SNAP-IN VALVE

Inventor: John Richard Focht, Yonkers, N.Y.
Assignee: Precision Valve Corporation, Yonkers, N.Y.
Filed: May 7, 1971
Appl. No.: 141,207

U.S. Cl............ 222/402.24, 29/510, 29/516, 285/DIG. 22
Int. Cl................ B65d 83/14
Field of Search ... 222/402.1, 402.24; 29/510, 29/516, 453; 285/319, DIG. 22

References Cited
UNITED STATES PATENTS
1,267,076 5/1918 Hudson 285/319 X
1,661,674 3/1928 Osborn 285/319
2,687,831 8/1954 Miller 285/DIG. 22
2,957,611 10/1960 Sagarin 222/402.24

FOREIGN PATENTS OR APPLICATIONS
76,994 11/1961 France 224/402.24

ABSTRACT
An aerosol valve assembly incorporates conventional valve parts in a plastic retainer member by means of tabs struck inwardly from the material of the retainer. The assembly of valve and retainer members is forced into an aperture in a modified container end closure. A secure seal to the end closure is established.

4 Claims, 2 Drawing Figures
SNAP-IN VALVE

The present invention is concerned with a valve structure for use with a pressurized aerosol dispenser. Most aerosol valves comprise a gasket, valve body and spring in a valve housing. These parts are held in proper assembly by means of a crimp or the like in the pedestal portion of a metal valve mounting cup. The mounting cup, when assembled with the valve parts and a product ejection tube, is sold as a unit for later seam rolling attachment to a mouth aperture in the top end closure wall of a container. U.S. Pat. No. 2,631,814 to Robert H. Abplanalp shows such a valve and mounting cup.

The present invention incorporates conventional aerosol valve parts in a one piece plastic retainer member which utilizes a novel valve retention means and which is particularly adapted for assembly with a modified metal end closure for the container. The assembly techniques made possible by the novel structure reduce assembly costs while providing an extraordinarily secure and leak-proof attachment.

The present invention provides a structure which is inexpensive and is well suited to automatic assembly. It uses presently available internal valve parts which have well established economy and reliability. The present invention allows the elimination of the conventional metal valve mounting cup and its seal to the container and permits the greater use of economical plastic materials. All plastic aerosol valve assemblies which eliminate metal valve mounting cups have been before proposed. See for example U.S. Pat. No. 2,985,342 to John R. Focht. The structure of the present invention improves over such previous proposals in its adaptability to automatic assembly and in its ability to withstand excessive container pressures without leakage.

In the drawings:

FIG. 1 is an elevational view in section showing the valve structure and end closure of the present invention, and

FIG. 2 is a view in partial section of the structure of FIG. 1 in an exploded form prior to assembly.

Referring now to the drawings, a domed metal end closure 10 is provided with a peripheral seam configuration 11 conventional for securing end closures to pressurized aerosol containers. A plastic valve assembly 60 is secured and sealed in a central aperture in the end closure 10. The manner of securing will be described in detail later in this disclosure. Although any of several plastic materials are useful, nylon is particularly well suited to fabrication of the parts used in this invention.

The valve assembly 60 comprises a molded plastic retainer member 20, a valve housing 30, a movable valve body 40 including a hollow valve stem 42 for receiving an actuating button 70 and includes a product passage in the hollow stem interior. A valve orifice 44 extends transverse to the valve stem passage and is sealed by the edge of the aperture of annular resilient sealing gasket 46 when the valve is closed, but is exposed to the pressurized product in the container when the valve stem 42 is depressed against the upward bias of valve spring 48. The resilient gasket 46 is held away from sealing engagement with the valve orifice 44 in a manner described in the aforementioned Abplanalp U.S. Pat. No. 2,631,814 to discharge the product.

Retainer member 20 is adapted to be force-fitted in sealing engagement with the end closure 10 of the container with the cylindrical skirt portion 22 extending through a central aperture in the end closure. The exterior surface of cylindrical portion 22 below radial flange 28 is provided with an annular sealing bead 21 and an annular shoulder portion 23. End closure member 10 is provided with a central aperture bordered by an inwardly projecting tapered flange 13. The diameter of the aperture is slightly less than the exterior diameter of cylindrical skirt portion 22 of the retainer member 20 to provide an interference fit when the retainer member is forced into the aperture. When the retainer member 20 is seated with the aperture, the lower edge of tapered flange 13 bears against the sloping face of annular shoulder 23 to retain the retainer member in place under conditions of container pressurization. The metal edge of the end closure aperture bites into the plastic of the shoulder portion 23 to establish a first pressure seal. Annular sealing bead 21 formed on the retainer member 20 bears against the tapered flange 13 with considerable radial compression to establish a further pressure seal. End closure 10 is provided with a shallow conical depressed region 12 surrounding the central aperture. When fully seated, the radial flange 28 of the plastic retainer member is deflected into a matching shallow conical configuration as is shown in FIG. 1. The deflection of the radial flange 28 of retainer member 20 causes the lower edge of tapered flange 13 to maintain an appreciable compressive force against the annular shoulder portion 23 upon which it bears. The retainer member 20, when forced into sealing engagement with the end closure aperture, is in a stressed condition which provides a high degree of attachment security and pressure sealing integrity.

The assembly of the plastic retainer member 20 and the end closure 10 is capable of withstanding excessive internal container pressure. Internal pressure tends to force the annular shoulder 23 into deeper engagement with the edge of the end closure aperture. Further, as
3,845,888

The completed valve assembly 60 or the further assembly of the valve assembly 60 with an end closure 10 can constitute marketable units which are fitted to a container along with product and propellant to form a complete dispenser package. Since the retainer member will accept conventional or stock valve parts, the full range of stock valve options and know how is available to be utilized with the present invention to tailor the valve to the particular product and package.

1 claim:

1. The combination of a metal end closure for a pressurized dispenser container, a valve unit and a plastic retainer for mounting the valve unit, the end closure including a central aperture defined by an axially inwardly projecting flange, the retainer including a cylindrical skirt portion for receiving a valve unit, the retainer including a resilient radial flange abutting the exterior surface of the end closure, the cylindrical skirt portion extending through the end closure aperture and including an annular shoulder against which the edge of the end closure flange bears to lock the retainer in place in the aperture, the end closure including a conical inward depression circumscribing the aperture whereby the radial flange of the retainer is deflected into conforming abutment with said conical depression, the cylindrical skirt portion of the retainer also including a plurality of tabs integral with a lower portion of the skirt and extending inwardly, the free ends of the tabs bearing axially against the valve unit.

2. A valve unit and a plastic valve retainer member assembly for a pressurized container, wherein the valve unit comprises a valve housing, a valve body, a valve spring and a valve gasket and wherein the valve retainer member is provided with a hollow cylindrical skirt portion including an exterior annular shoulder and an exterior annular sealing bead and is also provided with a radial flange, said assembly being adapted for mounting in an end closure for the container provided with a central aperture defined by an axially inwardly projecting flange, such that the annular shoulder bears against the edge of said central aperture, the annular sealing bead bears radially against said inwardly projecting flange, and the radial flange of the retainer member overlies and butts said end closure, said skirt portion also including a plurality of tabs integral with a lower portion of the skirt and extending inwardly, the free ends of the tabs bearing axially against the valve unit to retain it in the retainer member.

3. A valve unit and valve retainer member assembly according to claim 2, wherein the radial flange of the retainer member is deflected into close engagement with a shallow conical portion of the end closure bounding said central aperture.

4. A valve unit and valve retainer member assembly according to claim 3, wherein the cylindrical skirt portion terminates in an upper end wall, through which a hollow valve stem portion of the valve body extends, the valve gasket being pressed against the end wall by an adjacent top rim of the valve housing under the axial bearing of said tabs.