

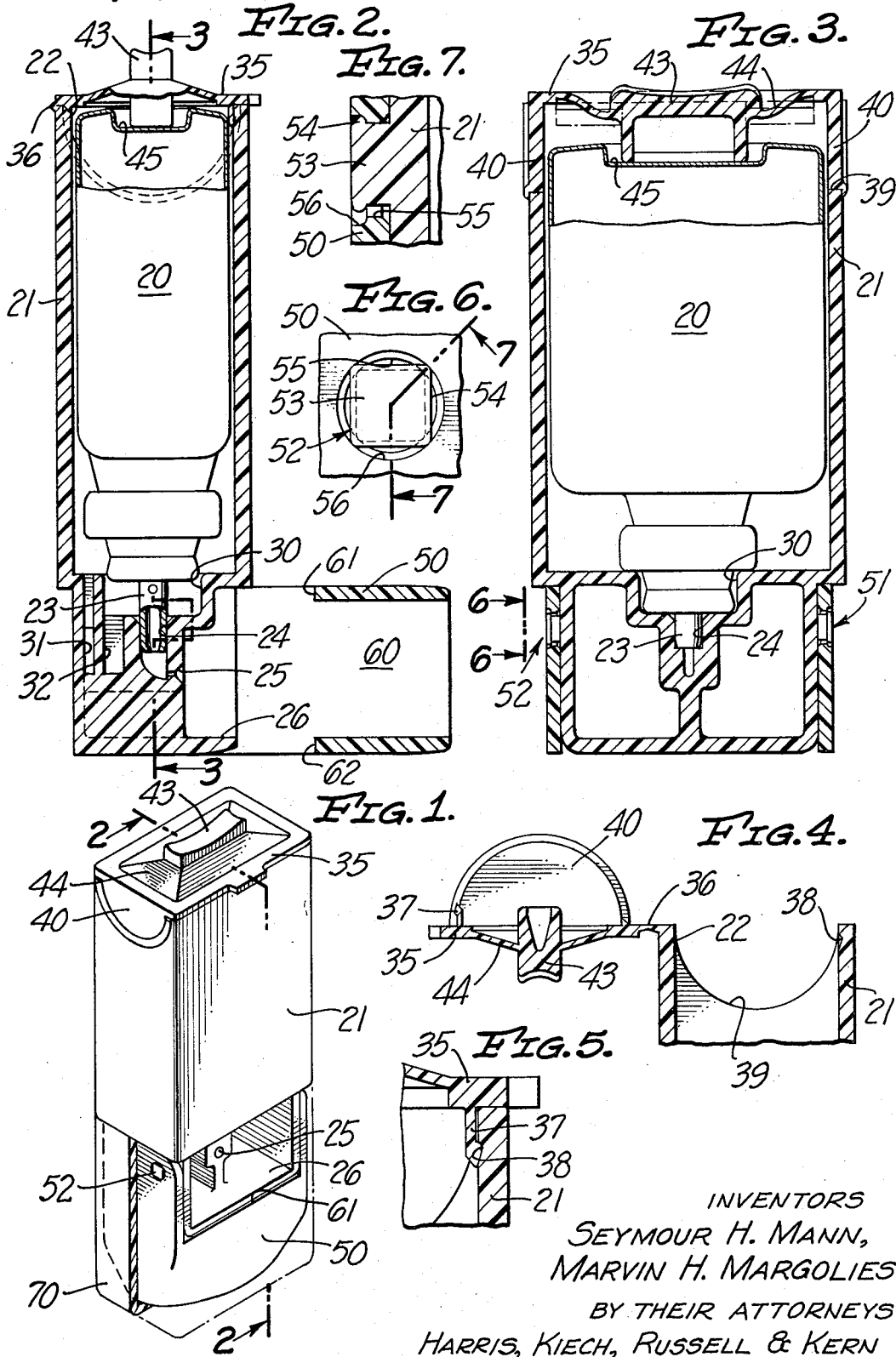
April 14, 1970

S. H. MANN ET AL  
INHALATION DEVICE

3,506,004

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2 Sheets-Sheet 1



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FIG. 8.

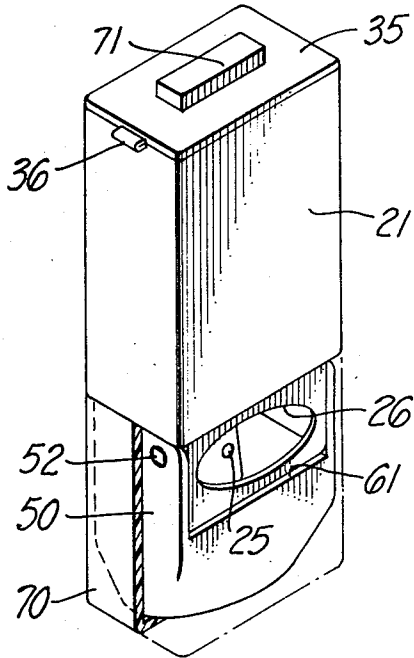


FIG. 9.

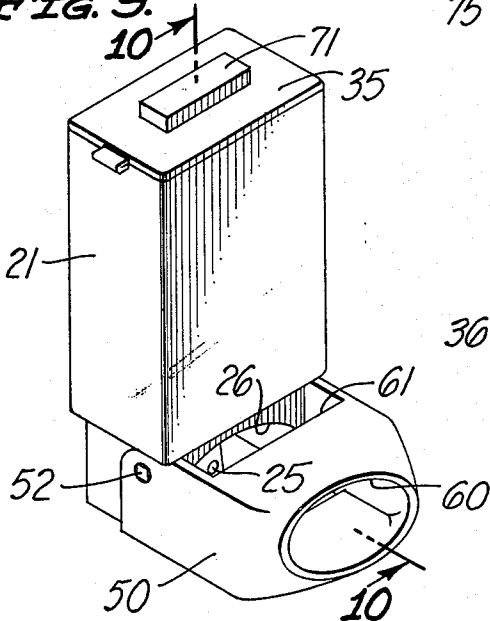


FIG. 10.

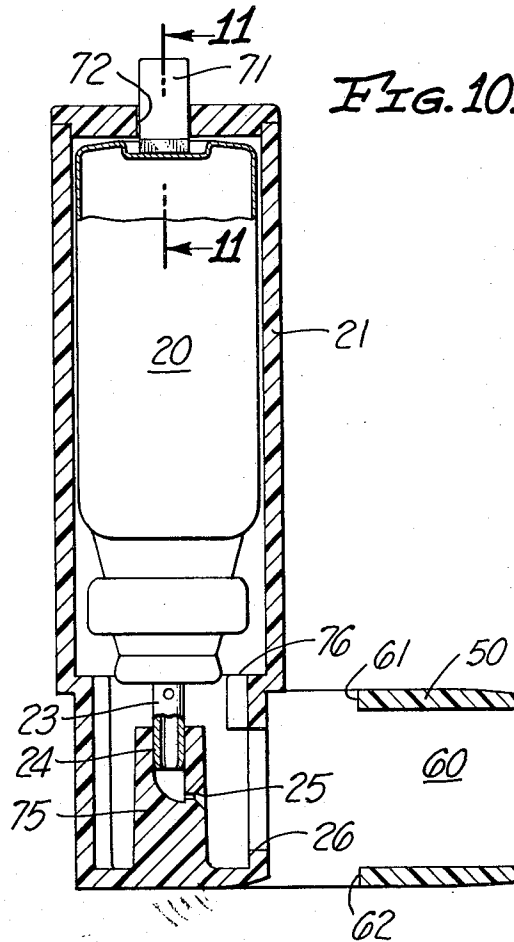
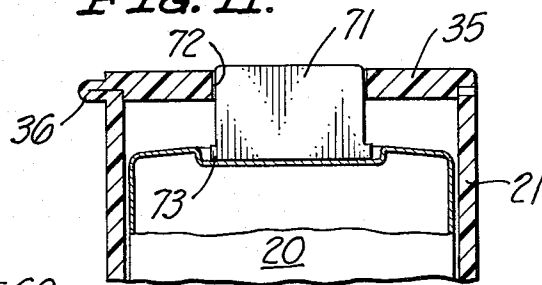


FIG. 11.



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3,506,004

## INHALATION DEVICE

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U.S. Cl. 128-208

6 Claims

### ABSTRACT OF THE DISCLOSURE

An aerosol dispensing device for discharging a metered amount of a medicament containing aerosol into the mouth of a patient during inhalation. A closed housing with a replaceable aerosol container. A molded housing with a unitary cover and actuator and having an output opening which is pivotally mounted to the housing by a square boss in a round opening mouthpiece, and a cap for fully closing the device. The cover is mounted to the housing by an integral flexible hinge.

This invention relates to aerosol dispensers, such as are used for administering medicaments for inhalation therapy. Aerosol charged containers with metering valves for dispensing measured amounts of fluids are known and available and a typical container is illustrated and described in U.S. Patent No. 3,001,524. A variety of dispensing apparatus for use with charged containers has been described and produced, some for specific purposes, other for general use.

It is an object of the present invention to provide a new and improved housing for aerosol dispensing containers which housing permits ready removal of spent containers and insertion of fresh containers. A further object is to provide such a housing which is closed except at the output opening and one which provides for manual operation for discharging a metered amount of fluid through the output opening and through a mouthpiece carried on the housing. A specific object is to provide such a structure which is totally enclosed except for the discharge opening of the mouthpiece and lateral inlet openings in the mouthpiece.

It is an object of the invention to provide a housing for an aerosol container with the housing formed of a unitary molding, and a mouthpiece pivotally carried on the housing. An additional object is to provide such a structure including a cap for positioning over the mouthpiece when in the storage position to completely enclose the device.

Other objects, advantages, features and results will more fully appear in the course of the following description. The drawings merely show and the description merely described preferred embodiments of the present invention which are given by way of illustration or example.

In the drawings:

FIG. 1 is an isometric view, shown partly in section, of a preferred embodiment of the inhalation device of the invention;

FIG. 2 is an enlarged sectional view taken along the line 2-2 of FIG. 1, with the mouthpiece pivoted to the working position;

FIG. 3 is a sectional view taken along the line 3-3 of FIG. 2;

FIG. 4 is a partial sectional view showing the cover of FIG. 2 in the open position;

FIG. 5 is an enlarged partial sectional view showing the detail of the cover in the closed position;

FIG. 6 is an enlarged partial view taken along the line 6-6 of FIG. 3;

FIG. 7 is a sectional view taken along the line 7-7 of FIG. 6;

FIG. 8 is a view corresponding to that of FIG. 1 of an alternative embodiment of the invention;

FIG. 9 is a view of the device of FIG. 8 with the cap removed and the mouthpiece in the working position;

FIG. 10 is an enlarged sectional view taken along the line 10-10 of FIG. 9; and

FIG. 11 is a partial sectional view taken along the line 11-11 of FIG. 10.

Referring to the embodiment of FIGS. 1-7, an aerosol charged container 20 is slidably inserted into a housing 21 through an insertion opening 22. The container 20 may be a conventional aerosol dispensing container equipped with a metering valve for delivering a measured amount of fluid when moved from the charging position of FIG. 2 to the discharging position of FIG. 3. The container 20 includes a discharge tube 23 which is positioned in a tube receiving opening 24 formed in the lower end of the housing 21. A discharge passage 25 provides communication between the tube 23 and an output opening 26 of the housing.

The housing 21 includes a stepped recess 30 for receiving the end of the container 20 and limiting downward movement of the container. A passage 31 and an opening 32 adjacent the tube opening 24 (FIG. 2) serve to reduce the mass of material in the housing.

A cover 35 is positioned in the insertion opening 22 for closing the housing and retaining the container 20. In the preferred embodiment illustrated, the cover 35 is molded integrally with the housing 21 and coupled thereto by a flexible hinge 36. A latching tongue 37 (FIG. 5) engages a mating groove 38 for holding the cover in place. Semicircular cutouts 39 in the housing 21 permit grasping of a container 20 for removing the container from the housing. Semicircular side plates 40 on the cover 35 close the side openings 39.

An actuating button 43 is molded integrally with the cover with a flexible diaphragm 44 permitting movement of the button between the positions of FIG. 2 and FIG. 3. If desired, the container 20 may be formed with a depressed zone 45 for receiving the button 43.

A mouthpiece 50 is carried on the housing 21 and is movable between a storage position as illustrated in FIG. 1, and a working position as illustrated in FIGS. 2 and 3. In the preferred embodiment illustrated, the mouthpiece is supported on aligned pivots 51, 52, with the pivot 52 illustrated in detail in FIGS. 6 and 7. A square boss 53 projects outward from the housing 21 and terminates in a flange 54. The boss 53 is disposed in a circular opening 55 formed in the mouthpiece, with a larger diameter recess 56 for the flange 54. The mouthpiece preferably is of molded plastic construction with thematerial being slightly resilient permitting deformation of the opening 55 for receiving the boss 53. The square boss and round opening arrangement permits assembly and operation without requiring any additional parts.

The mouthpiece 50 has a passage 60 therethrough, which passage is aligned with the discharge passage 25 and output opening 26 of the housing when the mouthpiece is in the working position. Lateral inlet openings 61, 62 permit entry of ambient air during inhalation by the patient.

A cap 70 is provided with a push fit over the mouthpiece for enclosing the mouthpiece and output opening when the device is in the storage position of FIGS. 1. This provides a completely enclosed device when it is not in use.

The inhalation device may be used by first opening the cover 35 with the tab 71 and inserting a charged container 20 into the housing 21. The cover is then closed and the device may be carried in the patient's pocket.

When the patient desires to inhale some of the medication, the cover 70 is removed and the mouthpiece 50 is pivoted to the position of FIG. 2. The patient places the mouthpiece in his mouth and manually compresses the container to the discharging position, as by placing a thumb at the bottom of the housing and a finger on the bottom 43. The button 43 is released, permitting the container to return to the position of FIG. 2. The mouthpiece is pivoted to the storage position and the cap is replaced. When necessary, a new container may be substituted for the spent container by opening the cover, removing the old container, inserting the new container and replacing the cover.

The structure as described and illustrated provides complete enclosure of the aerosol container, with replacement of the aerosol container being possible by opening only the end of the housing rather than by disassembly of the enclosure. The structure also provides an unrestricted air passage through the mouthpiece by way of openings 61 and 62 (this results in no impediment to normal breathing by the user), and operation by way of a diaphragm or substantially air-tight fitted button that keeps the aerosol container isolated within the enclosure free from dust and other contaminants.

An alternative form of the inhalation device is illustrated in FIGS. 8-11, where elements corresponding to those of the embodiment of FIGS. 1-7 are identified by the same reference numerals.

A push button 71 is positioned in an opening 72 of the cover 35, with the push button having a lower flange 73 for retaining the button in the cover and for engaging the container 20. The button 71 slides in the opening 72 with a substantially air-tight fit so as to close the housing and retain the button. The tube opening 24 is positioned in a boss 75 projecting upward from the lower end of the housing 21, with the container 20 engaging a flange 76 for limiting downward motion of the container.

Although exemplary embodiments of the invention have been disclosed and discussed, it will be understood that other applications of the invention are possible and that the device is not limited to the provision of medications for inhalation therapy.

We claim as our invention:

1. In an inhalation device for use in combination with an aerosol dispensing container equipped with metering valve means movable between charging and discharging positions and having a discharge tube at one end thereof and charged with a self-propelling liquid composition, the combination of:

- a housing having an insertion opening for slidably receiving said container, and an output opening,
- said housing including a support member having a tube opening receiving said discharge tube and providing a discharge passage for said tube directed toward said output opening,
- said housing including a cover joined with said housing by an integral flexible hinge for substantially closing said insertion opening and actuating means carried in said cover for engaging said container for manually moving said valve means to the discharging position; and
- a mouthpiece carried on said housing adjacent said out-

put opening and movable between a first storage position in alignment with said housing and a second working position at an angle with said housing and aligned with said discharge passage and output opening,

5 said mouthpiece having a passage therethrough with at least one lateral inlet for admitting ambient air.

2. A device as defined in claim 1 in which said cover and actuating means are formed integrally with said housing and with a flexible diaphragm joining said cover and actuating means.

3. A device as defined in claim 1 including a cap slidably positionable over said mouthpiece when in said first position for enclosing said mouthpiece and said output opening.

4. A device as defined in claim 2 including a cap slidably positionable over said mouthpiece when in said first position for enclosing said mouthpiece and said output opening.

5. A device as defined in claim 1 in which said housing, with said cover in said insertion opening, completely encloses said container except at said output opening.

6. In an inhalation device for use in combination with an aerosol dispensing container equipped with metering valve means movable between charging and discharging positions and having a discharge tube at one end thereof and charged with a self-propelling liquid composition, the combination of:

a housing having an insertion opening for slidably receiving said container, and an output opening,

said housing including a support member having a tube opening receiving said discharge tube and providing a discharge passage for said tube directed toward said output opening,

35 said housing including a cover for substantially closing said insertion opening and actuating means carried in said cover for engaging said container for manually moving said valve means to the discharging position;

a mouthpiece carried on said housing adjacent said output opening and movable between a first storage position in alignment with said housing and a second working position at an angle with said housing and aligned with said discharge passage and output opening,

said mouthpiece having a passage therethrough with at least one lateral inlet for admitting ambient air, and with said mouthpiece mounted on said housing by a pair of aligned pivots, each pivot comprising a square boss disposed in a round opening.

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U.S. Cl. X.R.

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