April 5, 1966 R. N. KHARASCH 3,244,331

DISPOSABLE SINGLE CHARGE AEROSOL CAPSULE

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FIG. 1

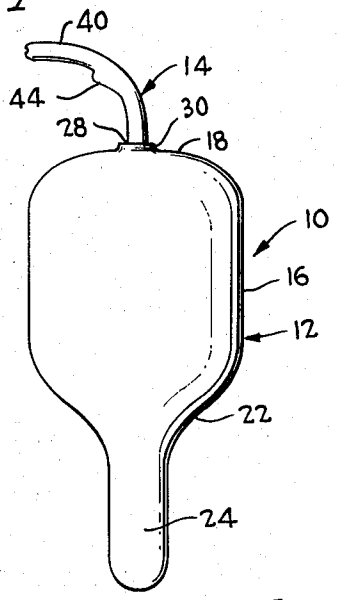


FIG. 2

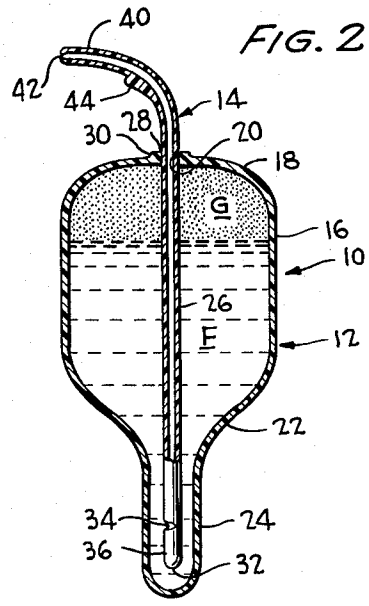


FIG. 3b

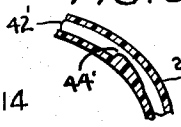
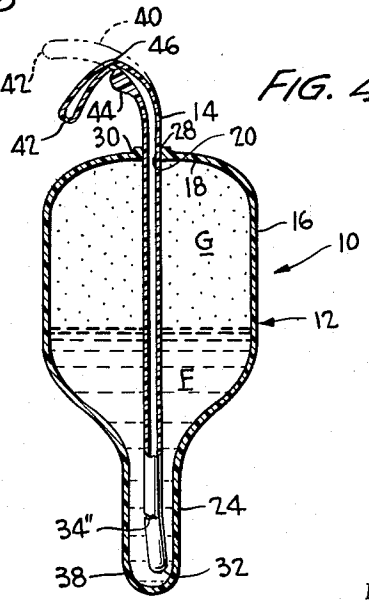


FIG. 3a

FIG. 4



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DISPOSABLE SINGLE CHARGE AEROSOL CAPSULE

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FIG. 5a

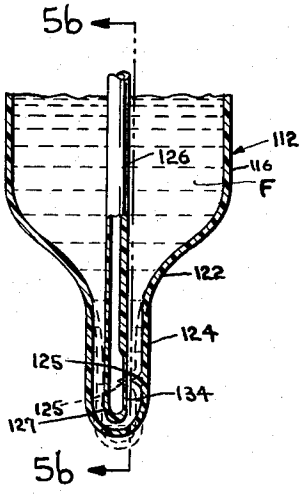


FIG. 5b

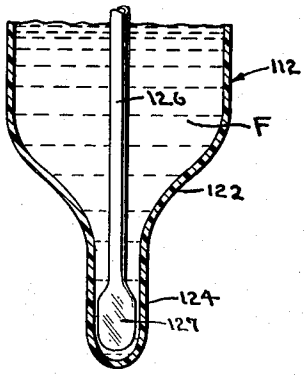


FIG. 6

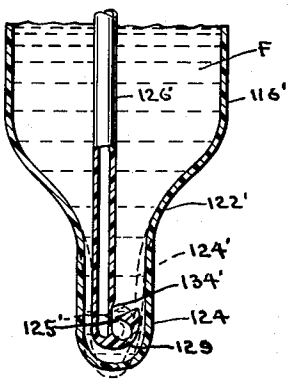


FIG. 7

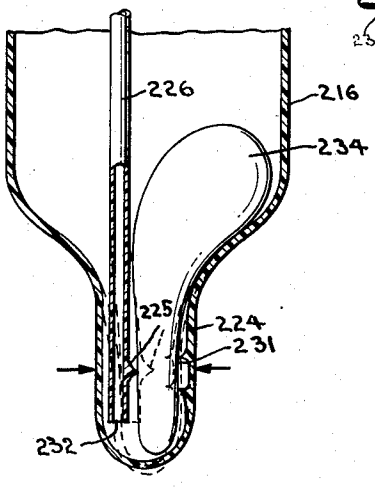
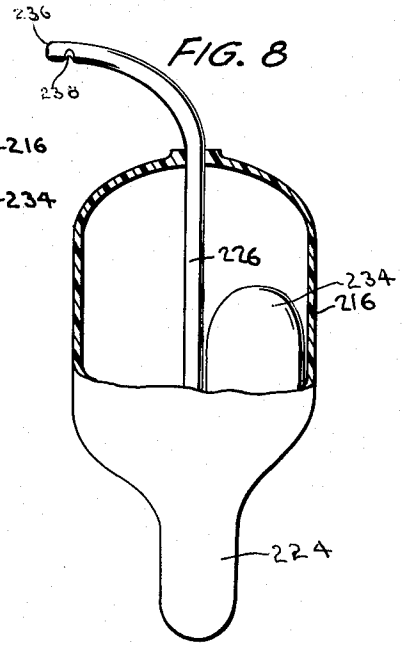


FIG. 8



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DISPOSABLE SINGLE CHARGE AEROSOL CAPSULE

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Filed Jan. 24, 1964, Ser. No. 340,061
15 Claims. (Cl. 222—211)

This invention relates generally to aerosol dispensers and more particularly to a "one-shot" aerosol capsule especially adapted for use on trips, etc., where packing space may be at a premium and where it is desired to have available a single charge or "shot" of shaving cream, deodorant, etc., available.

A primary object of the present invention is to provide a novel aerosol capsule wich lends itself to ready packaging, affords protection against accidental release or discharge, is readily and economically manufactured, and is readily used and practical for the purposes intended.

Another primary object of the invention is to provide a novel disposable aerosol capsule frangible seal means within the capsule, and in which said seal means is protected against rupture or breaking during transit, handling etc., and yet is immediately accessible to be broken by a simple manual manipulation.

A further object of the present invention is to provide a single charge aerosol capsule whereby substantially all of the fluent contents thereof will be dispensed and the use and activation of the capsule is readily accomplished in a single hand operation by a user.

Another object of the present invention in conformance with that set forth is to provide a novel aerosol capsule which includes means for controlling the distribution or amount of fluent material being discharged to different locations.

A still further object of the present invention is to provide a novel disposable aerosol capsule which includes novel frangible seal fracturing means.

And a still further object of the invention in conformance with that set forth above is to provide a novel disposable aerosol capsule which includes a frangible aerosol-charge element for activating the capsule.

These together with other objects and advantages will become apparent upon a consideration of the accompanying specification and drawings forming a part thereof, wherein:

In the drawings:

FIGURE 1 is a side elevation of the novel aerosol capsule of the invention;

FIGURE 2 is a view similar to FIGURE 1 with portions broken away and sectioned for purposes of showing details of construction;

FIGURE 3*a* is a view similar to FIGURE 2, showing in phantom lines the normal position of the cup or fluid well of the capsule, and illustrating how the frangible seal of the dip tube of the capsule may be broken;

FIGURE 3*b* is an enlarged fragmentary view of an end portion of a modified dip tube end portion for facilitating optional discharge of the aerosol dispenser contents;

FIGURE 4 is a view similar to FIGURES 2 and 3, showing in phantom lines the normal position of the control portion of the exposed end of the dispensing end of the dip tube; the capsule being actuated and showing how the broken tip is retained in the sump or fluid well;

FIGURE 5*a* is a slightly enlarged, fragmentary section similar to the lower portion of FIGURES 2, 3*a* and 4, showing a modified frangible seal on the lower dip tube end, and showing by phantom lines the manner in which the seal is broken;

FIGURE 5*b* is a vertical section taken substantially on the plane of line 5*b*—5*b* of FIGURE 5*a*;

FIGURE 6 is a view similar to FIGURE 5*a* showing a still further modification of the dip tube frangible seal;

FIGURE 7 is a fragmentary vertical section similar to FIGURES 5*a*–6, showing a disposable aerosol capsule including an aerosol-supply cartridge; and

FIGURE 8 is a side elevation of the embodiment of FIGURE 7, with portions broken away and shown in section.

Prior to referring to the drawings in detail, it should be kept in mind that the novel capsule of the invention is not only conducive for use as a "one-shot" aerosol capsule, but the principles of the invention are readily applicable in other types of "throw away" aerosol containers.

Referring to the drawings in detail, a novel aerosol capsule is indicated generally at **10** and comprises a flexible container indicated generally at **12** and an integral, relatively flexible dip tube indicated generally at **14**.

The entire assembly is produced from a suitable plastic material which will not be subject to corrosion, and although the dip tube is flexible, it will have sufficient rigidity to facilitate the breaking of a frangible seal at a weakened portion within the container; this structure and function will be subsequently described in detail.

The container **12** has an enlarged upper body portion **16**, conveniently having a circular cross-section, and continuing in a transverse top wall **18** which is centrally apertured at **20**. The body portion **16** includes a converging lower portion **22** which terminates in a sealed, flexible tip or "teat-like" fluid well or sump **24**.

The body portion **16** may be readily grasped in a user's hand and the tip or fluid well may be displaced from the phantom to the solid line position of FIGURE 3*a*. At the same time, the thumb and index finger of the user will be free to manipulate the exposed terminal end of the dip tube **14** in the manner clearly indicated in FIGURE 4, and for the purpose to be described.

The lower part of the container **16** and the well **24** will be filled with a fluent material F to be dispensed by pressure, i.e., powder or liquid, such as shaving cream, bath powder, deodorant, hair sprays, etc.

The assembly of the capsule may be accomplished at a relatively low temperature, and the container **16** will receive a charge of a suitable aerosol gas G which is conventionally used in commercial shaving cream dispensers and the like, for example. The introduction of the gas under lower temperature conditions will facilitate charging of the capsule, and when subject to normal temperatures will expand to the extent of providing the necessary internal pressure in the capsule.

The dip tube **14** comprises an elongated body portion **26** projecting through the aperture **20** of the wall **18** of the container and is integrated therewith, after the container is charged, by means of a heat weld, sealing material, etc., forming a sealed connection **28**. The wall **18** may include an enlarged boss portion **30** about aperture **20** to faciiltate sealing and provide structural rigidity to wall **18** at the seal **28**.

The lower end of the body portion **26** is closed as indicated at **32**, and formed in the tube within the well or tip **24** is a frangible seal **34** which comprises a weakened portion in the side wall of the tube to insure severing or breaking as shown at **34'** and **34''** in FIGURES 3 and 4, respectively. In the event the lower portion **36** of the tube **26** is entirely separated from the tube **26**, the portion remaining in the fluid sump or well will not impede dispensing of the fluid material F by the gas G.

It will be noted that the fluid F will accumulate in the lower portion of the sump or well **24** of the container and thus although a relatively small or single charge of the material F is provided in the container, the well or sump assures that substantially all of the material F will be dispensed.

The tube **26** includes at the exposed terminal end **40** a reduced diameter orifice **42** through which the fluent

material is immediately discharged as a spray, foam, etc., upon the breaking of the frangible seal **34**.

In order to afford the selective distribution of the spray, the tube **26** includes in spaced relation from the orifice **42** an enlarged portion **44** which provides a physically operated valve or close-off means for the tube, the portion **44** defining a natural fold or physically formed seal **46** which can be maintained by the relatively free thumb and index finger of the user of the device. The tube **26**, it will be noted from FIGURE 4, will be pinched tight at the fold **46** and thus a deodorant or hair spray, for example, can be selectively sprayed where needed.

The subject invention can also be used for the purpose of spraying insecticides, paints, etc., and the flexible container **16**, prior to the breaking of the frangible seal **34**, may be readily kneaded for the purpose of mixing paint, etc. Likewise, the capsule of the invention is practical and desirable for use in simple "touch-up" work on automotive finishes, furniture touch up, etc., and thus although the exemplary embodiment is disclosed as a "one-shot" aerosol capsule conducive to be transported and taken on trips, dispensed in restrooms, etc., the invention is disclosed by way of illustration and not limitation.

Considering FIGURE 3*b* as compared with 3*a*, a fragmentary portion of a dip tube **26'** includes a discharge orifice **42'**. The tube **26'** includes on the inner wall thereof in spaced relation from the discharge orifice an enlarged abutment portion **44'** which facilitates the forming of the "pinch valve" similar to that illustrated in FIGURE 4.

Alternatively, as seen in FIGURE 3*a*, the tube **26** may have formed on the inner wall thereof an enlargement **44''** which is disposed above the seal **34** within the well **24** The abutment **44''** will function as a "pinch off" valve by squeezing the tube together thereat.

Referring to FIGURES 5*a* and 5*b*, the upper portion of this dispenser is essentially the same as that previously described. This embodiment includes a container **112** including a body portion **116** having a lower converging portion **122** merging into an elongated, modified well or sump **124**. The sump **124** has formed on the inner surface thereof an inwardly projecting pointed portion **125** which can be urged toward the opposite wall portion of the sump **124** as shown by phantom lines.

A dip tube **126** is intermediately secured to the container body portion **116** as described with respect to FIGURES 1–4, and includes a lower, flat, "tear-drop" shaped portion **127** disposed in sump **124**. The flat portion **127** includes a relatively thin puncturable or frangible side wall **134** disposed adjacent the terminal end of the pointed projection **125**.

As shown by means of phantom lines in FIGURE 5*a*, by grasping the sump **124**, between one thumb and forefinger, the pointed end of projection **125** will penetrate the thin wall **134**, and the pressure change within container **116**, as in the previously described embodiment, will force the fluent material F upwardly out of the dip tube **126**.

Considering FIGURE 6, a body portion **116'** includes a dip tube **126'** mounted in the upper portion thereof as previously described. The well or sump portion **124'** has the lower end of the dip tube disposed therein.

The lower end of the dip tube **126'** includes a frangible or rupturable wall portion **134'**, and the lower end of the tube includes a flexible, reverse bend portion **129** terminating in a pointed portion **125'**.

The pointed end of portion **125'** is disposed opposite the thin wall portion **134'**, and when the well **124'** is squeezed, as shown by phantom lines, fluid F will be dispensed as previously described.

Considering FIGURES 7 and 8, there is disclosed an embodiment which includes a flexible and rupturable aerosol cartridge. This embodiment eliminates certain controlled manufacturing procedures that would be required in producing the previously described embodiments. Additionally, an aerosol charge that might react unfavorably with the fluid being dispensed, after extended contact therewith, is kept out of contact until actual dispensing.

This embodiment includes a flexible body portion **216** which has a lower well or sump portion **224**. The sump **224** is slightly larger than the sumps of the previously described embodiments and includes an annular recess **231** formed on the inner surface thereof, a dip tube **226** is secured to the upper end of the body portion **216** in a manner similar to that of the previously described embodiments.

The dip tube **226** is open at the lower end thereof as indicated at **232**, whereby fluid will be forced therethrough when pressurized fluid is released from a sealed, flexible and rupturable sack or cartridge **234** charged with such fluid. The tube **226** includes a lateral sharpened projection **225** which will pierce the adjacent portion of the sealed cartridge or sack **234** as indicated by phantom lines in FIGURE 7.

When the sump **224** is squeezed as indicated by the direction arrows on FIGURE 7, pressurized fluid in the sack **234** will rise, react on the fluid contained in the body portion **216** and force it out of the well.

If desired, the outer terminal end of tube **226** may be sealed as indicated at **336** to prevent accidental discharge of the aerosol capsule in the event the container **234** is accidentally ruptured. The tube **226** includes a weakened portion **238** permitting discharge of the capsule contents by breaking off the tip of the sealed tube.

It will be obvious to those skilled in the art that various changes may be made without departing from the spirit of the invention and therefore the invention is not limited to what is shown in the drawings and described in the specification, but only as indicated in the appended claims.

I claim:

1. An aerosol assembly comprising a flexible, deformable container including a transverse upper wall, a dip tube extending through said upper wall and intermediately sealed thereto, a fluid to be expressed sealed in said container, a pressurized expressing agent in said container, and frangible seal means located within said container in a position normally preventing the pressurized expressing agent from expelling the fluid to be dispensed through said dip tube, until flexure of the side walls of the container fractures the seal means and permits the pressurized expressing agent to expel said fluid.

2. The structure of claim **1** in which the terminal end of said dip tube exteriorly of said flexible container is flexible for permitting the tube to be manually folded over to control dispensing of the container contents.

3. The structure of claim **2** in which said flexible dip tube includes an intermediate, integral abutment portion to promote folding and pinching off of said tube.

4. The structure of claim **3** in which said intermediate, integral abutment portion is disposed inside the dip tube.

5. The structure of claim **3** in which said intermediate integral abutment portion is disposed exteriorly of said tube.

6. The structure of claim **1** in which said flexible container includes a lower sump portion in which the fluid to be expressed will accumulate, said frangible seal means being located in said sump portion.

7. The structure of claim **6** in which said dip tube terminates in said sump portion, said seal means being integral with a portion of said dip tube in said sump portion.

8. The structure of claim **7** in which said seal means comprises a lower sealed portion on said dip tube and a weakened section on said tube for permitting the dip tube to be ruptured in said sump portion.

9. The structure of claim **7** in which said seal means comprises a thinned-out section of said tube within said sump portion, said sump portion including a sharpened

projection aligned with and extendible through said thinned out section.

10. The structure of claim 7 in which said seal means comprises an intermediate thinned-out section of said tube within said sump portion, said dip tube including a sealed, terminal, reverse bend pointed portion disposed in alignment with said intermediate thinned-out section and extendible therethrough.

11. The structure of claim 1 in which said seal means comprises a sealed, puncturable sack in said flexible container, said sack containing said expressing agent.

12. The structure of claim 11 in which the lower end of said dip tube is open, said dip tube including a sharpened portion adjacent said puncturable sack for puncturing the sack.

13. The structure of claim 12 in which the sharpened portion of said dip tube comprises a lateral projection on said dip tube, said puncturable sack being disposed adjacent said lateral projection.

14. The structure of claim 1 in which said dip tube includes a flexible terminal end portion disposed adjacent a lower portion of said container, said flexible terminal end portion of said dip tube including an integral, intermediate abutment for promoting pinching-off and closing said tube to control dispensing the contents of said container.

15. The structure of claim 14 in which the lower end of said dip tube includes said frangible seal means, said seal means being located below said abutment, and a lower sump integral with said container and in which said frangible seal means and abutment are located.

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