United States Patent [19]

Chafitz et al.

[11] **3,739,952**

[45] **June 19, 1973**

[54] **INTERMITTENT DISPENSING DEVICE**

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[22] Filed: **July 9, 1971**

[21] Appl. No.: **161,134**

[52] **U.S. Cl.** **222/213**, 222/494, 239/534, 239/576

[51] **Int. Cl.** **B65d 83/14**

[58] **Field of Search** 222/494, 491, 212, 222/544, 563, 70, 213; 239/576, 99, 534, 535, 582; 137/624.14, 525.3; 285/244

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[57] **ABSTRACT**

A dispenser for intermittently releasing predetermined measured doses of a substance delivered to the dispenser comprising a dose-accumulating member including an elastically expansible element continuously expandable between first and second sizes, which member has an inlet and an outlet. A nozzle engaged with the outlet defines a release channel which is blocked when the expansible element is at the first size and is opened when the element is expanded to the second size.

8 Claims, 5 Drawing Figures

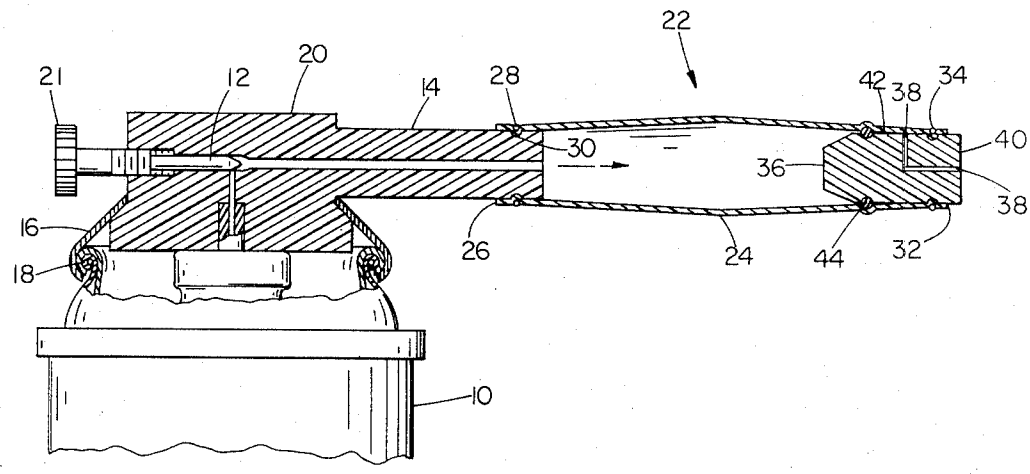


FIG 1

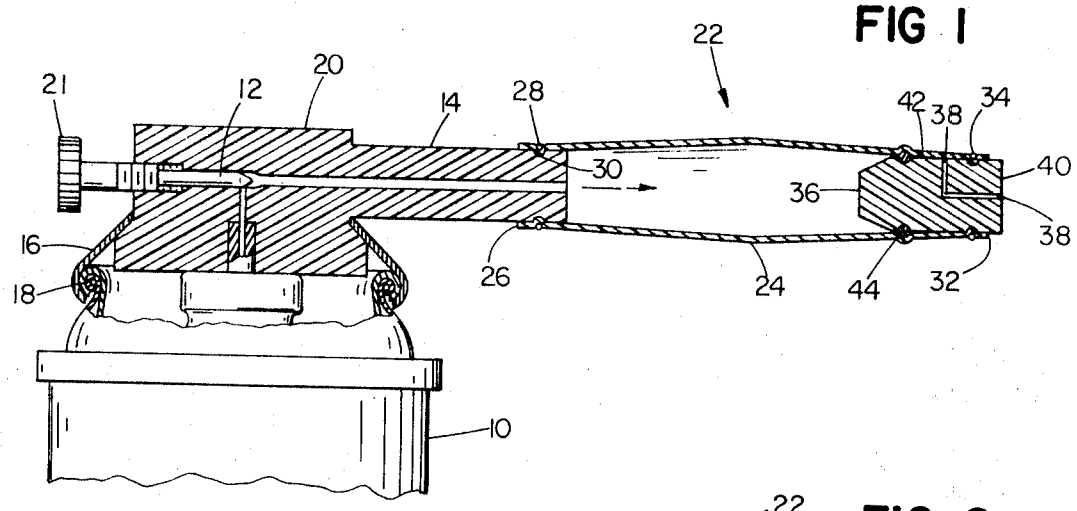
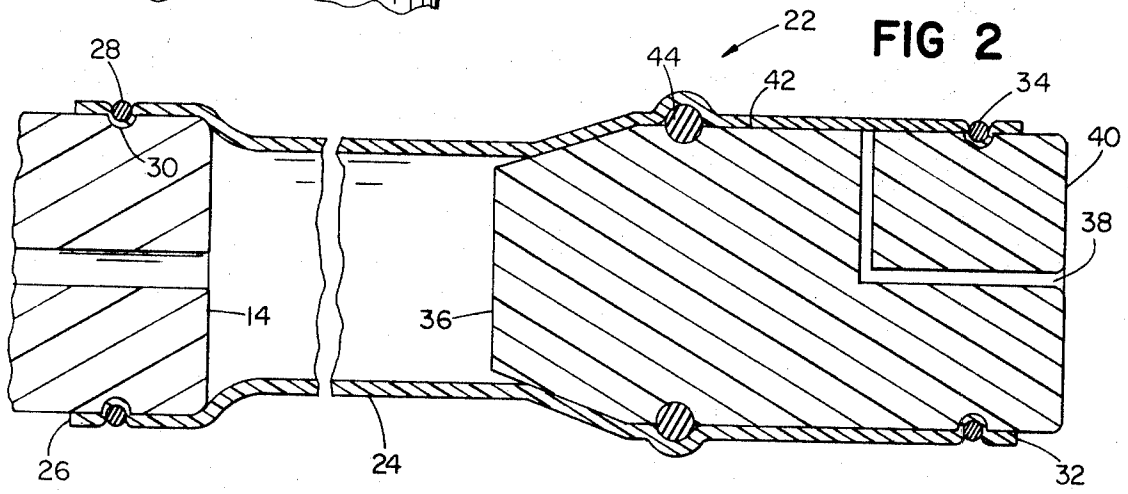


FIG 2



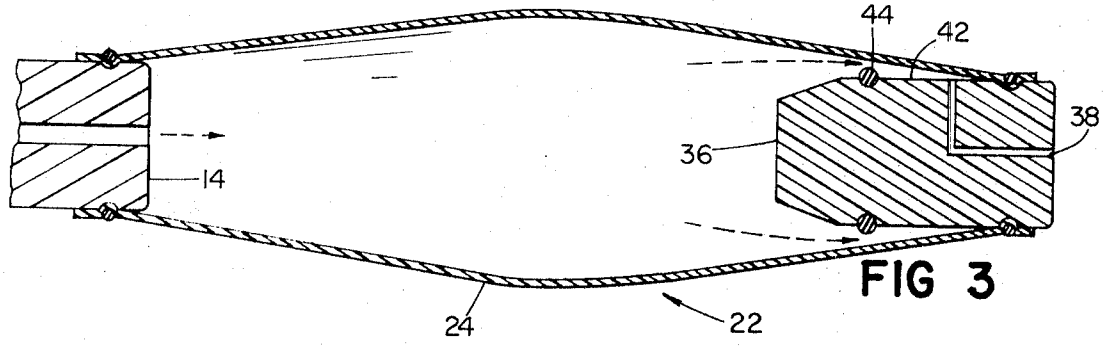


FIG 3

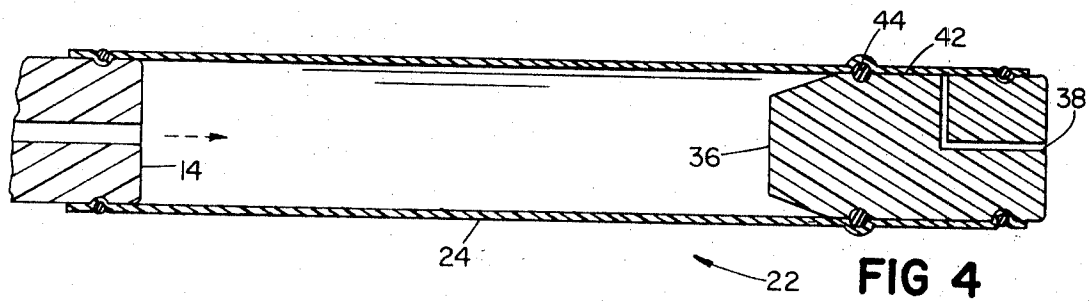


FIG 4

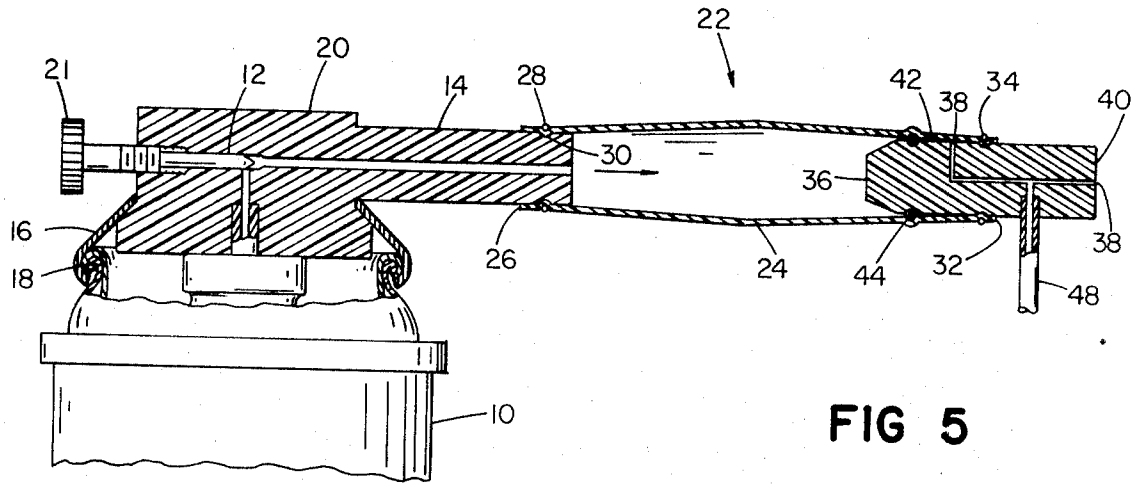


FIG 5

INTERMITTENT DISPENSING DEVICE

This invention relates to dispensers and pertains more specifically to a dispenser of efficient and economical construction which will automatically dispense predetermined measured doses of substance under pressure (e.g., the contents of a conventional aerosol container).

The invention is particularly useful in providing intermittent discharges of materials such as room deodorants packaged in aerosol containers together with conventional liquefied gaseous propellants.

According to the invention there is provided a dispenser for intermittently releasing predetermined doses of a substance which is delivered to the dispenser under an uninterrupted pressure. The dispenser comprises a dose-accumulating and measuring member including an elastically expansible and contractible element which is continuously expandable between first and second sizes. The expansible element has an inlet and an outlet. A nozzle is also provided which is engaged with the outlet. The nozzle defines a release channel for the substance. This channel is blocked by the expansible element when it is at the first size and is open when the element is expanded to the second size. In preferred embodiments of this aspect of the invention, the dose-accumulating member comprises an elastically expansible tube of rubber with one end (i.e., the "inlet") adapted to be mounted in a leak-proof connection with a conduit from the reservoir of the substances to be dispensed. The other end (i.e., the "outlet") is in leak-proof engagement with the nozzle. A portion of the tube engages a resilient sealing member which is recessed in a generally cylindrical surface of the nozzle. A channel is provided in the nozzle which has its opposite ends, respectively, in the face of the nozzle exterior of the tube and in the cylindrical surface of the nozzle between the resilient sealing member and the location on the nozzle where the outlet end of the tube is in leak-proof engagement therewith.

In a further aspect of the invention, such apparatus is provided in combination with a conventional aerosol container including means to limit the rate at which the substance is delivered to the dispenser. Preferably, those means comprise a needle valve and an adjustable actuator therefor.

Other objects, features, and advantages of the invention will appear from the following description of a preferred embodiment.

In the drawings:

FIG. **1** is a side elevation, partially in section, showing an aerosol container and dispenser according to the invention;

FIG. **2** is an enlarged sectional view of a portion of a dispenser similar to that of FIG. **1**;

FIGS. **3** and **4** illustrate the two stages in the repetitive dose dispensing cycle of the dispenser of FIG. **2**; and

FIG. **5** is a side elevation, partially in section, showing an alternative embodiment of a dispenser according to the invention.

As shown in FIG. **1** a conventional aerosol container **10** is provided, which includes a needle valve **12** for release of aerosol contents. Upon actuation of the needle valve **12** the substance is delivered, under pressure, through exit conduit **14.** A frame member **16** is engaged with flange **18** on the aerosol container **10** and

clamps a member **20** which defines the needle valve's seat and in which is threaded needle valve actuating screw **21.** The substance delivered from exit conduit **14,** which may be either liquid or gaseous, and which may in some cases by the liquefied gaseous propellant which is conventionally employed in aerosol containers, enters the dispenser indicated generally as **22.** The dispenser **22** (see also FIG. **2**) includes a tube of elastically expansible material **24** (e.g., rubber) having an inlet end **26** which is in leak-proof engagement with conduit **14** for receiving the substance under pressure. The seal with conduit **14** may take the form of a retaining ring **28** which cooperates with a groove **30** formed on the outer surface of conduit **14** to clamp the tube **24** in sealed relation to the conduit.

The outlet end **32** of tube **24** is similarly clamped by means of ring **34** to nozzle **36.** The nozzle **36** includes a release channel **38** extending between face **40** which is exterior of the dispenser **22** and a generally cylindrical surface **42** of the nozzle **36** which is interior or "upstream," of the retaining ring **34.** Still further upstream on the nozzle **26** there is provided a resilient sealing seat **44** (e.g., an O-ring) retained in a suitable groove on nozzle surface **42.** (A plurality of O-rings in spaced apart relation may be provided. For a given elasticity of tube **24** further O-rings will increase the tube expansion necessary for release of a dose.)

In the embodiment of FIG. **5,** an aspirator dip tube **48** communicates with the channel **38.** In this embodiment, therefore, the aerosol **10** need only contain a propellant, the dip tube being immersed in the substance (not shown) to be propelled from the unit.

In operation screw **21** is adjusted to open valve **12** for the delivery, at the desired rate, of the pressurized substance within the container **10** through conduit **14** to the dispenser **22.** The configuration of the dispenser **22** initially resembles that shown in FIG. **4,** with the expandable tube **24** in a relaxed state (i.e., the "first size"). As more and more of the substance is delivered to the dispenser, the tube **24** will expand as indicated in FIG. **3** (i.e., the "second size"). When the expansion of tube **24** becomes great enough, the seal between tube **24** and O-ring **44** will be broken and the substance accumulated within the expanded tube will be able to exit from the dispenser through the channel **38.** As the substance rushes out through the channel **38,** the tube **24** collapses and returns to a configuration similar to that shown in FIG. **4.** As this occurs, the seal between the tube **24** and O-ring **44** once again becomes effective and the cycle will repeat.

As will be apparent to those skilled in the art, the frequency of release of accumulated doses, as well as the size of each dose, may be readily adjusted by varying one or more of: (1) the amount that the valve **12** is opened, hence the rate at which material is delivered through exit conduit **14,** (2) the length and diameter of tube **24,** (3) the material used to make the tube **24,** (4) the diameter of the resilient seat **44,** and (5) the cross-sectional area of the channel **38.**

While a preferred embodiment of the invention has been described in detail, other embodiments are within the scope of the invention and the following claims.

What is claimed is:

1. A dispenser for intermittently releasing predetermined doses of a substance delivered to the dispenser under uninterrupted pressure, comprising a dose-accumulating member including an elastically expansi-

ble element forming a chamber continuously expandable and contractible between first and second sizes, which member has an inlet and an outlet, and a nozzle engaged with said outlet defining a release channel for said substance, said expansible element blocking said release channel when the element is at said first size and opening said release channel when said element is expanded to said second size to permit contraction of said element to force said dose through said release channel.

2. The dispenser as claimed in claim **1** wherein said dose-accumulating member comprises a tube having an outlet and at least a portion of said nozzle being generally cylindrical and engaged with said outlet end.

3. The dispenser as claimed in claim **2** including a retaining member for clamping said outlet end of said tube in sealed relation to said cylindrical surface of said nozzle.

4. The dispenser as claimed in claim **1** wherein said nozzle includes a resilient member which cooperates with said expansible element in its first size to block said release channel.

5. The dispenser as claimed in claim **4** wherein said dose-accumulating member comprises a tube having an outlet end, at least a portion of said nozzle is cylindrical and engaged with said outlet end, and said resilient member comprises a ring mounted in a groove in said cylindrical surface.

6. A self-contained, dose-dispensing unit comprising a container containing a substance under pressure, adjustable valve means for controlling continuous discharge of said substance from said container at a selected rate and a dispenser connected to said discharge means for intermittently releasing predetermined doses of the substance delivered from said container to the dispenser, comprising a dose-accumulating member including an elastically expansible element forming a chamber which is continuously expandable between first and second sizes to accumulate said does therein and has an inlet connected to said discharge means and an outlet, and a nozzle engaged with said outlet and providing a release channel for said substance which channel is blocked when said expansible element is at said first size and open when said expansible element is expanded to said second size to permit contraction of said element to force said dose through said release channel.

7. The unit as claimed in claim **6** wherein said adjustable valve comprise a needle valve.

8. A self-contained, dose-dispensing unit comprising a container containing a propellant under pressure; adjustable valve means for controlling continuous discharge of said substance from said container at a selected rate; a dispenser connected to said discharge means for intermittently releasing predetermined doses of the propellant delivered from said container to the dispenser, comprising a dose-accumulating member including an elastically expansible element forming a chamber which is continuously expandable between first and second sizes to accumulate a dose therein and has an inlet connected to said discharge means and an outlet, and a nozzle engaged with said outlet and providing a release channel for said substance which channel is blocked when said expansible element is at said first size and open when said expansible element is expanded to said second size to permit contraction of said element to force said dose through said release channel; and an asperator dip tube which communicates with said release channel.

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