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AEROSOL DISPENSERS HAVING AN ALUMINUM IMPACT EXTRUSION CONTAINER

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Fig. 1

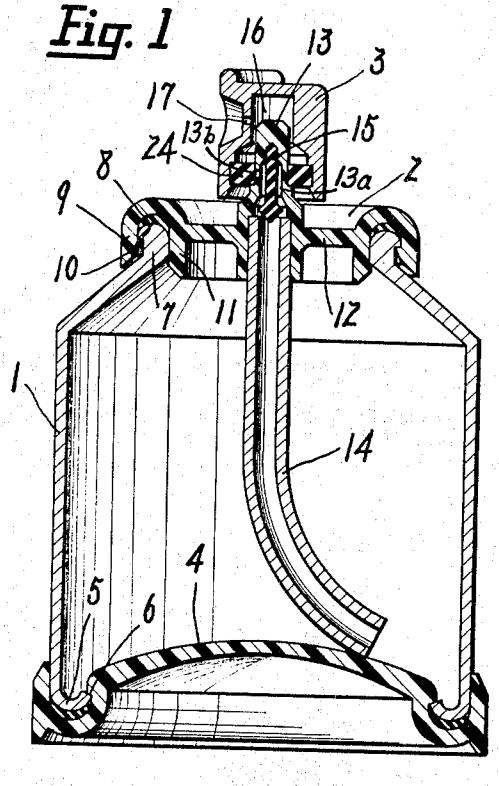


Fig. 2

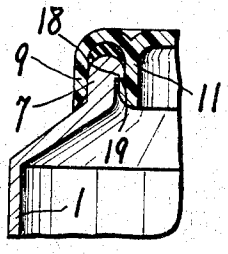
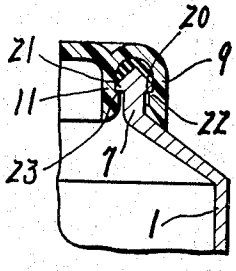


Fig. 3



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ABSTRACT OF THE DISCLOSURE

The present application is concerned with an improvement in aerosol dispensers and particularly such a dispenser having an aluminium body with an open annular end which curves inwardly and upwardly and an annular mouth with at least one side step therein facing downwardly, a plastic bottom having an annular recess with a side step in which is positioned the bottom end of said body and a plastic top supporting valve means and having coaxial walls with at least one side step therein engaging the side step of the body mouth for providing an aerosol dispenser container.

An object of the present invention is to provide a mass-production feasible aerosol dispenser for containing a gas dissolving liquid generally under several atomic pressures.

Another object of the present invention is to provide a simple but reliable means for supporting a discharge valve means on an aluminum impact extrusion container.

Still another object of the present invention is to provide a simple but reliable seal means for aluminum impact extrusion containers.

An aerosol dispenser according to the present invention comprises an aluminum impact extrusion container for containing liquid under gas pressure and a mounting cap molded out of synthetic resin for supporting discharge valve means, said container having a cylindrical mouth brim **7** being provided with an annular step **8** or **18**, or annular steps **20** and **21** projecting laterally from said brim **7** and facing downwardly, said mounting cap having a lateral disc portion **12** connecting annularly an inner annular wall member **11** and an outer annular wall member **9**, for touching said brim **7**, either or of both said wall members being provided respectively with an annular step **10** or **19**, or annular steps **22** and **23** projecting laterally respectively from either or both of said inner and outer wall members **11** and **9** and facing downwardly for engaging said brim **7** annular step **8** or **18**, or said annular steps **20** and **21**, the center top of said disc portion **12** connecting a center post **13** provided with an axial bore for placing in communication liquid to be contained in said container and an orifice provided laterally through said center post **13** wall, the outer end of said orifice normally engaging an annular resilient valve member **24** inner face for opening and closing said orifice.

Heretofore, a pressure container for aerosol dispenser has been either a glass bottle or a can made of tin-plate. And, the container mouth was closed by a mounting cap made of tin-plate and being of a cup-like form. The cylindrical side wall lower portion of said mounting cap was fixed to the container mouth wall inside by a mechanical enlargement of said side wall lower portion for sealing the container mouth.

Accordingly, old or known mounting caps cannot be fixed to cans or bottles without a special machine. Besides, the assembly of the parts of an aerosol dispenser by the mcehanical means alluded to above often fails to produce a satisfactory product.

According to the present invention, however, not only the above-mentioned drawbacks of known structures of aerosol dispensers are removed but an extensive advantage for the mass-production thereof can be provided.

The effects and advantages of the present invention will be apparent by reference to the following description taken in connection with the accompanying drawings, in which:

FIG. 1 is a vertical sectional view of an aerosol dispenser according to the present invention equipped with a push button and a resilient valve means.

FIG. 2 is a vertical sectional view of the mouth portion of a modification of an aerosol dispenser shown in FIG. 1.

FIG. 3 is a vertical sectional view of the mouth portion of another modification of an aerosol dispenser shown in FIG. 1.

In FIG. 1, **1** is an aluminum impact extrusion container for containing a solution under pressure of an expellent gas. The container **1** has a mouth brim **7** which is provided with an annular step **8** and a bottom end brim **5** which curves inwardly. **2** is a mounting cap which has an inner wall member **11** and an outer wall member **9**. A step **10** of said outer wall member **9** engages the step **8** of the container mouth brim **7**. **13** is a center post which encases a rod valve **15** in its axial bore **13***a*. **14** is a dip tube through which the solution passes upwardly through a valve orifice **13***b* into chamber **16** for discharging from nozzle orifice **17** when push button **3** is pushed down and the resilient valve member **24** yields for opening said center post valve orifice. The rod valve **15** moves downwardly, and engages the dip tube upper end for checking the injection when a solution under pressure is to be refilled through the center post valve orifice. **4** is a bottom plate molded out of synthetic resin for example nylon which has a suitable strength and flexibility. The bottom plate **4** is provided with an annular step **6** which projects outwardly and faces downwardly for engaging the container **1** bottom end brim **5** cut end which faces upwardly.

For filling the above-mentioned aerosol dispenser, container **1** is closed by mounting cap **2** equipped with a resilient valve member **24** and a push button **3**, bottom plate **4**. Said mounting cap **2** or said bottom plate is mounted easily to the container **1** by pushing the former or the latter axially. A solution under pressure of a soluble expellent gas is chilled for lowering the pressure of said gas and the container under a chilled state is filled with the solution through the mouth or bottom, whichever is left open. Then, the remaining opening of the container is closed by said mounting cap **2** or said bottom plate **4**, whichever has not been mounted to the container prior to filling operation.

At normal temperatures, the gas pressure in the container acts on bottom plate **4** and which pressure pushes the bottom plate downwardly for strengthening the engagement of annular step **6** and said container bottom **5** end. At the same time, the annular brim of said bottom plate **4** is pushed upwardly for tightening the engagement of said bottom plate brim upper face and said container bottom **5** lower face, because the contact point of said annular step **5** and said container bottom **5** end forms a fulcrum.

Before mentioning functions and merits of this invention which includes those of aluminum impact extrusion container **1** and mounting cap **2**, modifications of the foregoing aerosol dispenser will be explained.

In FIG. 2 and FIG. 3, numerals corresponding to those in FIG. 1 correspond to those portions which those numerals indicate. In FIG. 2, an inner wall member **11**

of a mounting cap is provided with an annular step **19** which engages an annular step **18** provided in a brim **7** of a container mouth.

In FIG. 3, both inner wall member **11** and outer wall member **9** of a mounting cap are provided with annular steps **22** and **23** for engaging respectively annular steps **20** and **21** provided in a brim **7** of a container mouth.

As a container for an aerosol dispenser it is difficult to provide, a glass bottle or a tin-plate can with a mouth brim having an annular step such as shown in the foregoing. Only aluminum impact extrusion containers can provide such annular steps in the container mouth brim without a rise in manufacturing costs of containers. Such annular steps provide almost immobile fulcrum to a synthetic resin mounting cap flexible members when an annular step of said mounting cap engages said container mouth brim annular step. Once a fulcrum is formed between said container and mounting cap steps by a stress of gas acting on said mounting cap, inner and outer wall members which are flexible and somewhat resilient stresses and holds the container mouth brim securely and forms a tight seal against leakage of gas. Besides, mounting operations of mounting caps to containers according to the present invention do not require special machines and are easy for mass-production.

Having thus described my invention what I claim is:

1. An aerosol dispenser comprising an aluminium impact extrusion container wall means for containing liquid under pressure of gas, said container wall means having a cylindrical upright mouth brim provided at least with one annular step projecting laterally from said brim and facing downwardly, and said container wall means

having a bottom opening defined by an annular bottom end of said container side wall, said side wall bottom end being bent inwardly, having an annular form end facing substantially upwardly, a mounting cap of synthetic resin, discharge valve means supported on said mounting cap, said mounting cap having a disc portion connecting coaxially inner and outer cylindrical wall members with said container mouth brim extending therebetween, at least one of said cylindrical wall members being provided with an annular step projecting laterally from said wall member and facing upwardly and engaging said annular step of said container mouth brim, a soft and elastic gasket being interposed between said container mouth brim upper end and said mounting cap bottom plate, a bottom plate of synthetic resin, said bottom plate defining said container bottom end and having an annular step facing downwardly and engaging said annular end of said container side wall bottom.

References Cited

UNITED STATES PATENTS

2,748,984	6/1956	Seymour	222—569 X
2,854,176	9/1958	Edwards	222—402.25 X
3,076,609	2/1963	Stocker	222—402.24 X
3,080,993	3/1963	Livingstone	220—60 X
3,138,304	6/1964	Raehs	239—337 X
3,195,787	7/1965	Kitabayashi	239—579 X
3,221,946	12/1965	Riley	220—402.2 X
3,268,106	8/1966	Satz	220—60

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