

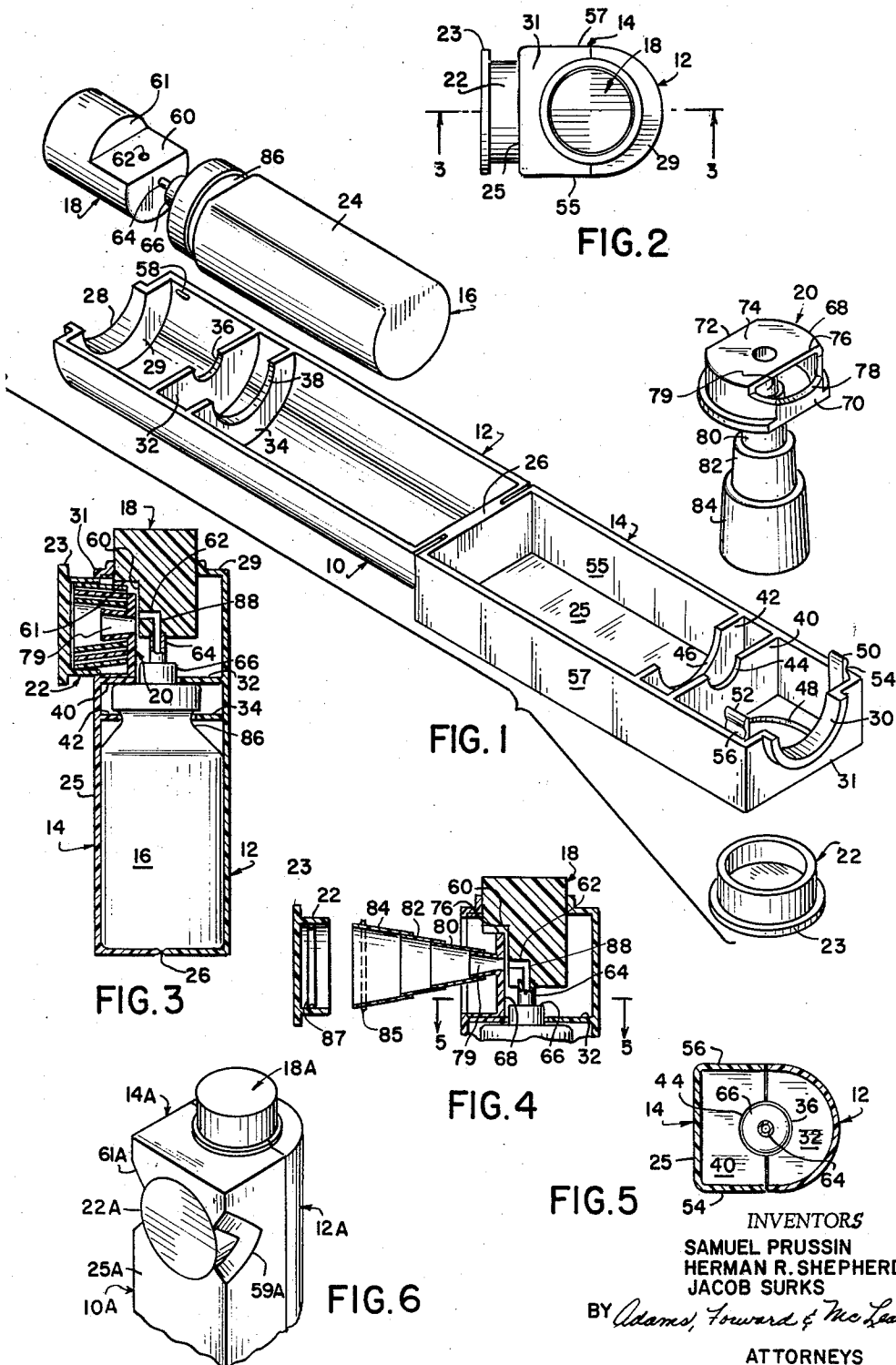
Aug. 27, 1963

S. B. PRUSSIN ETAL

3,101,904

SPRAY APPARATUS

Filed July 13, 1961



INVENTORS
 SAMUEL PRUSSIN
 HERMAN R. SHEPHERD
 JACOB SURKS
 BY *Adams, Forward & McLean*
 ATTORNEYS

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3,101,904

SPRAY APPARATUS

Samuel B. Prussin, Westport, and Herman R. Shepherd, Fairfield, Conn., and Jacob Surks, Elmont, N.Y., assignors to Aerosol Techniques, Inc., a corporation of New York

Filed July 13, 1961, Ser. No. 123,762

11 Claims. (Cl. 239—337)

Our invention relates to a unitary aerosol dispenser. More particularly, our invention relates to a unitary aerosol dispenser including a casing for an aerosol container and having a dispensing nozzle.

One of the new ways in which aerosol containers have been used is to dispense medications in the form of vapor sprays. A very popular example of such employment is found in metered aerosols used for oral or nasal therapy. Such employment requires that the aerosol dispensers not only be stored in the home but also be carried on the person of the user when he is away from home. However, the usual shape of aerosol dispensers with nasal or oral dispensing nozzles attached is such that it is not convenient to carry the dispenser in the pocket or purse. Furthermore, when being carried about, the dispensing nozzle is subjected to contamination by constant handling and contact with foreign objects.

It is an object of our invention to provide a unitary aerosol dispenser of a convenient shape without objectionable protrusions that will also protect the nozzle from contamination.

It is another object of our invention to provide such a unitary dispenser which easily and simply permits positioning of the dispensing nozzle in the operating position.

A further object of our invention is to provide such a unitary dispenser which eliminates the necessity of touching the dispensing nozzle by the user.

Briefly, the unitary aerosol dispenser of our invention comprises a hollow casing having an aerosol container positioned within the casing, a movable actuating button engaging the valve means of the aerosol container and manipulatable from the exterior of the casing through a first opening in the wall of the casing, and a hollow collapsible dispensing nozzle positioned adjacent the actuating button and in communication with the valve means of the container at one end thereof when the valve is actuated and the other end of the dispensing nozzle being extendable through a second opening in the casing wall. Thus, the dispensing nozzle has a collapsed position in which the end of the nozzle remote from the valve means is substantially flush with the end of the hollow casing so that there is no objectionable protrusion. The dispensing nozzle also has an extended position in which the end of the dispensing nozzle remote from the valve means extends substantially beyond the hollow casing.

The hollow collapsible dispensing nozzle can be, for example, a bellows type arrangement, a plurality of concentric cylinders having interlocking ends, or preferably, a plurality of hollow frusto-conical rings or members which are adapted to engage frictionally each other due to the overlapping in dimension of the inner and outer diameters of consecutive members. The interlocking concentric cylinders and the frusto-conical rings can be joined together by a thin membrane or they can be completely separate sectional members constituting the nozzle assembly. The nozzle can also be a tightly coiled helical conical spring in which in the open position is a continuous cone because the adjacent coils are contiguous. To eliminate loss of spray, the coils can be coated or a thin membrane used inside the spring. Preferably, the collapsible nozzle is telescopic.

Preferably, the dispensing nozzle is provided with lock-

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ing means, such as a shaft or rod or even the nozzle itself, which cooperates with the actuating button, having for example a passageway adapted to receive the rod or shaft, when the dispensing nozzle is in the collapsed position so that movement of the actuating button is prevented.

Also, advantageously, the dispensing nozzle can be provided with a removable cover means and particularly such means is adapted to engage in sealing contact with the hollow casing when the nozzle is in the collapsed position thereby protecting the dispensing nozzle and casing interior from contact with dirt. The sealing contact between the cover means and the hollow casing can be effected by any of the means well-known in the art, for example, providing an annular bead on one member to be received in an annular groove in the other member or by providing for the frictional engagement to the exterior of the cover means with the opening in the hollow casing through which the nozzle passes. Also, preferably the cover means engages the nozzle with sufficient tightness, e.g. by a friction fit or a bead, that when it is grasped the nozzle is pulled out of the casing along with the cover member.

Advantageously, the hollow casing is constructed so that it can be opened and closed for removal of the aerosol container and insertion of a new aerosol container. Preferably, the casing is divided into two casing members along the longitudinal dimension of the hollow casing thereby providing easy access to the interior of the hollow casing for removal and replacement of the aerosol container. Thus, in such an embodiment a portion of the first opening through one end of the hollow casing for the actuating button can be included in each of the two casing members such that the mating portions of the two casing members define the opening through the end of the casing. It is preferred, however, that the opening through the longitudinal wall of the hollow casing for the dispensing nozzle be entirely included in only one of the two casing members. Further, the two casing members can be provided with means to hold them removably together, e.g. by snap fasteners or a tongue and groove arrangement, with or without hinges. Preferably, they are hingedly joined to each other either along their longitudinal dimensions or at the end opposite the first mentioned opening. The particular hinging means employed can be any of the types well-known in the art. It is preferred that the hinging mechanism take the form of a flexible strip joining the two casing members. Thus, when the two casing members are fabricated from a plastic material it is possible to effect a saving in production costs by simultaneously molding both casing members interconnected by the flexible strip. Advantageously, web-like members can be transversely disposed within the hollow casing to engage the aerosol container, such as about the neck or about other restricted areas of the container, whereby the container is held in place. The confronting portions of the two casing members can be provided with mutually engaging fastening devices whereby the two casing members can be maintained in contact with each other. Other means of providing for opening and closing the casing besides dividing the casing longitudinally can be used such as a hinged or sliding bottom permitting insertion and removal of the aerosol container, or dividing the casing transversely into two members and providing them with removable fastening means.

The actuating button employed with the unitary dispenser of this invention can include a passageway in communication with the hollow valve stem of the aerosol container and with the nozzle. For example, the button can include the conventional L-shaped passageway having one portion thereof extending longitudinally of the

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button and the other portion extending transversely thereof; whereby the longitudinal portion of the passageway can receive the stem of the valve means and the transverse portion of the passageway provides for the escape of the material from the aerosol container into the nozzle. In such an arrangement the actuating button is longitudinally movable to actuate the valve means and the transverse portion of the conduit in the button registers with the interior of the dispensing nozzle when the button is moved to actuate the valve member. Also, in such embodiment it will be understood that the button preferably extends through the opening at the end of the casing while the dispensing nozzle extends through the opening in the longitudinal wall of the casing.

While it is desired that the end of the nozzle remote from the valve means be flush with the hollow casing when the nozzle is in the collapsed position in order to eliminate any excessive protrusion on the side of the casing, the end of the nozzle can either be completely within the casing or extend slightly beyond the casing when in the collapsed position. Thus, the term "substantially flush" as used in the specification and claims is meant to include not only being exactly flush with the casing but also extending slightly beyond the casing and recessed slightly within the casing. When the dispensing nozzle is provided with a removable cover, such cover itself will either be flush with the longitudinal wall of the casing or extend slightly beyond the casing wall depending upon the particular configuration of the nozzle in the collapsed position. Thus, when the cover member extends beyond the wall of the casing it can be provided with a lip or rim to facilitate gripping the cover. When the cover member is flush with the casing, one or a plurality of slight depressions can be provided in the casing wall to facilitate gripping the cover member.

In order to describe more completely the unitary dispenser of our invention reference is made to the attached drawings in which:

FIGURE 1 is an exploded isometric view of one embodiment of our invention.

FIGURE 2 is a top view of the assembled dispenser illustrated in FIGURE 1.

FIGURE 3 is a sectional view taken along the line 3—3 of FIGURE 2.

FIGURE 4 is a fragmentary view of a portion of the dispenser shown in FIGURE 3 illustrating the nozzle in the extended position.

FIGURE 5 is a sectional view taken along the line 5—5 of FIGURE 4.

FIGURE 6 is a fragmentary isometric view illustrating an alternate embodiment of our invention.

In FIGURE 1 is shown the hollow casing 10 comprising a rear member 12 and a front member 14 in an open position. Also shown are aerosol container 16, actuating button 18, dispensing nozzle 20, and cover member 22. As can be seen in FIGURES 1 and 2, rear member 12 is semi-cylindrical in shape while front member 14 is generally rectangular in cross-section. It can also be seen in FIGURE 1 that aerosol container 16 is provided with a flat front face 24 while the remainder of the container is cylindrical in shape. Thus, the cylindrical portion of aerosol container 16 will match the cylindrical shape of rear member 12 while the flat front face 24 of the container will match the flat front wall 25 of generally rectangular front member 14. While this particular shape is preferred, other shapes can be used. For example, the casing can be rectangular or completely cylindrical and the aerosol container can also be rectangular or completely cylindrical. Interconnecting rear member 12 and front member 14 is a flexible strip 26 which functions as a hinge. At the end of rear member 12 remote from flexible strip 26 is a semi-circular opening 28 in top wall 29 and at the end of front member 14 remote from flexible strip 26 is another semi-circular opening 30 in top wall 31. Located within the interior of rear member 12 are

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two web-like members 32 and 34 disposed transversely to the longitudinal dimension of rear member 12. Each of these webs 32 and 34 are provided with a semi-circular recess 36 and 38, respectively. As shown in the drawing the semi-circular recess 36 of web 32 is substantially smaller than semi-circular recess 38 of web 34 and web 34 is disposed more remote from semi-circular opening 28 than is web 32. Front member 14 is also provided with web-like members 40 and 42 having semi-circular recesses 44 and 46, respectively. As shown in the drawing the semi-circular recess 44 of web 40 is substantially smaller than semi-circular recess 46 of web 42 and web 42 is disposed more remote from semi-circular opening 30 than is web 40. Also shown in FIGURE 1 is a circular opening 48 in the front wall 25 of front member 14 located between web 40 and top wall 31.

Also shown in FIGURE 1 are a pair of fastening posts 50 and 52. These fastening posts 50 and 52 extend from side walls 55 and 57, respectively, of front member 14 and are positioned adjacent top wall 31. Each of fastening posts 50 and 52 are provided with a recess 54 and 56, respectively, located on the outward side of posts 50 and 52 and positioned proximate the outer ends thereof. Rear member 12 is provided with a pair of beads located on its interior adjacent top wall 29 and positioned to engage the recesses 54 and 56 on posts 50 and 52. One bead 58 is shown in the drawing.

The actuating button 18 is generally cylindrical in shape and is cut away to provide a flat surface 60 disposed parallel to the axis of button 18 and a flat shoulder 61 disposed transversely to the axis of button 18. Cylindrical passageway 62 is shown extending into the flat surface 60 of the button 18. The bottom of button 18 is also shown engaging the hollow stem 64 on the valve 66 of the aerosol container 16.

Positioned above the circular opening 48 in FIGURE 1 is the dispensing nozzle 20. As shown in the drawing, the uppermost component is a generally annular nozzle base 68 having parallel flattened faces 70 and 72 disposed parallel to the axis of base 68. The upper side of nozzle base 68, as illustrated in the drawing, is a flat surface 74. The uppermost surface 74 of nozzle base 68 is cut away to provide a shoulder 76 which is disposed parallel to flat surfaces 70 and 72. Flat surface 70 is also shown as having an arcuate recess 78. Also shown are frictionally engaged frusto-conical members 79, 80, 82 and 84. Member 79 is an integral part of nozzle base 68 and extends coaxially therefrom.

Shown immediately beneath circular opening 48 is cover member 22 having a generally annular shape and being of the type generally described as a "lens cover." Cover member 22 is provided with an annular bead 23 about its outer surface in order to facilitate gripping the cover member.

Referring now to FIGURES 2 and 3, the relative positions of the components of the unitary dispenser of this invention when assembled can be seen. Thus, when the hollow casing 10 is closed webs 32 and 34 confront webs 40 and 42, respectively, so that semi-circular recesses 36 and 38 and 44 and 46, respectively, define two circular coaxial openings. In a similar manner top wall 29 and top wall 31 confront each other so that semi-circular openings 28 and 30 define a circular opening through the top walls 29 and 31. The opening defined by circular openings 28 and 30 is of such size and so disposed as to accommodate the generally cylindrical body of actuating button 18. It can also be seen that webs 32 and 40 and the opening therethrough cooperate so as to engage the valve member 66 of aerosol container 16 while webs 34 and 42 and the opening therethrough cooperate to engage the neck 86 of aerosol container 16. The semi-circular recesses 38 and 46 of lower webs 34 and 42, respectively, can be sized so that the circular opening defined by semi-circular recesses 38 and 46 is of such dimension to accommodate the neck 86 of aerosol container 16 when such

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container is, for example, either a plain glass bottle or a plastic coated glass bottle, e.g. having a plastic coating about $\frac{1}{2}$ inch thick and thus slightly larger than the plain glass bottle. Furthermore, the length of the hollow casing 10 can be sized to accommodate aerosol containers of varying length. Thus, for example, the lower webs 34 and 42 can cooperate to prevent movement of an original aerosol container 16 in the form of a plain glass bottle when the actuating button 18 is moved. When a replacement aerosol container 16 in the form of a plastic coated bottle is employed, the lower webs 34 and 42 can also cooperate to prevent movement of the aerosol container 16 as the actuating button 18 is moved or movement of the aerosol container 16 can be prevented by the bottom of hollow casing 10 depending upon the relative distance between the neck 86 and the bottom of the aerosol dispenser 16 and the distance between the lower webs 34 and 42 and the bottom of hollow casing 10.

Also shown in FIGURE 3 is the dispensing nozzle 20 in the collapsed position. The dispensing nozzle 20 is inserted between top wall 31 and web 40 so that the parallel flat faces 70 and 72 bear against top wall 31 and web 40, respectively, thereby positioning the dispensing nozzle 20 within the hollow casing 10 and maintaining it in the proper position. The cover member 22 is also shown positioned about the collapsed frusto-conical surfaces 80, 82 and 84 and engaged about its exterior surface by cylindrical opening 48; whereby cover member 22 is maintained in sealing contact with hollow casing 10.

Referring to FIGURE 2, the positioning of actuating button relative to top walls 29 and 31 and the relative extension of cover member 22 beyond the front wall 25 of front member 14 can be seen.

As can be more clearly seen in FIGURE 3 the cylindrical passageway 62 shown on the flat surface 60 of actuating button 18 in FIGURE 1 connects with another cylindrical passageway 88. As shown in FIGURE 3 the lower end of cylindrical passageway 88 is adapted to receive the stem 64 of valve 66.

To assemble the components of the dispenser shown in the drawing, the actuating button 18 can be removably engaged with the stem 64 at the time of assembly or the actuating button 18 can be permanently engaged with the stem 64 at some previous time. The assembled actuating button 18 and the aerosol container 16 can then be placed in one of the two casing members, for example, rear casing member 12 so that the cylindrical body of actuating button 18 is received by semi-circular opening 28, valve member 66 is received by the semi-circular recess 36 and the neck 86 of aerosol container 16 is received by the semi-circular recess 38. The dispensing nozzle 20 can also be removably positioned between top wall 31 and web 40 as explained above or it can be permanently affixed by cementing in place. The front and rear casing members 14 and 12, respectively, can then be hingedly rotated about flexible strip 26 so that webs 32 and 34 confront webs 40 and 42, respectively, top wall 29 confronts top wall 31 and the flat surface 60 of actuating button 18 confronts the flat surface 74 of nozzle 20. The components of the dispenser are now disposed in the relative positions illustrated in FIGURE 3. In this closed position the recesses 54 and 56 of fastening posts 50 and 52, respectively, engage the beads located on the interior of rear member 12 adjacent top wall 29. (Only bead 58 is shown in the drawing in FIGURE 1.) Thus, it can be seen that when the charge in the aerosol container 16 is exhausted, the container can be removed and replaced by a fresh container.

Referring now to FIGURE 4 the dispensing nozzle 20 can be seen in its extended position in which the minor interior diameter of frusto-conical member 84 is frictionally engaged by the major outer diameter of frusto-conical member 82 and the minor inner diameter of frusto-conical member 82 is frictionally engaged by the outer diameter of frusto-conical member 80. Cover member 22 is shown

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removed from about the frusto-conical members of dispensing nozzle 20. The inner diameter of the cover member 22 can be so sized that it will frictionally engage the major outer diameter of frusto-conical member 84 such that as cover member 22 is pulled outwardly it will carry with it frusto-conical member 84 in such a manner that it will cause the consecutive frusto-conical members to engage each other until all such members are in the extended position at which time cover member 22 is finally removed from about frusto-conical member 84. Alternatively, frusto-conical member 84 can be provided with an annular bead 85 on its outer surface, as shown in FIGURE 4, and cover member 22 can be provided with another annular bead 87 along its inner surface adapted to engage bead 85. Such arrangement provides another means for the cover member 22 to engage frusto-conical member 84 and thereby move all the frusto-conical members into the extended position. Actuating button 18 is also shown as having been moved into position to actuate valve 66. It will be noticed that in this position passageway 62 registers with the interior of nozzle 20, specifically frusto-conical member 79.

A comparison of FIGURES 3 and 4 will show that when the dispensing nozzle 20 is in the collapsed position, as shown in FIGURE 3, the frusto-conical members, particularly frusto-conical member 84, are positioned in relation to the flat shoulder 61 of actuating button 18 such that vertical movement of the actuating button 18 is prevented. However, when the dispensing nozzle 20 is in its extended position, as shown in FIGURE 4, sufficient vertical clearance for flat shoulder 61 is provided so that actuating button 18 can now be vertically moved thereby permitting the actuation of valve 66. As will now be understood, the purpose of arcuate recess 78 in flat face 70 of the nozzle base 68 is to provide clearance for the cylindrical portion of actuating button 18 above flat shoulder 61. Thus, the frusto-conical member 84 of the dispensing nozzle itself cooperates with actuating button 18 as a locking means which prevents the accidental actuation of the valve 66 when the dispensing nozzle 20 is in the collapsed position.

FIGURE 6 illustrates an alternate embodiment of our invention showing hollow casing 10A, including rear member 12A and front member 14A, actuating button 18A and cover member 22A. As opposed to the embodiment illustrated in FIGURES 1-5, in the embodiment of FIGURE 6 the cover member 22A is disposed flush with the front wall 25A of front member 14A when in the closed or collapsed position. As can also be seen, quasi-conical recesses 59A and 61A are provided in the outer surfaces of side walls 55A and 57A, respectively, of such depth that the side wall of cover member 22A is exposed within the recesses 59A and 61A. Thus, the cover member 22A can easily be pulled out pulling the nozzle with it by placing the fingers in recesses 59A and 61A to grasp cover member 22A.

The aerosol container mentioned in the description of our invention can be any of the types well known in the art. Generally, the container consists of a sealed, rigid vessel which can be fabricated of metal, glass, plastic or any other material of sufficient strength. Within the vessel are an active ingredient and a propellant. The vessel is provided with a valve having a hollow stem which stem is usually actuatable to open the valve. Upon opening the valve, the active ingredient is forced out of the container through the hollow valve stem by the vapor pressure of the propellant. The valve mechanism can also be any of the types well known in the art, for example, one which provides continuous discharge of the active ingredient while the valve is held open, or a "metered" type which permits discharge of a measured quantity of active ingredient each time the valve is actuated.

We claim:

1. A unitary aerosol dispenser comprising a hollow

casing, an aerosol container enclosed within the hollow casing and having a valve means located at one end thereof, means for actuating the valve means actuatable through an opening in the hollow casing, a hollow, collapsible dispensing nozzle communicating at one end thereof with the valve means when the valve means is actuated and extendable at the other end thereof through an opening in the hollow casing, the dispensing nozzle having a first collapsed position in which the end of the dispensing nozzle remote from the valve means is substantially flush with the hollow casing and in which first collapsed position the dispensing nozzle engages the valve actuating means preventing actuation of the valve, and a second extended position in which the end of the dispensing nozzle remote from said valve means extends substantially beyond the hollow casing.

2. The dispenser of claim 1 in which the dispensing nozzle is provided with removable cover means adapted to engage in sealing contact with the hollow casing when the nozzle is in the collapsed position.

3. The dispenser of claim 2 in which the cover means is flush with the hollow casing when engaged with the casing.

4. The dispenser of claim 1 in which the hollow casing includes means for opening and closing the casing for removal and replacement of the aerosol container.

5. A unitary aerosol dispenser comprising an elongated hollow casing divided along the longitudinal dimension thereof into a first casing member and a second casing member, the hollow casing having means defining a first opening through one end thereof and means defining a second opening through a longitudinal wall thereof, the first and second casing members hingedly joined, an aerosol container having valve means including a hollow valve stem, the container disposed longitudinally within the hollow casing, a movable actuating button engaging the valve stem and extending through the first opening in the casing and containing a passageway in communication with the hollow valve stem, and a hollow, telescopic, dispensing nozzle positioned proximate the actuating button and the valve means, one end of the dispensing nozzle affixed within the casing and the other end of the nozzle extendable through the second opening through the longitudinal wall of the casing, the dispensing nozzle being separate from the valve means and the actuating button, the dispensing nozzle having a first collapsed position in which the end of the dispensing nozzle remote from the actuating button and the valve means is substantially flush with the hollow casing and a second extended position in which the end of the dispensing nozzle remote from the actuating button and valve means extends substantially beyond the hollow casing, the passageway of the actuating button communicating with the interior of the dispensing nozzle when the actuating button is moved to actuate the valve means.

6. The unitary dispenser of claim 5 in which the aerosol container is engaged by transversely extending web-like members internally disposed within the first and second casing members.

7. The unitary dispenser of claim 5 wherein the dispensing nozzle is provided with removable cover means adapted to engage frictionally and in sealing contact with

the hollow casing when the dispensing nozzle is in the collapsed position and adapted to engage frictionally the exterior of the dispensing nozzle.

8. The dispenser of claim 7 in which the cover means is flush with the casing when engaged with the casing.

9. The unitary dispenser of claim 5 in which the dispensing nozzle in the first collapsed position engages the actuating button preventing movement of the actuating button.

10. The dispenser of claim 5 in which the hollow telescopic nozzle comprises a plurality of hollow frusto-conical rings.

11. A unitary aerosol dispenser comprising an elongated hollow casing divided along the longitudinal dimension thereof into a first casing member and a second casing member, the hollow casing having means defining a first opening through one end thereof and means defining a second opening through a longitudinal wall thereof, the first and second casing members hingedly joined at the end remote from the end containing the first opening, the first and second casing members being provided with mutually engaging fastening means whereby they are maintained in contact with each other, an aerosol container having valve means including a hollow stem, the container disposed longitudinally within the hollow casing and engaged by transversely extending web-like members internally disposed within the first and second casing members, a movable actuating button engaging the valve stem and extending through the first opening in the casing and containing a passageway in communication with the hollow valve stem, a hollow, telescopic dispensing nozzle comprising a plurality of hollow frusto-conical rings and positioned proximate the actuating button and the valve means, one end of the dispensing nozzle affixed within the hollow casing and the other end of the nozzle extendable through the second opening through the longitudinal wall of the casing, the dispensing nozzle having a first collapsed position in which the end of the dispensing nozzle remote from the actuating button and the valve means is substantially flush with the hollow casing and a second extended position in which the end of the dispensing nozzle remote from the actuating button and valve means extends substantially beyond the hollow casing, the passageway of the actuating button communicating with the interior of the dispensing nozzle when the actuating button is moved to actuate the valve means, a removable cover means for the dispensing nozzle adapted to engage in sealing and locking contact with the hollow casing when the dispensing nozzle is in the collapsed position and adapted to engage frictionally the exterior of the dispensing nozzle, the dispensing nozzle cooperating with the actuating button when the dispensing nozzle is in the collapsed position to prevent movement of the actuating button.

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