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A. WAKEMAN
DISPENSING DEVICE
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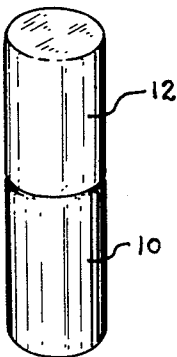


Fig. 1

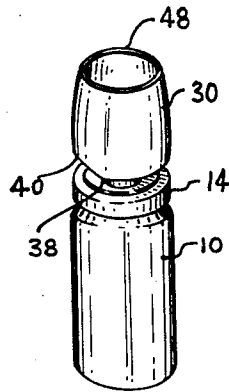


Fig. 2

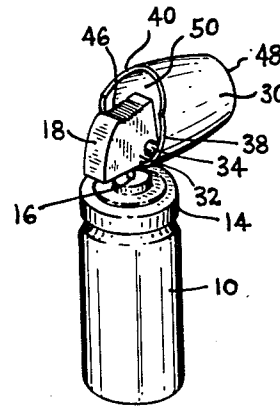


Fig. 3

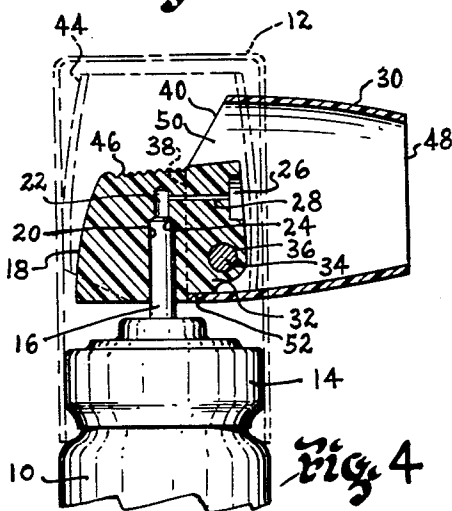


Fig. 4

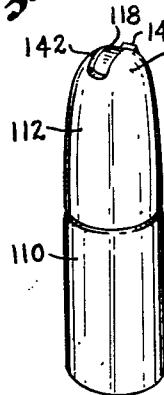


Fig. 5

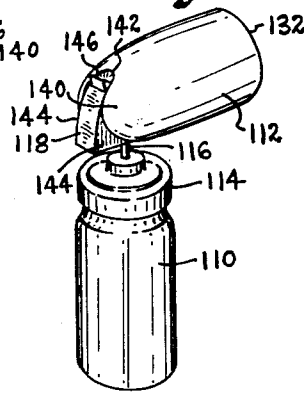


Fig. 6

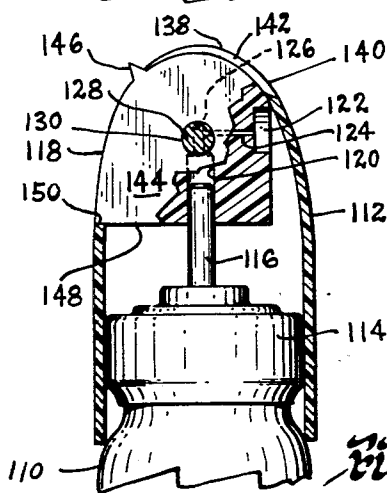


Fig. 7

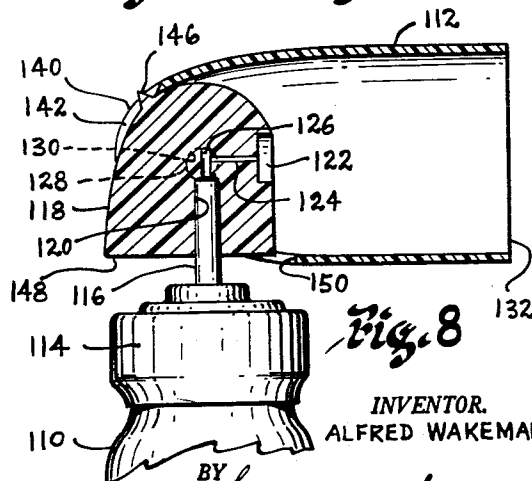


Fig. 8

INVENTOR.
ALFRED WAKEMAN

BY
Steward & Steward

his ATTORNEYS

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DISPENSING DEVICE

Alfred Wakeman, Durham, Conn., assignor to The Risdon Manufacturing Company, Naugatuck, Conn., a corporation of Connecticut

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The invention relates to a dispensing device for aerosol products, that is, for products that are confined within a container under pressure and dispensed therefrom in the form of a spray. More particularly, the invention relates to a dispensing device especially suited for use as an aid in the oral inhalation of medicinal aerosol products.

The administration of medicinal agents by inhalation has many advantages compared with alternate methods of administration. Administration is quick and easy and may be effected by the patient himself. Response to this type of administration is prompt.

Ever since the introduction of liquefied gas aerosol products it has been recognized that this type of package is particularly well suited for use in this type of drug therapy. However, the adaptation of the usual type of non-medicinal aerosol spray package to dispense a medicinal aerosol spray intended for internal human consumption presents special problems not ordinarily encountered.

Since the medicinal spray is taken internally it is necessary to provide some means for controlling and confining the spray so that it may be readily inhaled. It is also necessary to maintain a greater degree of cleanliness about the package than is usually required and means must be provided for preventing dust and dirt from contaminating the package. In addition, it is desirable that the product be quick and easy to use and one which may be used in a relatively inconspicuous manner as it is frequently necessary that such products be used at periods which complete privacy for the user can not be obtained.

In keeping with the throw-away aspect of this type of package it is necessary that the container for the product be inexpensive. Accordingly, the means for achieving these objectives must be simple and must not add any substantial costs to the packaging of the product. At the same time these means must be esthetically pleasing in design so as not to impair the sales appeal of the product created by the appearance of the package.

The provision of a dispensing device for aerosol spray products in which these and other objectives are achieved constitutes the general object of the present invention.

Briefly, and in general, the present invention comprises a dispensing device that is provided with means for producing and controlling the discharge of the product from the container in the form of a spray. Suitable valve means, together with a manually operable actuator therefor, are provided on the container to accomplish the discharge of the product as desired, the discharge orifice for the product being located in the actuator for the valve.

A suitable nozzle is provided externally of the actuator for the purpose of confining the product spray after it has left the orifice in the actuator. The nozzle is secured to the package, preferably at the valve actuator, so as to form a part thereof. In one form of the invention the nozzle is so adapted as to serve as a closure for the package while in another form of the invention a separate closure cap is provided. In both forms of the invention, and for the purpose of maintaining a unity in the design of the package, the nozzle is arranged to form an upright continuation of the container portion of the package.

The discharge orifice for the package may be located anywhere on the periphery of the actuator and preferably to one side of the vertical axis of the package. The nozzle

is secured to the valve actuator in a manner to permit pivotal movement of the nozzle relative to the actuator whereby the nozzle may be disposed with its axis substantially opposite the discharge orifice in the actuator. A pivotal connection is accordingly, provided for the valve actuator and the nozzle.

In one form of the invention the pivotal connection occurs adjacent the lower edge of the actuator and to one side of the vertical axis of the package. With the connection at this point pivotal movement of the nozzle relative to the actuator may be effected without removing the actuator from the package. In another form of the invention the pivotal connection occurs at a point on the vertical axis of the package and the nozzle is adapted to also serve as a closure for the package. Pivotal movement of the nozzle relative to the actuator is effected after first removing the nozzle and closure from the package.

For the purpose of illustrating the manner in which the invention may be practiced, two presently preferred embodiments of the invention are shown in the drawings and these embodiments will be described in detail hereinafter. However, it is to be understood that the general and detailed descriptions of the devices shown in the accompanying drawings are by way of example only and do not define or restrict the scope of the invention, the claims appended hereto being relied upon for that purpose.

Of the drawings:

FIG. 1 is a perspective view of a medicinal aerosol package employing a dispensing device embodying one form of the invention;

FIG. 2 is a similar view of the package of FIG. 1 but with the closure cap removed to show the nonoperative position of the dispensing device;

FIG. 3 is a perspective view of the package of FIG. 2 with the dispensing device in operative position;

FIG. 4 is a sectional view through the dispensing device of the package of FIG. 3;

FIG. 5 is a perspective view of a medicinal aerosol package employing a dispensing device embodying another form of the invention.

FIG. 6 is a similar view of the package of FIG. 5 with the dispensing device in operative position;

FIG. 7 is a sectional view through the dispensing device of the package of FIG. 5 with the device in non-operative position; and

FIG. 8 is a sectional view through the dispensing device of the package of FIG. 5 with the device in operative position.

Referring first to FIGS. 1–4, there is shown a medicinal aerosol package employing a dispensing device embodying the teachings of the invention. In the main, the package comprises two principal parts, a container 10 in which the medicine and a suitable propellant are confined under pressure, and a closure 12 for the package at the upper end of the container. The lower edge portion of the closure 12 extends downwardly below the top of the container 10 (see FIG. 4) to form a cover cap for the package and prevents the entry of dust and dirt to the interior of the package.

Any suitable open ended container, either plastic, metal or glass, may be employed in the package. A cap and valve assembly 14 is provided for the container 10 and is applied to the open end of the container to effect a pressure-tight sealing off of the interior of the container from the atmosphere. This may be accomplished in any one of a number of ways well understood in the art, as for instance, by providing resilient sealing members internally of the cap assembly and by crimping the lower edges of the assembly under a lip formed in the upper edge of the container.

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The cap and valve assembly 14 includes a valve for controlling the discharge of the medicinal product from the container and the valve stem 16 for the valve extends above the cap assembly 14 as is best seen in FIG. 4 of the drawings. In preferred form, the valve is one which is manually operated by a downward push on the valve stem. The stem 16 of the valve is made hollow so as to permit the product and propellant within the container to escape upwardly therethrough.

An actuator 18 for the valve is mounted on the upper portion of the valve stem 16, and an internal passageway 20 is formed therein to enable the actuator to fit over the stem in frictional engagement therewith. The inner end of said passageway is provided with a somewhat smaller extension 22 and the shoulder 24 formed at the junction of the passageway 20 and its extension 22 serves to properly position the actuator with respect to the stem. An orifice 26 is provided at a peripheral point on the actuator 18 and a discharge passageway 28 connects the passageway extension 22 with the orifice 26 so that the product and propellant escaping through the valve stem 16 may be discharged from the package through the orifice in the actuator. The orifice 26 is shown in the drawings as being located at one side of the actuator and approximately at a right angle to the axis of the actuator as this location is quite customary in aerosol packaging, however, the location of the orifice is not critical to the invention and the orifice could be placed at other locations just as well.

A hollow nozzle 30, open at both ends and preferably substantially cylindrical in shape, is mounted on the actuator 18. In the embodiment shown in FIGS. 1-4 the nozzle 30 is mounted at a point substantially offset from the vertical axis of the package and is pivotally connected to the actuator 18 adjacent its lower front edge portion 32. The mounting comprises a pin 34 which extends between and is fixed to opposite sides of the nozzle 30 adjacent one end. The central portion of the pin 34 is pivotally journaled in a suitable opening 36 in the actuator 18. One side of the nozzle's lower edge 38 is cut away at an angle to form a scallop 40 that serves as a finger hold to facilitate the pivotal movement of the nozzle relative to the actuator.

Normally, the nozzle 30 will occupy an upright or upwardly disposed position as is best shown by the dotted lines 44 in FIG. 4, this being the position of the nozzle when the package is not being used. In its upright position the nozzle 30 forms an extension of the container portion 10 of the package and the outside diameter of the nozzle is made less than that of the container so as to permit the fitting of the closure cap 12 over the nozzle 30. The operative parts of the dispensing device, and especially the nozzle, are thus protected against contamination by dust and dirt. To give a pleasing appearance the nozzle 30 is formed with a smooth inwardly turning contour.

Whenever it is desired to use the package the closure cap 12 is first removed from the container 10. The nozzle 30 is then pivoted to bring the axis of the nozzle substantially in alignment with the discharge orifice 26 in the valve actuator 18, that is, to a substantially horizontal position in the device shown. Movement of the nozzle 30 to this position exposes the top 46 of the valve actuator 18 and permits the person using the package to depress the actuator to open the valve.

Opening of the valve causes the product to discharge from the package in the form of a spray. Due to the tubular configuration of the nozzle 30 this spray is confined to the relatively small area enclosed thereby and the user, by placing his mouth over the free end 48 of the nozzle, may inhale the spray into his throat and lungs. Inasmuch as the lower end 38 of the nozzle 30 is open and is larger than the actuator 18, an access opening 50 is provided at this end of the nozzle through which the user may draw air during inhalation. Proper positioning of the nozzle 30 with respect to the orifice 26 is assured

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by the engagement of the lower edge 38 of the nozzle 30 with the underneath surface 52 of the actuator 18.

Another form of the invention is employed by the medicinal aerosol package shown in FIGS. 5-8. This package, like the package previously described above, comprises two principal parts, a container 110 in which the medicine and a suitable propellant are confined under pressure, and a nozzle 112 that serves as a closure for the package at the upper end of the container. A cap and valve assembly 114, similar to the cap and valve assembly provided for the previously described package, is also provided for this package and has a valve with a hollow valve stem 116 extending above the cap assembly.

A manually operable actuator 118 is provided for the valve stem and has an internal passageway 120 adapted to fit over the upper portion of the valve stem 116 in frictional engagement therewith. The actuator 118 is provided with an orifice 122 at one side and the orifice 122 connects, through passageway 124, with an extension 126 of the actuator's internal passageway 120 so as to provide a continuously open path in the actuator through which the product and propellant escaping through the valve stem may pass.

The nozzle 112 is hollow and is pivotally connected to the actuator 118 approximately at the midpoint thereof, the connection being made by means of short pins 128, 128 provided on opposite sides of the nozzle 112 which are pivotally journaled in suitable openings 130, 130 in the actuator 118. Unlike the previously described embodiment the openings 130, 130 do not extend through the actuator. One end 132 of the nozzle 112 is open and the diameter of the nozzle, at this end, is substantially equal to that of the container 110 for the package, being just slightly larger than the diameter of the cap and valve assembly 114 so that the open end 132 of the nozzle 112 may be inserted over the assembly to form a closure for the package. In order to render the nozzle aesthetically pleasing, its shape is such as to gradually taper inwardly towards its upper end 140, the end opposite the open end 132.

A slot 142 is formed in the upper end 140 of the nozzle 112 and extends part way down one side, the width of the slot being substantially the same as the width of the actuator 118. The portions of the nozzle 112 lying at either side of the slot 142 are, thus, disposed at the sides 144 of the actuator 118. The actuator 118 is provided with a peripheral projection 146 adjacent the top portion thereof which extends into the slot 142 formed in the nozzle. The height of the projection is greater than the depth of the slot and the projection serves as a means for effecting relative pivotal movement between the actuator 118 and the nozzle 112 whereby the axis of the nozzle may be disposed substantially opposite the discharge orifice 122 in the actuator.

In operation the nozzle 112 is normally disposed so that its axis is substantially coincident with the vertical axis of the package. When so disposed, the nozzle 112 may be utilized as a closure for the package by inserting the open end 132 of the nozzle over the cap and valve assembly 114. In this position the valve stem 116 extends part way into the internal passage 120 formed in the actuator 118. The position of the actuator 118 within the nozzle 112 is such that the actuator 118 closes off the slot 142 from the interior of the nozzle and a tight closure is effected whereby dirt is prevented from entering the actuator or the cap and valve assembly 114.

When it is desired to use the package, the nozzle 112 is removed from the container 110. The actuator 118 is pivoted through approximately 90° with respect to the nozzle so as to dispose the internal passageway 120 outwardly of the slot 142 formed in the nozzle 112 and to dispose the orifice 122 in the actuator substantially opposite the axis of the nozzle. The actuator 118 is then reinserted onto the valve stem 116. The user then places his mouth over the free end of 132 of the nozzle 112, presses

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downwardly on the nozzle adjacent the actuator 118 and inhales the spray discharged through the orifice 122 into his throat and lungs. When the actuator 118 and the nozzle 112 are in their operative positions a clearance opening 149 occurs between the actuator 118 and the bottom 150 of the slot 142 through which air may be drawn during the inhalation of the product by the user.

Replacement of the nozzle 112 on the container 110 is facilitated by the fact that the lower edge portion 148 of the actuator 118 abuts against the bottom 150 of the slot 142. When this abutment occurs the internal passageway 120 is automatically aligned with the valve stem 116 and the nozzle and actuator may be inserted over the cap and valve assembly on the container without difficulty.

What is claimed is:

1. A device for orally dispensing a product confined under pressure within a container having a valve for controlling the discharge of the product therefrom, said device comprising an actuator for the valve having a discharge orifice formed therein, said actuator being positioned on said valve and movable in a direction to open the valve, and a hollow, open-ended nozzle pivotally secured to the actuator and normally disposed in an upright position above the container, said nozzle having a clearance opening to permit pivotable movement of the nozzle relative to the actuator whereby said nozzle may be pivoted to dispose the open end of the nozzle in alignment with the orifice in the actuator without having to withdraw the nozzle from the container.

2. An oral dispensing device as set forth in claim 1 wherein the thickness of the nozzle does not exceed the

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thickness of the container and the pivotal connection between the nozzle and the actuator is offset from the centerline of the actuator and the nozzle whereby said nozzle may be pivoted from a normal upright position in which the nozzle forms a continuation of the container to a lateral position in which the open end of the nozzle is in alignment with the orifice in the actuator.

3. An oral dispensing device as set forth in claim 2 wherein the orifice in the actuator is located in one side thereof and the pivotal connection is located adjacent the lower edge of the actuator and the side having the orifice.

4. An oral dispensing device as set forth in claim 3 wherein said nozzle is open at both ends to permit the nozzle to fit around the actuator in its normal upright position.

5. An oral dispensing device as set forth in claim 4 wherein said nozzle has an open, lower end that is larger than said actuator whereby an access opening for the passage of air is formed between the actuator and the lower end of the nozzle when the nozzle is disposed with its axis in alignment with the discharge orifice.

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