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COMBINED DISC-RUPTURING AND FLUID-DISPENSING
MEANS FOR PRESSURIZED FLUID CONTAINER
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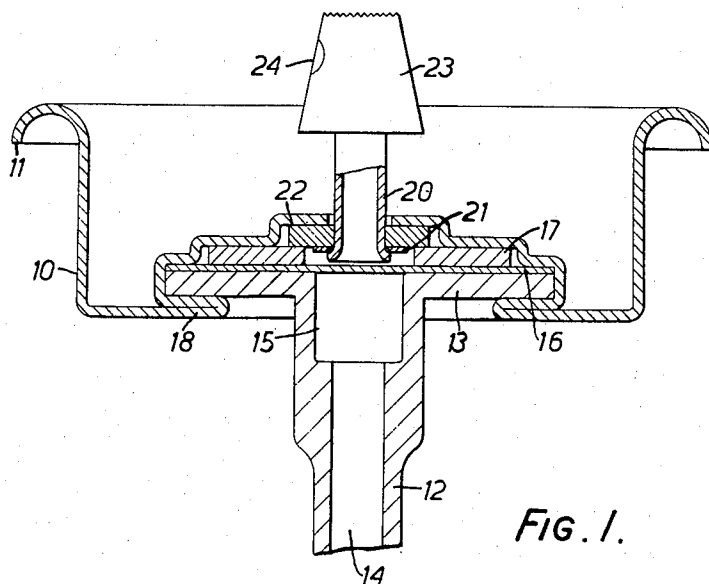


FIG. 1.

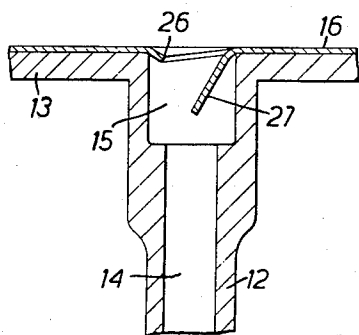


FIG. 2.

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COMBINED DISC-RUPTURING AND FLUID-DISPENSING MEANS FOR PRESSURIZED FLUID CONTAINER

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2 Claims. (Cl. 222—82)

This invention relates to discharge mechanisms for pressurized liquid dispensing containers of the so-called aerosol type. More specifically, the invention is concerned with a discharge control mechanism for an aerosol container of the kind which, once operated, causes the entire contents of the containers to be completely discharged. A discharge mechanism of this kind will normally include a sealing member which is ruptured when the container is required for use.

The invention relates to a construction of discharge control means for a container of this kind, by which improved and more reliable operation is secured.

Features and advantages of the invention will become apparent from the following description of one embodiment thereof, given by way of example, in conjunction with the accompanying drawings, in which:

FIGURE 1 is a fragmentary cross-sectional view of the combined discharged control means for an aerosol container, and

FIGURE 2 is a fragmentary view showing the sealing member in its ruptured condition.

This form of the invention includes a lid or cap member 10, which is intended to be applied to the opening of a suitable container (not shown) for the fluid, the cap being conveniently secured to the container, the opening of which sealingly engages a flange 11. The cap 10 carries a discharge control assembly in the center of its central, dished part. A feed tube 12, intended to extend to the bottom of the container, has at its upper end an outwardly extending annular flange or disc portion 13, which may be integral with it or not, as desired, and a central passageway 14 in the tube member is enlarged at 15, at its upper end. The feed tube is conveniently molded of a suitable plastic material. Extending over the surface of, and in contact with, the disc portion 13, is a rupturable sealing member 16, consisting of a disc of sealing material. An annular sealing washer 17 is disposed above the member 16, and member 16 is clamped between disc portion 13 and washer 17, and these parts are held in sealed contact with the central part of the cap 10, by the cap being turned inwardly as at 18 to apply pressure to the contacting parts.

The construction so far described will seal the container in use, until such time as the sealing member 16 is broken. To enable this to be done, and to provide a suitable outlet for the contents of the container, a control or actuator member is provided. This includes a short tube 20, the lower end of which is arranged to provide a flange. The flange can be integral with the tube and made by suitably expanding the tube or, as shown, the lower end can be opened out, so as to retain a small metal washer 21. Above the washer 21 is a further washer 22 of resilient material, such as neoprene, which is accommodated within a fitting recess formed in the center portion of the cap 10. To tube 20 is attached a button 23, having in it a spray forming nozzle which is indicated generally at 24 and which communicates with the bore of tube 20.

To release the contents of the container, so that they will be discharged as a fine spray from nozzle 24, the button 25 is pressed downwardly, sliding through washer

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22 as it does so. The end of tube 20 will thereby impinge upon the sealing disc 16 and eventually break it, permitting the contents of the container to discharge through passageway 14, through the enlarged part 15 of the passageway and then through tube 20 to the nozzle 24.

The sealing member 16 is made of a material such that when the container is used in this way, the sealing member will be both deformed and broken. While a variety of materials can be used, a soft metal such as aluminium, tin, or lead which can be stretched fairly easily beyond its elastic limit is preferred. It is further arranged that the diameter of the lip of the enlarged part 15 of the passageway 14 is of greater diameter than the lower part of tube 20. Consequently, when the tube is pressed downwardly, the sealing member 16 will first yield and stretch, before it is finally punctured by the downwardly moving tube. As a result of this, the sealing member will be deformed somewhat in the way indicated in FIGURE 2. It will be seen that the edge of the hole formed by the tube 20 is coned as at 26; further it will occur, that the portion 27 of the disc 16 that is forced away in the opening operation will probably remain attached to the sealing member 16.

With this arrangement it will usually occur that the part 27 that is broken out of disc 16 will be incompletely detached, and will be retained in the downward position shown by the passage of tube 20. However, should tube 20 be forced upwardly, for example by the pressure of the contents of the container, the part 27 might be carried upwardly also by the forces produced towards the horizontal plane of the opening from which it was produced. Should this occur it is not possible for part 27 to close completely the opening formed at 26 in the sealing member since the deformation of the disc causes the hole to be longer than, or of different shape from, the part 27. In this way the possibility is avoided of the broken part of the sealing member obstructing the opening sufficiently to prevent the contents of the container being discharged.

It will be appreciated that other modes of construction can be adopted, with the same object of that once the sealing member 16 is broken, the opening caused in the sealing member is not of the same shape or size as that portion which is ruptured from it in the opening operation.

In the foregoing description it has been assumed that the cap 10 closes an opening which is at the top of the container when the discharge control mechanism is in use and a feed tube 12 extending to the bottom of the container is necessary to ensure that substantially all of the liquid contained in the container is expelled. It will be appreciated however that where the container can conveniently be used to produce a spray with the discharge control mechanism at the bottom of the container, feed tube 12 can be omitted. In this case the disc portion 13 is a separate element having a central aperture greater in size than the end of tube 20 to ensure deformation of the sealing member 16 prior to rupture thereof.

With this arrangement the end of tube 20 is exposed to the contents of the container when the sealing member is ruptured and if, as may well be the case with powder dispensers, a ball or marble provided in the container for agitating the contents so as to mix the propellant with the material it is desired to dispense, should become positioned at the inner end of tube 20 such tube is likely to become blocked, or at least partly so, with a consequent reduction in efficiency. Equally if no such ball or marble is included but the material in the container is liable to form lumps, such lumps could lodge in or over the end of tube 20 and produce a similar result.

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In order to overcome these possible disadvantages tube 20 is preferably slotted axially at its inner end or is provided with one or more radial bores near its inner end so that even if such end should become blocked or partly blocked the slots or bores permit a satisfactory flow of container contents through tube 20.

What I claim:

1. Discharge means for dispensing pressurized fluid from a container having an upper wall containing an opening, comprising rigid cap means including a vertical tubular wall adapted for mounting in the container opening, and a horizontal bottom wall connected with the lower end of said tubular wall, said bottom wall containing an opening;

a vertical feed tube extending downwardly through said bottom wall opening and including at its upper extremity a radially outwardly extending annular flange seated upon the upper surface of said bottom wall, said feed tube containing a vertical passageway having at its upper end an orifice of a given diameter; a deformable and rupturable soft metal sealing disc seated upon the upper surface of said flange portion to close the feed tube orifice;

an annular sealing washer seated upon the upper surface of said sealing disc and arranged coaxially relative to said feed tube orifice, said sealing washer containing a bore the diameter of which is at least as great as the orifice diameter;

a resilient annular washer seated upon the upper surface of said sealing washer and coaxially arranged relative to said feed tube orifice, said resilient washer containing a bore the diameter of which is less than said orifice diameter;

means rigidly clamping said flange, said disc and said washers downwardly upon the said bottom wall;

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and a vertical actuator member having a tubular lower portion mounted for vertical sliding movement in the bore of said resilient washer, the lower extremity of said tubular portion being parallel with the upper surface of said disc and having an outer diameter which is less than the orifice diameter, said actuator member having at its upper end a discharge nozzle communicating with the bore of said tubular portion, whereby upon axial displacement of said actuator member in the direction of said feed tube, the tubular lower extremity of said actuator member successively deforms and ruptures said sealing disc so that the ruptured parts are incapable of reforming the seal.

2. Discharge means as defined in claim 1 wherein said tubular portion terminates at its lower end in an outwardly-flaring flange portion the outer diameter of which is less than the diameter of the feed tube orifice, and further including a rigid washer mounted on said flange portion within the bore of and spaced from said sealing washer for engagement with the lower surface of said resilient washer.

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