Aug. 27, 1963 S. B. PRUSSIN ETAL 3,101,904

SPRAY APPARATUS

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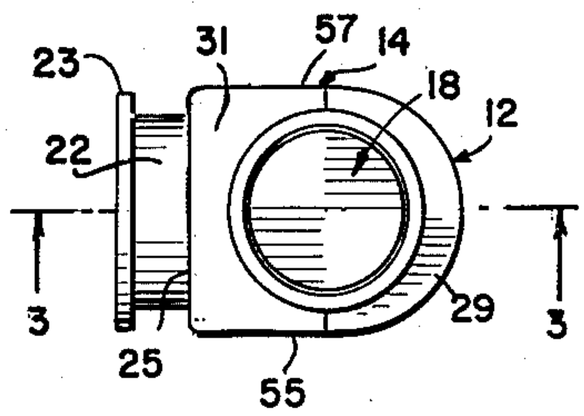

FIG. 2

FIG. 1

FIG. 3

FIG. 4

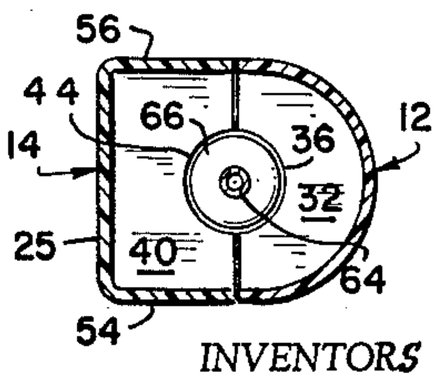

FIG. 5

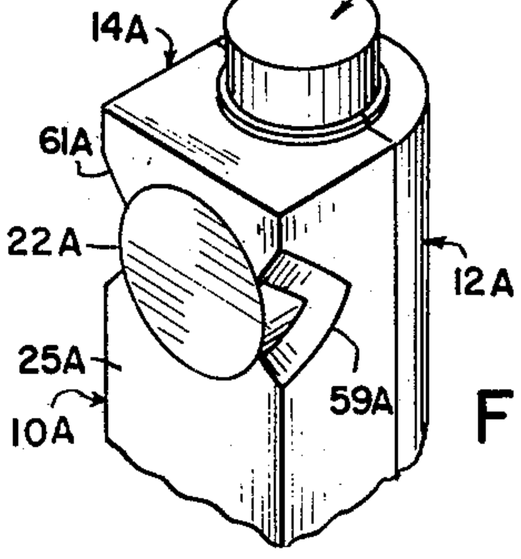

FIG. 6

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SPRAY APPARATUS

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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 locking 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 partciular 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

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

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 semicircular 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

container is, for example, either a plain glass bottle or a plastic coated glass bottle, e.g. having a plastic coating about 1/32 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

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 propellent. 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 propellent. 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 frustoconical 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 frustoconical 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.

References Cited in the file of this patent

UNITED STATES PATENTS

1,631,951	McAnsh	June 7, 1927
2,645,387	Kahn	July 14, 1953
2,914,222	Meshberg	Nov. 24, 1959
2,965,100	Bridges	Dec. 20, 1960
2,966,283	Darvie	Dec. 27, 1960