April 9, 1968 H. L. MARDER 3,377,005

AEROSOL CONTAINER OVERCAP WITH OOZEPROOF VALVE-ACTUATING MEANS

Filed Feb. 3, 1967

FIG. 1

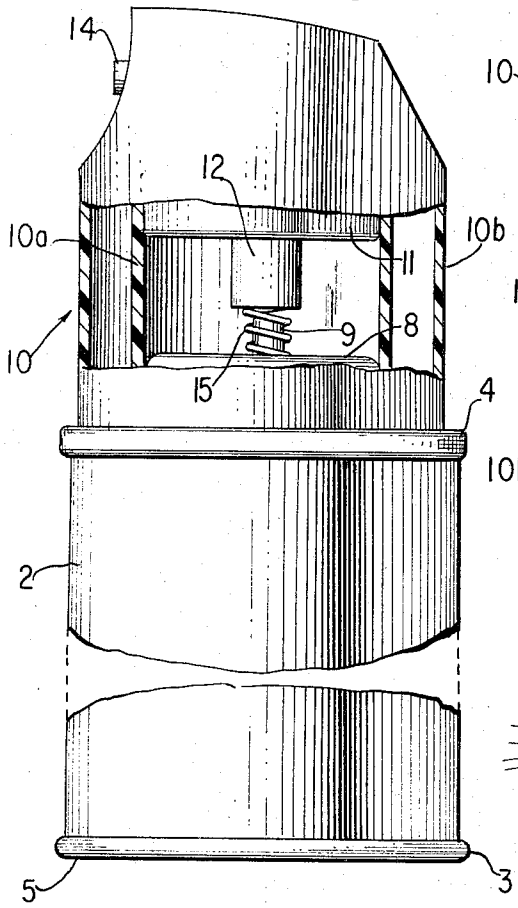
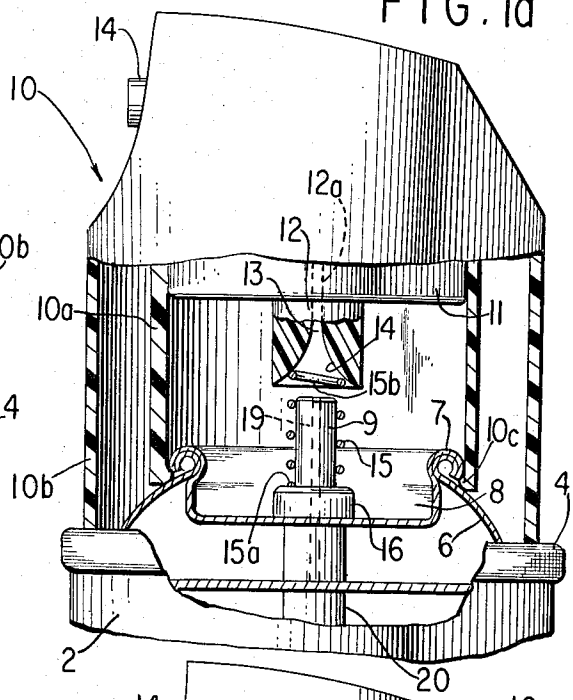


FIG. 1a



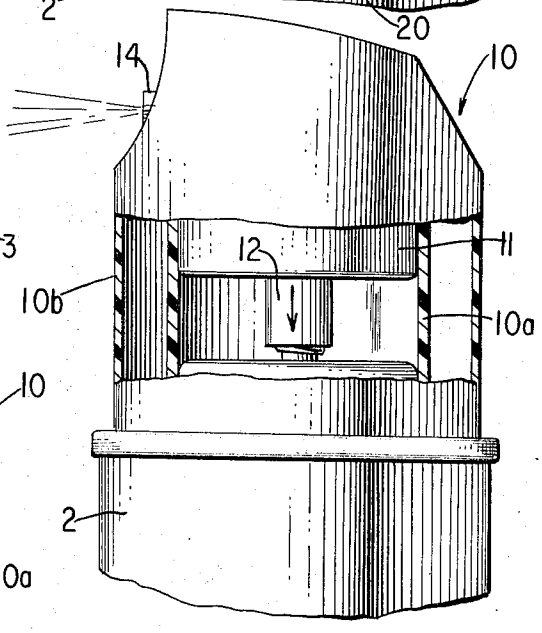


FIG. 2

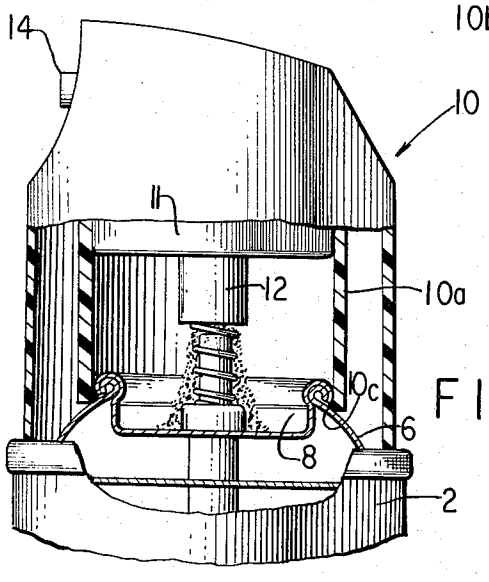


FIG. 3

INVENTOR
HERMAN L. MARDER
BY Andrew Kaffes
ATTORNEY

United States Patent Office 3,377,005 Patented Apr. 9, 1968

3,377,005

AEROSOL CONTAINER OVERCAP WITH OOZE-PROOF VALVE-ACTUATING MEANS

Herman L. Marder, Plainfield, N.J., assignor to American Home Products Corporation, New York, N.Y., a corporation of Delaware

Filed Feb. 3, 1967, Ser. No. 613,780
5 Claims. (Cl. 222—402.13)

ABSTRACT OF THE DISCLOSURE

An aerosol container conventionally provided with an actuatable valve stem and having associated therewith a spray overcap on which is mounted an actuator element or button adapted for actuating said valve stem, is characterized by means normally biasing said actuator element out of communicating engagement with the valve stem, and reservoir means associated therewith. The arrangement assures that any product accumulating in the conduit to the discharge or spray orifice, after valve shutoff, is discharged into said reservoir instead of exuding via said orifice.

Background of the invention

The invention relates generally to an aerosol container provided with manual actuatable valve means for dispensing the contents of the container and, more particularly, to such containers wherein the manually actuatable depress button operatively associated with the valve means of the container is mounted in a housing affixed to the top of said container. Said housing, in conjunction with the related valve actuating means, are well known in the art of aerosol containers and are commonly referred to as "spray overcaps."

The use of substantially large or extensive spray overcap structures, whether constituted of a single molded piece hinged by a connecting web or constructed of two or more functional pieces wherein the movable actuator portion for the valve is separate but held captive within a stationary body, has been found to engender the disadvantage of collecting and holding relatively sizable amounts of product in the conduit between the valve and the terminal discharge orifice after valve shutoff. This product subsequently escapes and exudes through the terminal discharge orifice which may be located on the actuator per se or the overcap housing therefor. In many instances, this occurrence proves unsightly and, further, interferes with a succeeding spray performance of the aerosol container, particularly when the aerosol container is used for more than one application in quick succession. The afterooze or discharge of product after shutoff of the valve is particularly evident and undesirable in those products composed of aerosol compositions designed to issue as foam.

Summary of the invention

This invention relates specifically to aerosol containers having the aforementioned overcap structures provided with movable valve actuator members which are so constructed and arranged with biasing means whereby said actuator member is positioned out of communicating contact with the valve stem of the container when the actuator member is in its normal valve shutoff position. Since the actuator member, in this position, is not in direct communication with the valve stem, the product that accumulates in the actuator member channel after shut-

off is permitted to be discharged through the valve stem core into a reservoir which preferably may be provided by the valve mounting cup, in turn concealed within the interior confines of the overcap assembly, instead of escaping and/or exuding by way of the terminal discharge or spray orifice which is conventionally in communication with said channel of said actuator member.

The objects, advantages and nature of the present invention will be more readily understood from the descriptions of a preferred embodiment thereof hereinafter with reference to the accompanying drawings now described below:

Description of the drawings

FIG. 1 is a side elevation of an aerosol container with overcap and actuator button assembly mounted thereon and provided with spring biasing means urging the actuator button out of communicating connection with the stem of the valve mounted on the container. A portion of each of the inner and outer walls of the overcap are shown broken away to disclose the relationship of parts when the actuator button is in normally upwardly biased position, and the valve stem is also in normally upwardly biased valve-closing position.

FIG. 1*a* is an enlarged fragment of the overcap container assembly shown in FIG. 1, with parts of the container and of the valve cup housing, as well as of the hollow stem core of the actuator button, broken away to disclose more clearly the structural arrangement.

FIG. 2 is another side elevation of the upper position of the aerosol container of FIG. 1, again with portions of the overcap walls broken away, but with the actuator button, hollow stem core thereof, and the valve stem in depressed position with the biasing spring compressed and the valve stem depressed thereby in valve-opening, product-dispensing position.

FIG. 3 is still another side elevation of aerosol container of FIGS. 1 and 2, with portions of the overcap walls broken away, in this instance to show the parts returned to the position of FIG. 1 following the spray operation disclosed in FIG. 2, and again part of the wall of the valve cup broken away as in FIG. 1*a*, to disclose the accumulation of product foam in the reservoir provided by the valve cup.

Description of preferred embodiment

Referring to the drawing, an aerosol container 2 has sealed thereto by rolled beads 3 and 4 respectively a bottom closure 5 and a top closure 6 of generally conical configuration. Seated in the apex of top closure 6 and sealed thereto by rolled bead 7 is a conventional valve housing or cup 8 having the usual valve mechanism therein (not shown) and dip-tube 20 attached thereto. Extending upwardly from the valve housing 8 is the similarly usual hollow valve stem 9 which functions dually as a valve-actuating member and has a conduit 19 for product when the normally closed valve is pressed open by depressing the stem 9.

Seated on the top of container 2 is a spray overcap 10. Said overcap 10 comprises an inner wall 10*a* and an outer wall 10*b*, the former of which is provided near its bottom with an annular bead 10*c* which functions as a snap-locking device for affixing overcap 10 to bead 7 of valve cup 8. As illustrated in U.S. Patent 3,260,416 and U.S. Patent 3,006,510, for example, overcap 10 functions as a housing for an actuator button 11, which

also may be of the specific structure shown in said patents. As disclosed herein, actuator button **11** is provided with a hollow stem core **12** having a bore **13** of a diameter which permits substantially sealing engagement of said core with the upper end of hollow valve stem **9**. In this instance, however, bore **13** is provided with a flared contour **14** at its end which permits facile engagement of said core with said stem when said core is pressed downwardly on said hollow valve stem **9** in telescoping relationship therewith, but also, permits facile disconnection when core **12** is raised in the manner which will appear hereinafter. Bore **13** of hollow stem core **12** communicates via a conduit **12***a* in actuator button **11** with the spray orifice **14**.

Positioned substantially concentrically of valve stem **9** and encircling the outer circumference thereof is a helical spring **15** thereon, the lower end **15***a* of which abuts the surface of the conventional "island" **16** of cup **8**. The upper end **15***b* of spring **15** abuts the lower end **18** of hollow stem core **13**, thus normally biasing said core **12** upwardly and out of communicating engagement with the upper end of hollow valve stem **9** as shown in FIG. 1.

A primary feature of the preferred embodiment of the invention just described comprises the use of a compression spring in conjunction with an actuator button **11** that is so designed with stem core contour **14** that will not permit a permanent friction type engagement with the valve stem **9** of the valve mechanism, but instead is so designed to permit only leakless, non-permanent engagement with the top portion of said stem **9**. Another feature is the choice of a compression coil spring **15** of such dimensions and resilience that, when in place on valve stem **9**, it will effectively make contact with, and be compressed between, actuator stem core **12** and the island **16** of valve mounting cup **8** during manual depressing of the actuator button **11** for spraying and discharging of product.

In the operation of the aerosol container by means of spray overcap **10** for operating purposes, actuating button **11** thereof is pressed downwardly by the finger of the user against the upwardly biasing action of spring **15**, as shown in FIG. 2. As a result, flared contour **14** of bore **13** of hollow stem core **12** sealingly abuts the upper end of valve stem **9**. Thereafter, and with hollow stem core **12** and valve stem **9** in said abutment, the valve stem **9** is also pressed downwardly to open the valve (not shown) in valve housing **8** whereby spray is discharged from spray orifice **14**. On release of button **11** to discontinue spraying, as shown in FIG. 3, the previously depressed valve stem **9** returns to valve closing position and then spring **15** functions to lift stem core **12** of actuator button **11** out of communicating connection with valve stem **9**. In such position of the various parts, the product still in the conduit **12***a* connecting bore **13** and stem core **12** with spray orifice **14**, discharge downwardly out of flared contour **14** of bore **13** to be recived, in this case, as a foam, in the receptacle or reservoir provided by valve cup **8**.

The coil spring **15**, for all practical purposes, can simply be placed over and around the valve stem **9** so that it rides freely between the actuator stem core **12** and the valve mounting cup island **16** in the valve shutoff position. Alternatively, the coil spring **15** can become an integral part of the actuator stem core **12** and be held in position so that the spring is assembled to the aerosol unit in a single capping operation.

The compression spring referred to in the description of the preferred embodiment hereinbefore has been defined as a coil spring constructed of metal; it has been found that coil compression springs of such construction (preferably of stainless steel) are very practical. It will be understood by those skilled in the art, however, that plastics or synthetic polymeric materials of wide variety may be substituted for use in making the coil spring for this purpose and, of course, the spring may vary in configuration, number of turns, and wire or filament diameter. Similarly, the compression factor of the spring may vary, but the spring should preferably be of such design that it can be compressed with no more than a little pressure in excess of that normally used to depress the actuator button **11** for product discharge under normal conditions.

Also within the scope of this invention is the use of springs other than those designed as coil springs. For example, the biasing means can take on almost any configuration, whether metal or plastic, as long as it is adaptable to the cap and actuator structures, and functions as a vertical lifting mechanism to disengage the actuator stem core from the valve stem. As one illustration, there may be employed instead, a simple, flat, thin bar constructed of resilient plastic or metal material and so curved that when mounted under the actuator and on top of the valve mounting cup, it is flexed and applies an opposite force to the depression of the actuator. Also applicable, from a functional standpoint and wthin the scope of this invention, is the use of resilient foam rubber or plastic which may be dimensionally fitted around the valve stem underneath the actuator. Such materials may be compressed on depression of the actuator button and on release thereof, force the actuator button to a position out of contact with the valve stem.

Other variations and modifications can be made without departing from the spirit and scope of this invention as defined by the appended claims.

I claim:

1. In combination with an aerosol container having mounted in the top thereof, upwardly directed valve actuator means for actuating the normally closed discharge control valve means mounted on said container, overcap means mounted on said container and encasing said valve actuator means, first conduit means provided in said valve actuator means, manually operable actuator means movably mounted on said overcap means, second conduit means associated with said actuator means, said second conduit means being connected at one end thereof with discharge orifice means, said second conduit means being selectively connectible at the other end thereof with said first conduit means in said valve actuator means for communcation therewith, biasing means normally urging said other end of said second conduit means out of communitcating connection with said first conduit means in said valve actuator means, and reservoir means adjacent said valve actuator means for receiving fluid from said second conduit means when said second conduit means is urged out of communicating connection with said first conduit means of said valve actuator means.

2. The combination defined in claim **1** wherein said overcap means comprises at least one vertically disposed circumferential wall, said manually operable actuator means comprises a button which is movably substantially vertically within said wall, said button has a substantially vertically disposed stem core depending therefrom, said valve actuator means comprises a vertically disposed valve stem, said first conduit means comprises a first axial bore extending through said valve stem, said second conduit means comprises a second axial bore in said vertically disposed stem core depending from said button, said biasing means comprises a coiled spring mounted circumferentially on said valve stem, said reservoir means comprises a cup provided by said valve means, and said coiled spring has one end thereof arranged to abut structure associated with said cup and the other end arranged to abut the lower end of said stem core.

3. The combination defined in claim **2** wherein said valve stem, said stem core, and said first and second bores therein respectively are dimensioned to permit easily disconnectible, telescoping connection therebetween when said button is pressed downwardly against the biasing action of said spring.

4. The combination defined in claim **2** wherein said overcap means comprises a second vertically disposed wall positioned interiorly and concentrically of said first wall, and abuts the periphery of said cup.

5. The combination defined in claim **3** wherein said stem core is of larger diameter than said valve stem and said second bore is flared downwardly and outwardly at its lower end to receive the upper end of said valve stem when said actuator button is pressed downwardly against the said biasing action of said spring.

References Cited

UNITED STATES PATENTS

2,949,243	8/1960	Raehs et al.	239—576 X
2,981,446	4/1961	Campbell	222—509 X
3,215,317	11/1965	Abplonalp	222—509 X
3,263,868	8/1966	Sagarin	222—402.13

ROBERT B. REEVES, *Primary Examiner.*

N. L. STACK, JR., *Assistant Examiner.*