DISPENSING CAP FOR ATOMIZERS
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ABSTRACT OF THE DISCLOSURE

This invention relates to a novel dispensing cap particularly adapted for use with atomizers of the type having collapsible walls, and is concerned primarily with means for providing rapid recovery or recuperation of the distorted atomizer walls caused by manual squeezing during an atomizing or dispensing operation.

Summary of the invention.

The dispensing or atomizing cap of this invention is characterized by the provision of a movable valve mechanism in a dome-shaped portion of the cap which is arranged for axial movement relative to an internal atomizing mechanism. During the dispensing or compression portion of the dispensing cycle the upward or forward movement of the valve mechanism is limited by the dome-shaped portion of the cap while downward or backward movement of the valve mechanism during the recovery cycle is limited by the internal atomizing mechanism. In addition, the valve mechanism includes a stem in guiding but spaced relationship to the dome-shaped portion of the cap thereby forming a gap or clearance through which air is readily drawn to rapidly recuperate the earlier distortion of the manually squeezed container walls. This rapid recuperation is achieved in the absence of detrimental effects which might otherwise preclude a perfect admixture of air and liquid during the dispensing or compression portion of the dispensing operation.

An added advantage of the dispensing cap is the particular bell-shaped configuration of a valve of the valve mechanism which is rapidly moved in the forward direction when the container wall is squeezed and is additionally guided by the atomizing mechanism in both the forward and backward directions of travel thereof. This guiding of the valve assuages complete close-off of the cap during the compression of the container and prevents the valve from misseating in either the closed or open position thereof.

The above and other structural arrangements which achieve the advantages heretofore noted will be readily apparent immediately hereinafter with reference to the following detailed description and accompanying drawings in which:

Brief description of the drawing

FIG. 1 is an axial sectional view through a novel dispensing cap of this invention, and illustrates a bell-shaped valve which is guided in its reciprocal movement and is limited in its downward movement by an atomizing mechanism of the dispensing cap.

FIG. 2 is an axial sectional view through another dispensing cap of the invention, and discloses a bell-shaped valve which includes an axial dispensing orifice as compared to a generally radial dispensing orifice of the dispensing cap of FIG. 1.

Description of the preferred embodiments

The dispensing or atomizing cap of FIG. 1 includes a peripheral skirt 1 provided with means (not shown), such as screw threads or lugs, for securing the cap to a dispensing or atomizing container (also not shown) of the type having a body wall constructed from collapsible material, such as copolymeric plastic or rubber. The cap includes a dome-shaped portion 2 which is provided with an internal annular valve seat or surface 3 against which is adapted to rest a valve 5 having a stem 6. The stem 6 projects axially upwardly from a bell-shaped conical portion (unnumbered) of the valve 5, and is reciprocally received in an axial bore or aperture 4 of the dome-shaped portion 2. The aperture 4 and the stem 6 are preferably circular in transverse section and an appreciable annular gap or clearance is provided therebetween to facilitate the recuperation of the dispensing container as will be more apparent hereinafter. However, in lieu of the annular gap the stem 6 and aperture 4 can be relatively close fitting but either the stem or the surface defining the bore can be provided with a relatively large axial groove or slot. Irrespective of the structure which provides the clearance heretofore noted, the appreciable clearance permits air to quickly enter the collapsed container and effect the recovery of the collapsible wall thereof to its normally uncollapsed position.

When the collapsible container is squeezed internal pressure acts against the lower surface of the bell-shaped valve 5 urging it forwardly or upwardly against the valve seat 3 whereby the valve 5 seals the annular gap between the stem 6 and the bore 4. The admitted liquid and air is thereby discharged through a generally radially disposed dispensing orifice 7 in the dome-shaped portion 2 of the cap. In the case of the cap of FIG. 2 which corresponds bear reference numerals corresponding to those of FIG. 1, the same operation causes the dispensing of the air-liquid admixture through an axial dispensing orifice 7 in the stem 6 of the valve 5.

The admixture of liquid and air takes place through a suction tube 10 and channels or bores 9 formed in an internally housed atomizing mechanism or nozzle 8 of the cap. The atomizing mechanism 8 is press-fit or otherwise secured in the cap at a position which limits the downward movement of the valve 5 (both FIGS. 1 and 2) and thus accurately limits the size of the valve aperture to assure an efficient atomization of the liquid-air admixture.

It should be particularly noted that the valve 5 of each cap does not interfere with the intake of air through the suction tube 10, which is not true of conventional atomizers, since the dispensing orifices 7 allow unobstructed access of air to the suction tubes 10 independent of the air channels or bores 9 in the atomizing mechanism 8. In addition to the structure heretofore noted which permits rapid recuperation of the collapsible container, the weight of the valve 5 augments the recovery of the container toward its normal uncompressed condition.

While the preferred embodiments of the invention have been heretofore described, it is to be understood that variations thereof may be made in accordance with this invention. For example, the seal between the valve 5 and the valve seat 3 can be increased by positioning a silicone or similar elastic material gasket therebetween. If the liquid which is to be atomized is highly viscous the atomizing mechanism 8 can be provided with additional channels or bores 9.

Referring to the cap of FIG. 1, the dispensing orifice 7 can be positioned midway between its illustrated position and the orifice 4. In this case the valve 5 would include a bore which would be in axial alignment with the noted displaced orifice 7 when the valve 5 is in the position illustrated in FIG. 1 of the drawing.
What is claimed is:

1. A dispensing cap particularly adapted for use with a collapsible walled container comprising a hollow generally dome-shaped portion having an axial bore, a valve, means mounting said valve for reciprocal movement between dispensing and nondispensing positions, an atomizing mechanism housed within said cap, a chamber between said atomizing mechanism and said dome-shaped portion, bore means in said atomizing mechanism for placing said chamber in communication with a container to which the cap is adapted to be secured, and said dome-shaped portion including a valve seat for limiting the movement of said valve toward dispensing position of said valve, and said atomizing mechanism including means for limiting the movement of said valve toward nondispensing position of said valve, said valve being of a bell-shaped configuration, and said atomizing mechanism including a suction tube in underlying relationship to said bell-shaped valve.

2. The dispensing cap as defined in claim 1 wherein said valve includes an axial stem, said stem being reciprocally mounted in said bore, and means provided for forming an appreciable clearance between said stem and said bore.

3. The dispensing cap as defined in claim 1, wherein said suction tube is disposed generally internally of said bell-shaped valve to guide the reciprocal movement thereof toward at least the nondispensing position of said valve.

4. The dispensing cap as defined in claim 1 wherein said valve includes an axial stem, said dome-shaped portion being provided with an axial bore, said stem being reciprocally mounted in said bore, and there being axial channel means between said bore and said stem for admitting air into said chamber.

5. The dispensing cap as defined in claim 1 wherein said valve includes an axial stem, said stem being reciprocally mounted in said axial bore, clearance means between said stem and said axial bore, said valve including a dispensing orifice disposed generally axially thereof, and said suction tube defining said means for limiting said valve in the nondispensing position thereof.

6. The dispensing cap as defined in claim 5 wherein said valve includes a generally downwardly opening concave bell-shaped portion, and said bell-shaped portion being in generally externally telescopic relationship to said suction tube in the nondispensing position of said valve.

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