

- [54] **INHALATION ACTUATED AEROSOL  
DEVICE FOR DISPENSING A METERED  
QUANTITY OF FLUID**
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222/3, 402.15; 128/208, 203, 211, 173 R

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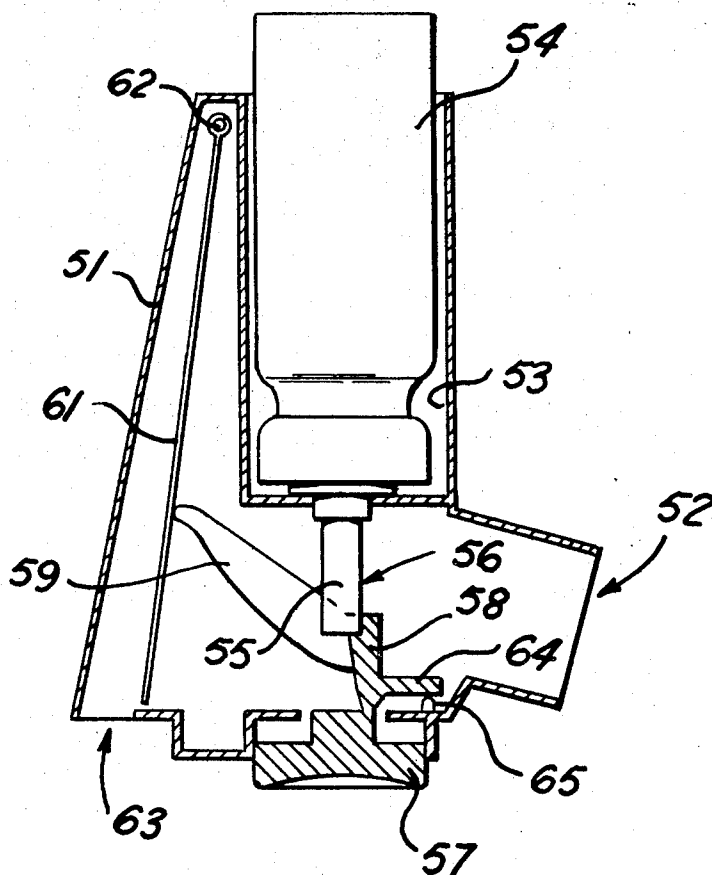
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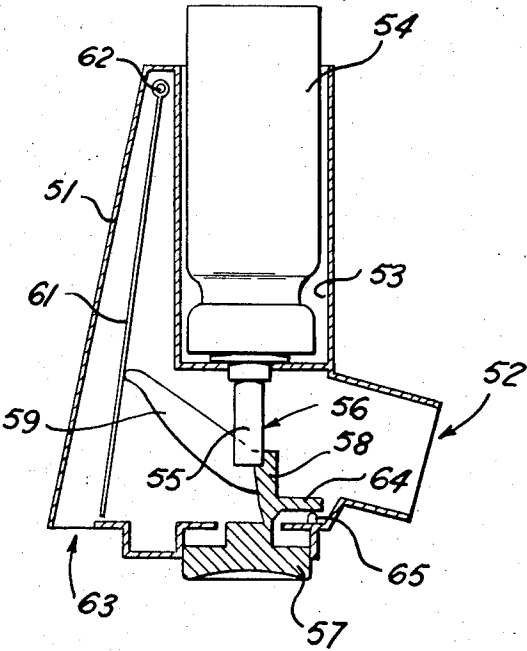
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[57] **ABSTRACT**

A device for dispensing fluid from an aerosol container of the kind having a spray stem or spray head which, when actuated, dispenses fluid from the container, the device comprising a duct having an inlet and an outlet, means to receive the aerosol container with the outlet of the spray stem or head communicating with the duct, a strut engageable with the stem or head so that relative movement of the strut towards the container will press the stem or head inwardly of the aerosol container, and means for disengaging the strut to release the stem or head when the air pressure at the outlet of the duct falls below the air pressure at the inlet of the duct.

**6 Claims, 1 Drawing Figure**





# INHALATION ACTUATED AEROSOL DEVICE FOR DISPENSING A METERED QUANTITY OF FLUID

## BACKGROUND TO THE INVENTION

The invention relates to aerosol containers, and more particularly to devices for dispensing fluid from aerosol containers of the kind having a spray stem or spray head which, when actuated, dispenses fluid from the container. Such aerosol containers will be referred to hereinafter as aerosol containers of the kind described.

With aerosol containers of the kind described known as inward-charging, outward-discharging containers pressing the stem or head inwardly of the container charges a metering chamber in the container and when released the stem or head returns under spring pressure, dispensing a metered dose of fluid

With aerosol containers of the kind described known as outward-charging, inwardly discharging containers pressing the stem or head inwardly releases a previously metered dose, and release of the stem or head causes the next dose to be metered and stored.

With aerosol containers of the kind described known as continuous spray containers pressing the stem or head inwardly causes continuous emission of fluid until the stem or head is released.

## DESCRIPTION OF THE PRIOR ART

The use of aerosols for the relief of ailments such as asthma and bronchitis has been known for many years, and dispensing devices have been proposed for use with such aerosols which devices seek to ensure that the user receives a dose of a drug at the commencement of inhalation at a mouthpiece.

However such devices are specifically for use with one type of aerosol, generally the outward-charging inwardly discharging type.

Apparatus has been devised in which the user must suck at a mouthpiece and then actuate the aerosol, the user not being able to draw any breath until the aerosol is actuated. This is undesirable as many users have difficulty drawing breath even under normal circumstances.

In other known devices the user first cocks a spring on the device and then draws a breath through the device. The spring is triggered by a breath controlled valve and the energy stored in the spring is utilised to actuate the aerosol. In other devices a toggle arrangement prevents actuation of the aerosol until suction applied by the user breaks the toggle. However these devices are complicated in construction and therefore expensive. Furthermore as considerable force is required to actuate the outward-charging, inwardly discharging aerosol the dose is not always released right at the start of drawing breath.

## SUMMARY OF THE INVENTION

It is an object of the invention to provide a device for dispensing fluid from an aerosol container which device is of very simple and inexpensive construction, being composed of only a small number of moving parts.

It is a further object of the invention to provide such a device in which a dose of fluid may readily be provided when suction is applied to the device.

In general terms these objects are achieved by utilising the fact that inward-charging outward-discharging

containers require a very low force to maintain the spray head or stem in the inward position after charging, and hence a very low force to release the dose. This permits the use of a very simple release mechanism.

Accordingly the invention provides a device for dispensing fluid from an aerosol container of the kind described, the device comprising a duct having an inlet and an outlet, means to receive the aerosol container with the outlet of the spray stem or head communicating with the duct, a strut engageable with the stem or head and manually operable to press the stem or head inwardly of the aerosol container, and means for disengaging the strut to release the stem or head when the air pressure at the outlet of the duct falls below the air pressure at the inlet of the duct.

The device according to the invention is very suitable for use with an aerosol container containing medicament for asthma sufferers. If the user manually moves the container and the strut toward one another and then sucks at the duct outlet he will receive medicament at or immediately after commencement of sucking.

The device is particularly suitable for use with an inward-charging, outward-discharging container, as mentioned above, since the force required to hold the head or stem in the inward position, and hence the force required to disengage the strut, is relatively small. It is however a significant advantage of the device that it may be arranged for use with outward-charging, inward-discharging or continuous spray containers while still utilising a very simple construction of few parts. In order to ensure that a single discrete dose is emitted at or immediately after commencement of sucking, the strut, or means associated therewith, may be arranged to seal the outlet of the stem or head while the strut is in the engaged position.

The air pressure difference whereby the strut is disengaged may be detected by a pressure responsive device, which may be a vane in the duct. Alternatively, the pressure difference may be detected by a device responsive to air flow in the duct resulting from said pressure difference. Such a flow responsive device may comprise a hot-wire anemometer.

## DESCRIPTION OF A SPECIFIC EMBODIMENT

One specific example of the invention will now be described with reference to the accompanying drawing which shows a device for dispensing asthma medicament from an aerosol.

Referring to the drawing, a plastics casing 51 has an outlet orifice 52 suitable for placing in the mouth of a user. The casing 51 defines a recess 53 in which there is placed an aerosol type medicament dispenser 54. The dispenser 54 has a stem or spray head 55 with an outlet orifice 56 in one side. Pressing stem 55 inwardly of the aerosol container causes a metering chamber (not shown) to be primed, and release of the stem allows a metered dose of medicament to issue from orifice 56.

In the device shown in the drawing, a press button 57 has a strut 58 integral therewith but pivotable about a flexible hinge. The strut engages the end of the stem 55, so that when the press button is pushed inward then the stem is pressed into the dispenser 54 and the metering chamber is filled with medicament. Attached to the strut 58 is a lever arm 59, and this in turn is engaged by a vane 61 pivoted to the body of the device at a

hinge 62. The vane 61 in its normal position as shown in the drawing blocks a duct within the casing 51 and extending between an air inlet 63 and the outlet orifice 52. However, when suction is applied at the outlet orifice 52 then the difference in air pressure across the vane 61 causes it to move in an anti-clockwise direction thereby opening the passage between the air inlet 63 and the outlet 52, and at the same time striking the lever arm 59 and causing both the lever arm and also the strut 58 to rotate in a clockwise direction about the hinge joint between the strut and the press button 57. It will be clear that, if before this occurs the press button 57 has been pressed inwardly to hold the stem 55 into the dispenser 54, then the above-described sequence of events will release the stem and spray head 55 so that it will move downwardly and the dose of medicament stored within the valve will be dispensed into the air stream flowing out of the orifice 52. It will be appreciated that in use of the device the asthma sufferer presses the push-button 57 upwardly and holds it and then draws breath through the outlet orifice 52; the arrangement ensures that the medicament is dispensed at the beginning of the inhalation thereby assuring maximum effect.

So as to ensure that the device resets itself after use, the strut 58 is provided with an extension 64 engageable with a spring loaded pin 65. When the device is operated the rotation of the lever arm 59 and the strut 58 by the vane 61 depresses the pin 65, but when the press button 57 is thereafter released the pin tilts the strut back towards the stem 55 to engage it.

The embodiment described is suitable for use with any reservoir of the appropriate size and having a metering valve which is primed on the inward stroke of the stem and dispenses medicament on the outward stroke. One particular form of such a metering valve utilizes a hollow stem as the receptacle, and is charged by pressing the stem and spray head 55 inwardly past a stem seal until the orifice 56 is within the reservoir, whereupon medicament under pressure enters the hollow stem through the orifice, and subsequent release of the stem and spray head 55 dispenses the medicament. This is, however, only one of several possible valve constructions. In some constructions the outlet orifice 56 is in the end of the stem, not the side. The device of this example may be adapted for use with an outward-charging, inward-discharging container, or a continuous spray container, by providing means which seal the outlet orifice when the strut is in the engaged position shown. Thus pressing the strut inwardly will cause a

dose of medicament to be stored in the spray stem, removal of the strut allowing the dose to escape through the outlet orifice of the stem.

Other modifications and improvements may be made without departing from the invention, as will be appreciated by those skilled in the art.

The sealing means may for example comprise a sealing pad on the strut, or a piston carrying a sealing pad and interposed between the strut and the spray stem.

If desired button 57 may be dispensed with, the relative movement of the strut towards the container being brought about by manual downward movement of the container.

I claim:

1. An aerosol device comprising an aerosol container of the type which has a tubular valve stem and which on depression of the stem measures out a metered quantity of fluid ready for discharge through the stem when the stem is released, a duct which is in fluid connection with the tubular valve stem and has one end open to atmosphere and the other end arranged for insertion into the mouth of a user, a two-part strut having a first part to engage the stem and a second part which is manually engageable to move the strut between an inoperative position in which the stem is released and an operative position in which the stem is depressed, a flow sensor in the duct, and means to move the first part of the strut out of engagement with the stem to release the stem when the flow sensor detects a flow of air in the duct when a user inhales through the duct, the arrangement being such that release of manual pressure from the second part of the strut will also release the stem.

2. A device as claimed in claim 1 in which the flow sensor comprises a vane in the duct sensitive to a pressure differential between the outlet and the inlet of the duct.

3. A device as claimed in claim 1 in which the first part of the strut carries a projection which is engageable by the vane to move the said first part out of engagement with the stem.

4. A device as claimed in claim 1 in which the parts of the strut are pivotally connected together.

5. A device as claimed in claim 4 in which the two parts of the strut are spring biased into the position where the first part is engageable with the stem.

6. A device as claimed in claim 4 in which the two parts of the strut are integrally formed from plastics material.

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