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ACTUATOR FOR AEROSOL MEDICATION SPRAY DISPENSERS

Filed March 12, 1962

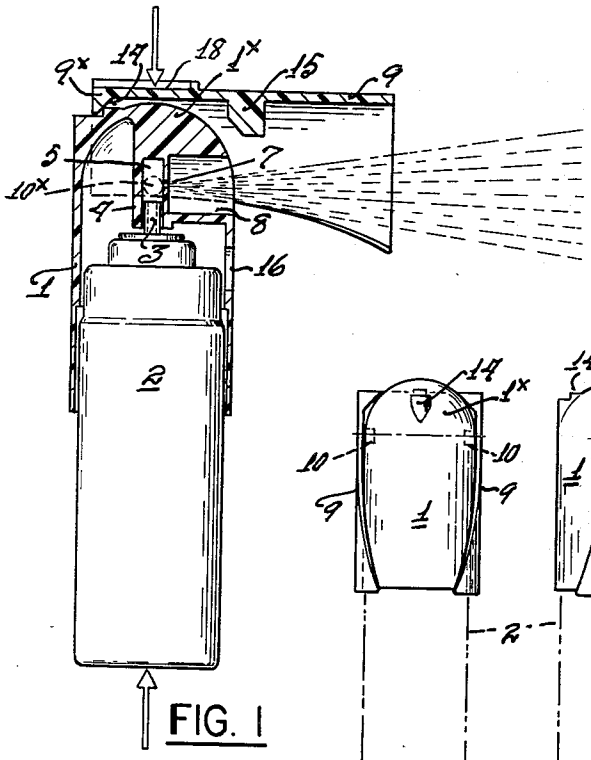

FIG. 1

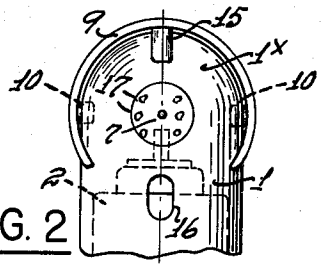

FIG. 2

FIG. 3

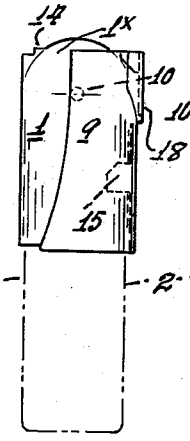

FIG. 4

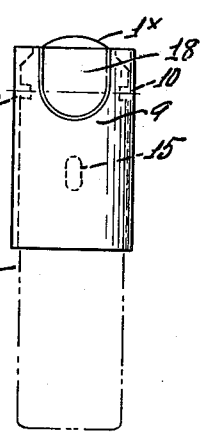

FIG. 5

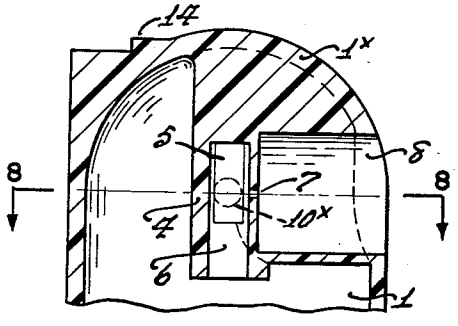

FIG. 7

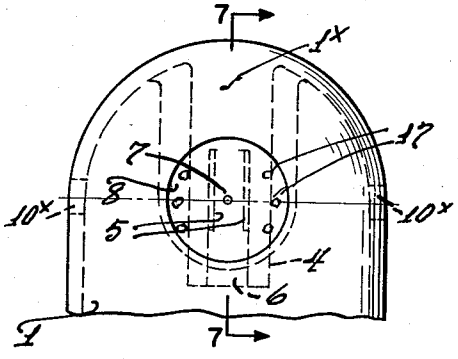

FIG. 6

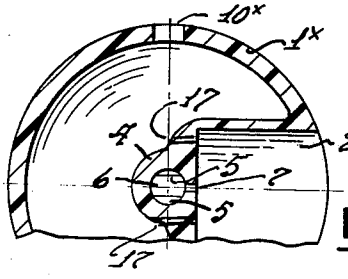

FIG. 8

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ACTUATOR FOR AEROSOL MEDICATION SPRAY DISPENSERS

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In recent years a number of medications have been put up in aerosol form for inhalation therapy, using a fluorohydrocarbon propellant. These medications have included epinephrine and isoproterenol for use as bronchodilators, ergotamine tartrate for migraine, octyl nitrite and its derivatives as vasodilators and many others. Any drug which is directed towards pulmonary therapy may be suitable for this method of administration since it reaches the pulmonary tissues directly. In addition, many medications requiring a prompt onset of action can best be administered in this fashion because the rate of absorption from the lung is much faster than when the drug is administered orally and in many instances is as rapid as when the drug is injected.

Medications for this purpose are usually put up in metal or glass vials with a valve on the top through which the medication is dispensed by the pressure of the fluorohydrocarbon. The valves are usually metered in order to administer a carefully measured quantity of medication. The drug can either be dissolved or suspended in the fluorohydrocarbon using a variety of co-solvents or suspending agents.

In order to direct the medication into the oral cavity for inhalation, a funnel-like actuator of some type is required. This has a small hole which sets on the stem of the valve and is connected with a fine nozzle through which the spray is directed. Because the cans must be held either upright or upside down (depending on design) to operate properly, the orifice is usually at right angles to the axis of the valve stem. Surrounding the nozzle is a funnel-type aperture which confines and directs the stream of aerosol into the mouth. Actuators of this type are generally made of plastic.

A disadvantage common to all of the currently available actuators is that the patient must remove the actuator from its covering position and replace it in the operating position. This usually involves inserting the valve stem into a small hole and may additionally involve removing the cap or turning a ring to open the orifice. In the case of a patient overcome by an asthmatic, angina or migraine attack, who is acutely ill, or may have tremors, this may be a difficult procedure to carry out.

To overcome these difficulties, we have developed an actuator which does not need to be removed and replaced in another position to operate it. The actuator consists of two parts—a headed sleeve unit which sets on top of the aerosol container and receives the valve stem, the head of the sleeve being formed with a fine orifice through which the medicament is expelled at right angles to the stem, plus a rotating cover which pivots on two pins extending from the sides of the sleeve head. The sleeve with its head can be of plastic, although it may be made of metal or other material, and the rotating cover must be of a flexible material, preferably plastic.

The invention will be described in reference to the accompanying drawings, in which:

FIG. 1 is a vertical section through an embodiment of the invention and applied to an aerosol container as shown in the full lines;

FIG. 2 is a fragmentary view in elevation showing the headed sleeve partly broken away, together with dotted lines indicating the position of an aerosol container, the parts being in the position of FIG. 1.

FIG. 3 is a view in elevation looking at the rear side of the device with the cover in closed position, dotted lines indicating an aerosol can.

FIG. 4 is a view similar to FIG. 3 with the dispenser turned 90° from the position in FIG. 3.

FIG. 5 is a view in elevation similar to FIGS. 3 and 4, showing the rear face of the dispenser.

FIG. 6 is a front face elevation of the headed sleeve, the area thereof being that of FIG. 7, dotted lines showing certain interior walls.

FIG. 7 is an enlarged section through the upper portion of the headed sleeve, the vertical section being taken on the line 7—7, FIG. 6.

FIG. 8 is a horizontal section on the line 8—8, FIG. 7.

Referring to the drawings, it will be seen that the actuator consists of two parts, i.e. a headed sleeve 1 which receives the aerosol can 2. The latter will have, as customary, a stem valve 3 which is moved downward for release. In the valve hole 4 of the actuator head is a shoulder or its equivalent, which will engage the top rim of the stem valve, and in the present embodiment there are opposed shoulders provided by shallow internally projecting plate-like members 5 molded integrally with the actuator head at opposite sides of its reception passage 6, for the stem valve. Of course, the shoulder may be round or of any other suitable form.

In the actuator head, generally indicated at 1^x, is a fine orifice at 7 communicating with passageway 6, leading to an annular discharge port 8.

The actuator with its said head is preferably made of plastic, although it may be made of other materials such as metal.

The second member of the actuator is the rotatable cover 9, which is of a flexible material, preferably plastic. Being flexible, it can be snapped into position on the actuator head to the point where two opposed pintles, indicated at 10, will move into reception holes formed in the actuator head 1^x, the holes themselves being indicated in FIGS. 7 and 6, at 10^x.

The side of the cover 9 is formed as a split skirt, the opposite margins of the skirt, at least toward its lower end, being spaced a distance less than the diameter of the actuator sleeve 1, and these edge marginal areas of the skirt are outwardly flared toward the lower ends thereof. Because of the elasticity of the cover member 9, the skirt margins move apart on engagement with the sleeve 1, when moved to closed position, as in FIGS. 3 and 4, and thus the skirt spreads around the sleeve 1. The cover member 9 may rotate from closed position 90°, so that in its open and operative position, for guidance of the spray from the can, it lies at right angles to the axis of the can as shown in FIG. 1.

At its top, when in closed position, the cover member 9 is formed with a nose or flange, as shown at 9^x, FIG. 1, and when the cover is moved to the position of that figure, the nose or flange snaps over a detent ridge 14, FIGS. 1 and 7, due to the flexibility of the material used in the cover member. Thus the cover member is held, but capable of release, when it assumes horizontal position.

Internally of the cover member 9 is formed a projection 15 which, when the cover member is closed, enters an aperture 16 in the actuator head, in line with the top of the can, so that the actuator is held against downward operative movement by abutment of the projection with the can outwardly of the stem valve.

In the operation of the device, the sleeve 1 of the actuator closely surrounds the aerosol can and at that point seals the can from the passage of dirt or the like. When the cover is closed, all other openings leading to the top of the can are closed by the skirt of the cover, due to its springy grip upon sleeve 1. When the cover

is raised to the position of FIG. 1, its nose 15 is retracted from aperture 16, the flange 9^x rides over the detent 14 and the actuator is in condition for use. Downward pressure on the actuator in the direction of the arrow, FIG. 1, will cause the shoulder means 5 to engage the rim of the stem valve 3, and the latter will be depressed to release the propelled fluid as a spray through the fine orifice 7, to be guided by the cover member 9, the latter serving as a funnel-like member which confines and directs the medicated spray, as into the mouth when the medicament is directed toward oral administration.

It is preferred that at the opposite sides of the annular discharge port 8, and within the same, a plurality of holes 17 be provided. Tests have shown that streams of air, passed through these holes from the interior body of the actuator, will produce turbulence in the spray, the latter being broadened, the effect being to reduce the impact of the spray on the back of the throat.

It is desirable that top area of the cover 9, which, in the position of FIG. 1, lies immediately over the head 1^x, be provided with a flat finger rest, and such formation on the cover is shown at 18.

Having described our invention, what we claim and desire to secure by Letters Patent, is as follows:

1. An actuator for aerosol spray dispensers, which comprises a sleeve adapted to receive an aerosol can having an outwardly projecting discharge stem valve, the sleeve carrying a head formed with a normally vertical passageway for receiving the stem valve, a shoulder in the passageway and adapted to engage the top rim of the stem valve, the head having an orifice which is transversely of, and communicating with, said passageway and with the exterior of said head, in combination with a transversely curved cover for the sleeve and pivoted at its upper area to the sleeve, the cover having an open end and having an open longitudinal area leading to the open end of the cover, the cover being adapted to bridge the sleeve at the fine orifice of the latter in the head thereof, margins of said open longitudinal area being flexible and their edges being spaced a distance less than the diameter of the actuator sleeve, so that said marginal areas are moved apart, and then move toward each other, when the cover is swung on the actuator sleeve to closed position.

2. An actuator for aerosol spray dispensers constructed in accordance with claim 1, in combination with means for holding the cover in open position in a line transversely of the actuator head and comprising such position of the pivot means intermediate the cover and the head, that a rear area of the cover lies above the pivot means and abuts the head when the cover is moved to full open position, and two co-acting detent means intermediate the cover and the head, one being carried by the cover and one by the head, and at least one detent means being resilient for snap mutual engagement of the two detent means.

3. An actuator for aerosol spray dispensers constructed in accordance with claim 1, in which the actuator head is formed with a discharge port communicating with the fine orifice in the head, said discharge port being in line with the cover when the latter is in raised and open position, the actuator being formed with a receiving aperture, a projection carried by the cover and extending inwardly, the pivot means for the cover, the projection of the cover, and the receiving aperture of the actuator being so related that the projection enters said receiving aperture when the cover is closed and is adapted to engage the upper wall of an aerosol can to restrain the actuator against active movement relative to the stem valve carried by the can.

4. An actuator for aerosol spray dispensers constructed in accordance with claim 1, in which a plurality of air holes are provided in the head exteriorally of its fine orifice and leading to the stem valve receiving vertical passageway in the head of the sleeve.

5. An actuator for aerosol spray dispensers constructed in accordance with claim 1, in combination with a substantially flat finger rest carried by the cover directly over the head when the cover is moved outwardly and raised to substantially horizontal position for use of the actuator.

6. An actuator for aerosol spray dispensers which comprises a sleeve adapted to receive an aerosol can which has an outwardly projecting vertically disposed stem valve, the sleeve carrying a head formed with a normally vertical passageway and a shoulder in the passageway adapted to engage the top rim of such stem valve, the head having an orifice communicating with said passageway and with the exterior of the head, in combination with a cover pivoted to said sleeve, the cover being formed with a receiving open longitudinal area for the sleeve and leading to the open end of the cover, margins of said open longitudinal area of the cover being spaced a distance less than the diameter of the sleeve, and means carried by the actuator head and the cover adapted to releasably latch the cover on the actuator head when the cover is moved to raised and open position relatively to the sleeve.

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