Oct. 29, 1968 G. RUGGERI 3,407,977

ACTUATING AND DELIVERING CAP FOR DISPENSERS

Filed April 4, 1967 2 Sheets-Sheet 1

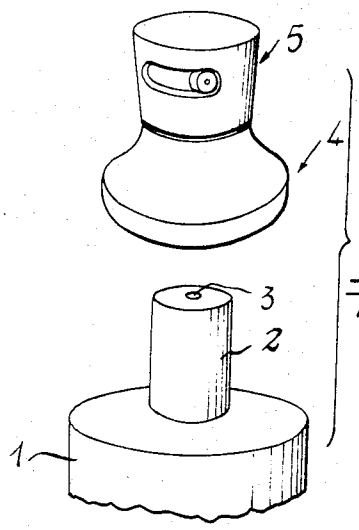

Fig. 1

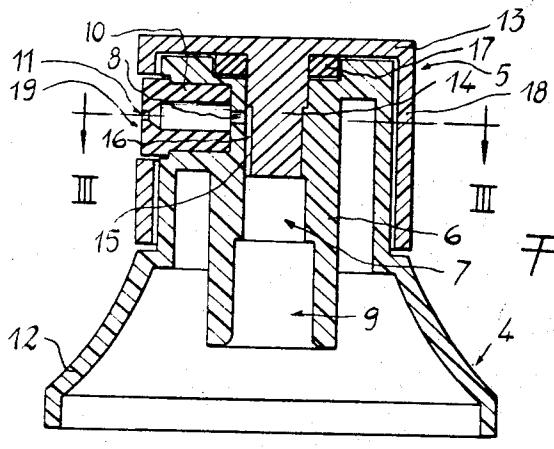

Fig. 2

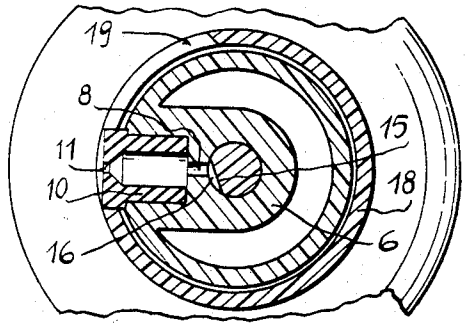

Fig. 3

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Oct. 29, 1968 G. RUGGERI 3,407,977

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Filed April 4, 1967 2 Sheets-Sheet 2

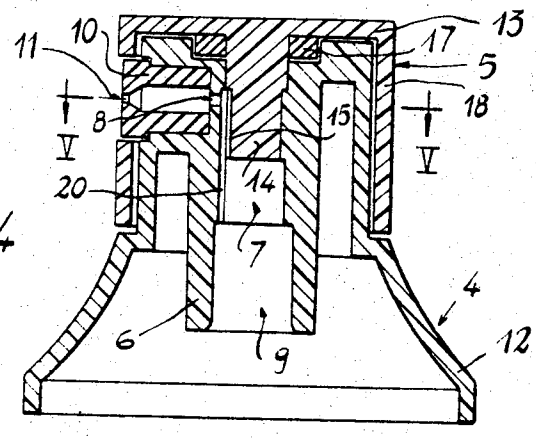

Fig. 4

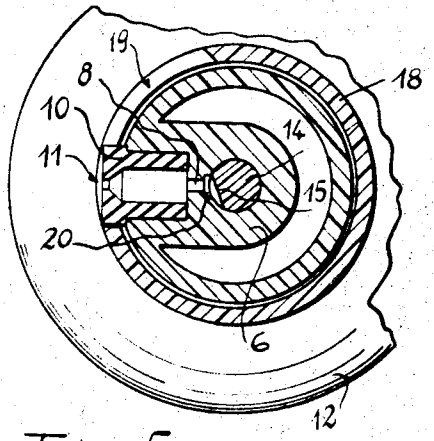

Fig. 5

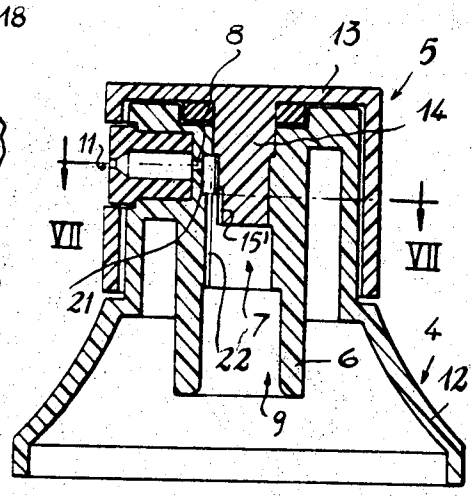

Fig. 6

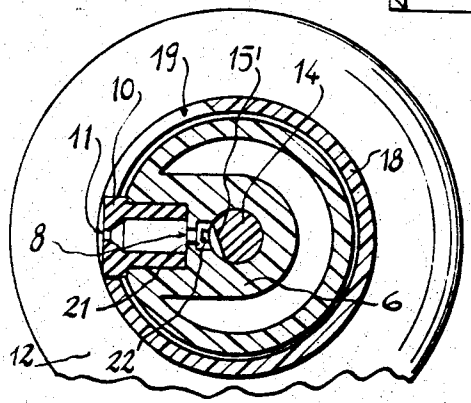

Fig. 7

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ACTUATING AND DELIVERING CAP FOR DISPENSERS

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ABSTRACT OF THE DISCLOSURE

A cap applicable to an aerosol dispenser for regulating the aerosol flow delivered therefrom. The cap includes a body provided with means for fastening thereof on an aerosol dispenser and has a longitudinal cylindrical cavity and a transverse hole, and additionally comprises a stake rotatably accommodated within said cavity and having a chamfer extending from an end thereof to said hole.

This invention relates to actuating and delivering caps for dispensers, and more particularly to adjustable flow, actuating and delivering caps for aerosol dispensers.

Practicalness and utility of generally small size aerosol dispensers are broadly acknowledged and have led to a wide-spread use of such dispensers.

In ordinary dispensers, the delivery of an aerosol material is provided through a depression operable valve. Known valves do not allow a jet regulation for the material being delivered at an aerosol state, and do not allow therefore to carry out a good utilization of said material.

Therefore, it is the object of the present invention to provide an actuating and delivering cap, applicable to usual aerosol dispensers and suitable to allow a flow regulation for the material being delivered as aerosol, so that an optimum utilization and a substantial saving of the material delivered by the dispenser are provided.

Another object is to provide a cap readily applicable to ordinary dispensers and which is of a very simple structure and thus of a very low manufacturing cost.

Such a cap is formed of a first and second bodies angularly movable to each other, and in which the first body has a cylindrical inner cavity of a circular cross-section defined by a wall through which a hole is formed, said hole substantially radially extending relative to said cavity, and in which the second body includes a cylindrical stake rotatably accommodated within said cavity and on its surface having a chamfer extending from an end thereof to the first body hole, means being provided for controlling the rotation of said first and second bodies, and means on the side of the above chamfered end of the stake for fastening the cap on a dispenser.

For a better understanding of the structure and advantages provided by this cap, some embodiments thereof will now be described as given by mere way of example and not of limitation, reference being made to the accompanying drawings, in which:

FIG. 1 is a perspective view of a cap as approached to the top of an aerosol dispenser;

FIG. 2 shows an axial section of a cap embodiment, of which

FIG. 3 is a cross-section according to line III—III in FIG. 2;

FIG. 4 is an axial section of a further cap embodiment, of which

FIG. 5 is a sectional view according to line V—V in FIG. 4;

FIG. 6 is an axial section of a further cap embodiment; and

FIG. 7 is a sectional view according to line VII—VII in FIG. 6.

FIG. 1, being particularly referred to, shows the top of a pressure container **1**, containing the material to be delivered in the aerosol form and on its upper end having a valve (for simplicity not shown as of a well known type), from which a hollow stem **2** projects, an aerosol material being delivered through hole **3** by pressing of said hollow stem **2**. The container, valve and stem above-mentioned constitute a usual type aerosol dispenser and therefore are not more particularly shown.

At the top of FIG. 1 an actuating and delivering cap is shown, said cap being formed of a first body **4** and a second body **5**, the structure of which is particularly shown in FIGS. 2–7.

Particularly referring to FIGS. 2 and 3, a cap is shown as comprising a first and second bodies, the first body being designated by reference numeral **4** and the second body being designated by reference numeral **5**. Body **4** comprises a tubular wall **6** defining a cylindrical cavity **7** of a circular cross-section, both ends of said cavity being open, as clearly seen in FIG. 2. A hole **8** is provided in the tubular wall **6**, said hole **8** radially extending relative to cavity **7**; at and adjacent the bottom of wall **6** (FIG. 2), cavity **7** enlarges to form a cavity **9** within which the stem **2** of the dispenser valve may be accommodated and firmly retained, the cap being thus secured to said stem **2**.

Unitary to body **4** there are a nozzle **10**, projecting from said body and having an outlet hole **11** coaxial with hole **8**, and an enlarged skirt or shell **12** substantially bell-shaped.

Body **5** comprises a peripherally circular disc-like body **13**, centrally of which a cylindrical stake **14** projects, said stake **14** being rotatably accommodated within cavity **7** and extending therein to occupy only a portion of the length thereof, as clearly seen from FIG. 2.

On the surface of stake **14** a chamfer **15** is formed, said chamfer **15** extending from the lower end of the stake (FIG. 2) to above hole **8**. Between the inner surface of the tubular wall **6** and the surface of stake **14**, at chamfer **15**, there is defined a conduit **16** which, under the conditions shown in FIGS. 2 and 3, connects hole **8** with the bottom of cavity **7**. From the figures it can still be noted that on stake **14** and between the disc-like body **13** and the upper surface of body **4** a seal **17** is inserted, and that a cylindrical wall **18**, enclosing as a cover the top of body **4**, extends from the periphery of the disc-like body **13**; an extended aperture **19** is formed in the cylindrical wall **18** and nozzle **10** projects therefrom.

As previously stated, stake **14** is rotatably accommodated within cavity **7**, so that by manually operating on the disc-like body **13** said stake can be rotated within said cavity: when bodies **4** and **5** are at the relative position shown in FIG. 3, hole **8** will directly communicate through conduit **16** with the bottom of cavity **7**. Under these conditions, when the cap is mounted on the dispenser, that is when stem **2** of the valve for container **1** is inserted in and forced into the cavity **9** of body **4**, an aerosol delivery of the material in container **1** will occur through cavity **7**, conduit **16**, hole **8** and hole **11** of nozzle **10** by exerting a pressure above the disc-like body **13** so as to cause a lowering of stem **2**.

Should the dis-like body **13** and stake **14** therewith be rotated counterclockwise with respect to FIG. 3, chamfer **15** would be no more opposite to hole **8**, and thus said hole **8** and hole **11** would not communicate with the bottom of cavity **7** through conduit **16**, so that no aerosol material would be delivered through the hole **11** even if stem **2** of the dispenser valve should be caused to lower.

In FIGS. 4 and 5 an embodiment for a cap substantially similar to that of FIGS. 2 and 3 is shown, and therefore, for sake of simplicity, the same previously used reference numerals are used for indicating like or corresponding parts. The cap of FIGS. 4 and 5 exclusively

differs from the cap of FIGS. 2 and 3 in that a channel depression **20** is formed on the surface of the tubular wall **6** defining the cylindrical cavity **7**, said channel depression **20** extending from hole **8** to beyond the lower end of stake **14**. As shown in the figures, the rate of material being delivered as aerosol at time unit through hole **11** of nozzle **10** is maximum, said rate being a function of the loss of pressure suffered by the material being delivered on passing through the conduit defined by the surface of chamfer **15** of stake **14** and the opposite surface of channel depression **20**. When body **5** is counterclockwise rotated with respect to body **4** (FIG. 5), chamfer **15** of stake **14** is no more opposite to channel depression **20**, so that under these conditions a delivery of aerosol material can be provided with a lower flow at time units than in the previous case, said flow being affected by the high losses of pressure suffered by the delivered material on passing through the conduit defined by the surface of channel depression **20** and the opposite cylindrical surface of stake **14**.

In FIGS. 6 and 7 a cap embodiment is shown, said cap differing from that of FIGS. 4 and 5 in that the channel depression on the surface of the tubular wall **6** defining the cavity **7** is formed of two adjacent and consecutive channel depression lengths, designated at **21** and **22** respectively, the length **21**, which is nearer to hole **8**, having a larger cross-section than length **22** which is more remote from said hole, and in that a chamfer **15'** on stake **14** extends from the lower end of said stake to a short distance above the area where the channel depression length **22** joins the channel depression length **21**. As shown in FIGS. 6 and 7, by this cap a delivery of aerosol material is obtained through hole **11** of nozzle **10** by exerting a pressure on the disc-like body **13**, said aerosol material exiting from the container on which the cap is mounted with a flow which at time unit is of a maximum rate, said flow being affected by the losses of pressure encountered by the delivered material on passing through the conduit defined by the surface of the channel lengths **21** and **22** and the opposite surface of chamfer **15'**. If body **5** is counterclockwise rotated (FIG. 7) with respect to body **4**, at time unit lower flows of aerosol delivered material can be provided from nozzle **10** than in the case wherein bodies **4** and **5** are at the mutual positions shown in figures; in fact, in such a case the material exiting from hole **3** of stem **2** will encounter higher losses of pressure than in the previous case on passing through the conduit defined by the surface of channel lengths **21** and **22** and the opposite cylindrical surface of stake **14**.

From the foregoing it is apparent that by a cap according to the invention the flow of material being delivered as aerosol can be varied between zero and a maximum, or between a minimum and a maximum value in a continuous or discontinuous operation, the adjustment being manually workable in a substantially simple and rapid manner by rotation of the disc-like body **13**.

What I claim is:

1. An actuating and delivering cap for dispensers, formed of a first and second bodies angularly movable to each other, wherein the first body has a cylindrical inner cavity of a circular cross-section defined by a wall through which a hole is provided, said hole substantially radially extending to said cavity, and wherein the second body comprises a cylindrical stake rotatably accommodated within said cavity and having on its surface a chamfer extending from an end thereof to the hole of the first body, means being provided for controlling the rotation of said first and second bodies, and means on the side of said chamfered end of the stake for securing the cap on a dispenser, said cavity having two ends which are both open, said means for securing the cap to the dispenser being unitary with the first body, said stake extending into said cavity from one to the other end thereof to occupy only a portion of the length of said cavity and said stake end from which said chamfer extends being that end which is inside the cavity, said means for controlling the rotation being unitary to the other end of the stake, the cavity surface of the first body having a channel depression extending from said hole to beyond the stake end inside said cavity, and the cross-section of said channel depression increasing to said hole, said channel depression being formed of two adjacent and consecutive channel depression lengths, nd the length which is nearer said hole having a larger cross-section than the other length.

2. An actuating and delivering cap for dispensers, formed of a first and second bodies angularly movable with respect to each other, wherein the first body has a cylindrical inner cavity of a circular cross-section defined by a wall through which a hole is provided, said hole substantially radially extending to said cavity, and wherein the second body comprises a cylindrical stake rotatably accommodated within said cavity and having on its surface a chamfer extending from an end thereof to the hole of said first body, means being provided for controlling the rotation of said first and second bodies, and means on the side of said chamfered end of the stake for securing the cap on a dispenser, a nozzle being unitary to said first body, said nozzle projecting from said body and having an outlet hole coaxial with said hole of said first body, an end of said stake projecting from said cavity and being unitary to and projecting from the center of a disc-like body, from the periphery of which a cylindrical wall extends, said cylindrical wall enclosing as a cover at least a portion of said first body, in said cylindrical wall an extended aperture being provided, said nozzle projecting from said aperture and being movable thereto.

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