end of the first member 16.

Orifices 19, 20 are formed in the sections 15, 16. The orifices 19, 20 are vertically spaced apart by a predetermined distance when the button 14 is in the position shown in FIG. 2. A key 17 is longitudinally formed along the inner surface of the second section 15 and is vertically movable in a slot 18 formed in the outer surface of the first section 16. The key 17 and slot 18 arrangement prevents relative rotational movement of the first and second sections 16, 15 and thereby ensures that the orifices 19, 20 are properly aligned when the button 14 is actuated to the position shown in FIG. 3. A boss 21 having a conical lower end 22 extends downwardly from the closed end of the second section 15 along the longitudinal axis of the button 14.

The first section 16 has a centrally located aperture 32 formed in the closed end thereof. The button 14 is secured to a valve stem 13 of the aerosol container or can 10 by inserting the valve stem 13 through the aperture 32 and frictionally seating the surfaces of the aperture 32 in an annulus 33 formed about the outer periphery of the stem 13. The valve stem 13 is rigidly connected to a valve element 31, and the valve element 31 is biased upwardly by a valve spring 11. A dip tube 12 extends downwardly into the aerosol container or can 10. The biasing pressure of the button spring 24 should

be greater than the biasing pressure of the valve spring 11, for example, by at least 1 to 2 pounds per square inch.

When the button 14 is secured to the valve stem 13 in the manner shown in FIG. 2, the boss 21 is positioned above a beveled opened end 23 of the valve stem 13 such that downward movement of the boss 21 for a distance corresponding to the predetermined distance separating the orifices 19, 20 fully seats the conical end 22 in the beveled stem opening 23. When the conical boss end 22 is seated in the opened stem end 23, the valve stem 13 is sealed to prevent further passage of aerosol contents from the can 10 through the stem 13.

In operation, an external pressure is applied to the top of the second member 15 to overcome the bias of the button spring 24. Since the biasing pressure of the button spring 24 is greater than the biasing pressure of the valve spring 11, the valve stem 13 and the valve element 31 move downwardly and provide flow of the aerosol contents in the can 10 up through the dip tube 12 around the valve element 31 through ports (not shown) in a valve seat 30 formed at the upper end of the valve element, and upwardly through the opened end 23 of the stem 13. Since the externally applied pressure is greater than the bias pressure of the button spring 24, the second section 15 moves downwardly with respect to the first section 16 for a distance corresponding to the predetermined distance separating the two orifices 19, 20 when the button 14 is in the position shown in FIG. 2. At this time, the conical end 22 of the boss 21 is fully seated in the opened end 23 of the stem 13 to seal further aerosol content flow through the stem, and the two orifices 19, 20 are aligned as shown in FIG. 3. Simultaneous sealing of the valve stem 13 and alignment of the orifices 19, 20 provides a metered exhaust of aerosol contents in the button 14. It is obvious that the metered amount of aerosol contents discharged from the button is determined by the volume of a chamber defined by the first and second sections 16, 15.

When the external pressure is removed from the top of the second section 15, the valve element 31 and the second section 15 move to the positions shown in FIG. 2 to discontinue further aerosol content flow to the button 14, and to hermetically seal the interior of the button 14, respectively.

The aerosol can valve means described hereinabove are presented by way of example only. There are many known alternative valve arrangements. For example, the aerosol metering button of the present invention can be used in combination with the aerosol can embodiments described in U. S. Pat. No. 3,358,885.

The first and second sections 16, 15 can be made of medium density linear polyethylene or other suitable material. However, the first and second sections 16, 15 must be interfitted such that the button 14 is hermetically sealed when in the position shown in FIG. 2.

It is also within the scope of the present invention to permanently secure the button 14 to the valve stem 13, or to construct the button and valve stem such that the button is removable for further use on other aerosol cans.

It is apparent that the second section 15 can alternatively be fitted within the first section 16. In this embodiment, the radial flange 25 is formed at the opened end of the first section 16 for abutting engagement with

the top of the closed end of the second section 15, and the opened end of the second section 15 is suitably spaced from the closed end of the first section 16 for reciprocal movement therein.

I claim:

1. In a combination of an aerosol can have sprayable contents therein and an aerosol metering button, wherein said can comprises a valve stem having an opened end extending outwardly from said can, valve means for interconnecting an inner end of said valve stem and said contents in said can, and means for biasing said valve means to a closed position, and wherein said button is secured to said stem, the improvement comprising said button including:

a first section having a closed end secured to said stem, an opened end opposite said closed end, and a first orifice therethrough,

a second section sealably fitted to and movable between a first position and a second position with respect to said first section, said second section having a closed end, an opened end opposite said closed end for receiving said first section therein, a second orifice therethrough, and closure means for sealing said opened end of said valve stem,

when said second section is in said first position with respect to said first section, said first and second orifices are separated by a predetermined distance and said closure means is axially separated from said opened end of said valve stem by said predetermined distance,

when said second section is in said second position with respect to said first section, said closure means seals said opened end of said valve stem and said first and second orifices are aligned, and

means in said button for biasing the closed ends of said first and second sections to maintain said second section in said first position with respect to said first section, said button biasing means having a biasing pressure greater than that of said valve biasing means,

in response to a downward external pressure greater than the biasing pressure of said button biasing means, said second section initially being maintained in said first position with respect to said first section as said first section moves said valve stem downwardly to open said valve means against said valve biasing means and permit passage of said contents in said can to enter said button through said opened end of said valve stem, and said second section thereafter being moved to said second position with respect to said first section to seal said opened end of said valve stem and to align said first and second orifices for exhausting the sprayable contents in said button.

2. The combination of claim 1 wherein said button further comprises means for limiting relative motion between said first and second sections to reciprocal motion.

3. The combination of claim 1 wherein said button further comprises a vertical recess in one of said first and second sections, and a vertical guide rib on the other of said first and second sections, said vertical guide rib being vertically movable in said recess for preventing relative rotational movement between said first and second sections.

4. The combination of claim 1 wherein said second section comprises inwardly directed means at the

opened end thereof for abutting engagement with the closed end of said first section to prevent separation of said first and second sections under the pressure of said button biasing means.

5. The combination of claim 1 wherein said valve stem has an annular recess formed about the outer periphery thereof, and wherein the closed end of said first section has an aperture for seating said recess therein to provide a hermetical seal between said stem and said first section.

6. An aerosol metering button for use with an aerosol can having sprayable contents therein; wherein said can includes a valve stem having an opened end extending outwardly from said can, valve means for interconnecting an inner end of said valve stem and said contents in said can, and means for biasing said valve means to a closed position; said button comprising:

- a first section having a closed end adapted to be secured to said stem, an opened end opposite said closed end, and a first orifice therethrough,
- a second section sealably fitted to and movable between a first position and a second position with respect to said first section, said second section having a closed end, an opened end opposite said closed end, a second orifice therethrough, and closure means for sealing said opened end of said valve stem,

when said second section is in said first position with respect to said first section, said first and second orifices are separated by a predetermined distance and said closure means is axially separated from said opened end of said valve stem by said predetermined distance,

when said second section is in said second position with respect to said first section, said closure means seals said opened end of said valve stem and said first and second orifices are aligned, and

means in said button for biasing the closed ends of said first and second sections to maintain said second section in said first position with respect to said first section, said button biasing means having a biasing pressure greater than that of said valve biasing means,

in response to a downward external pressure greater than the biasing pressure of said button biasing means, said second section initially is maintained in said first position with respect to said first section as said first section moves said valve stem downwardly to open said valve means against said valve biasing means and permit passage of said contents in said can to enter said button through said opened end of said valve stem, and said second section thereafter is moved to said second position with respect to said first section to seal said opened end of said valve stem and to align said first and second orifices for exhausting the sprayable contents in said button.

7. The button of claim 6 wherein said first section is positioned in said second section.

8. The button of claim 6 wherein said second section comprises inwardly directed means at said opened end thereof for abutting engagement with said closed end of said first section for preventing separation of said first and second sections under the pressure of said biasing means.

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