United States Patent

Krupp et al.

[15] **3,679,091**

[45] **July 25, 1972**

[54] VENTED CURL FOR AEROSOL DOME

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[22] Filed: **April 9, 1970**

[21] Appl. No.: **26,965**

[52] **U.S. Cl.**.....**220/61,** 220/74, 222/182

[51] **Int. Cl.**.....**B65d 7/42**

[58] **Field of Search**.....220/44 R, 66, 67, 74; 222/182, 222/402.1, 402.25

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[57] **ABSTRACT**

An aerosol dome having a lower end adapted to be attached to a container and an upper end having an opening surrounded by an outwardly turned wall. The outwardly turned wall has a free end portion in overlapping and contacting engagement with an outer surface of the dome to define an enclosed area of uniform cross-sectional configuration. The integral outwardly turned wall has openings defined therein with at least a portion of each of the openings being spaced from the free end portion and the adjacent outer surface of the dome to place the enclosed area in communication with the surrounding atmosphere. In one embodiment the opening is produced by forming a recess extending from the free edge through the free end portion with the base of the recess being spaced from the adjacent outer surface of the dome. In an alternative embodiment the opening is defined by an aperture extending through the wall at a point spaced from the free end.

5 Claims, 5 Drawing Figures

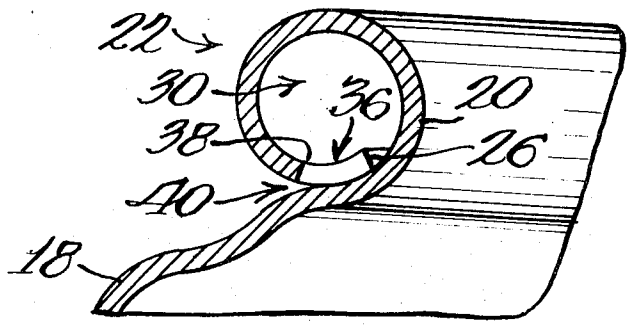


Fig. 1.

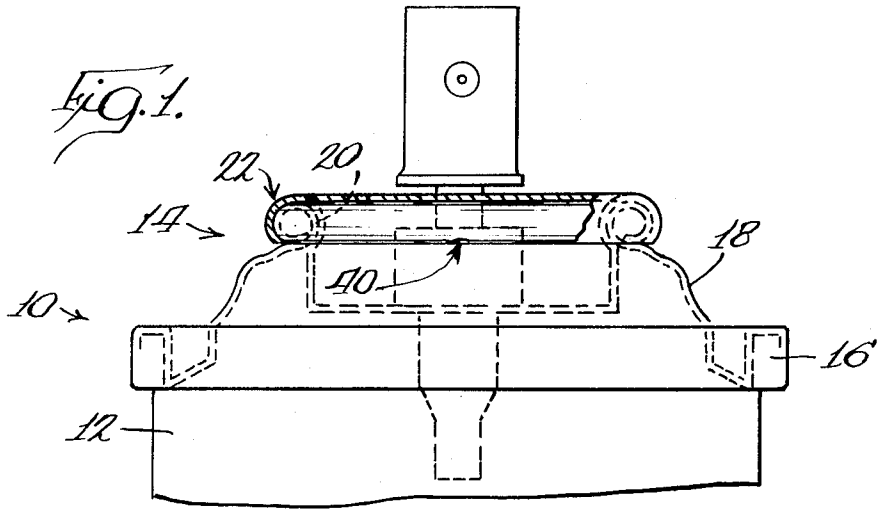


Fig. 2.

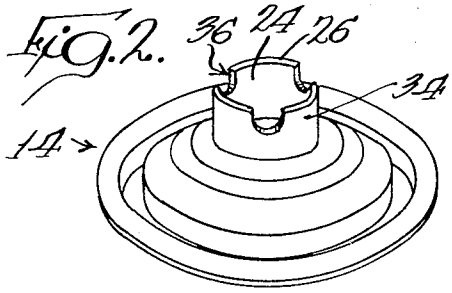


Fig. 3.

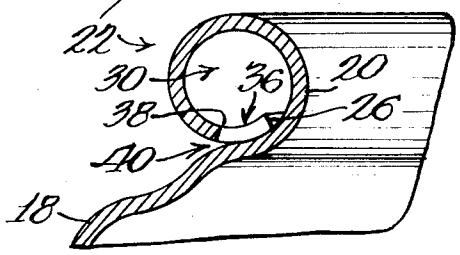


Fig. 4.

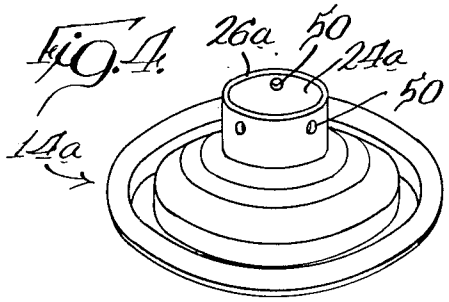
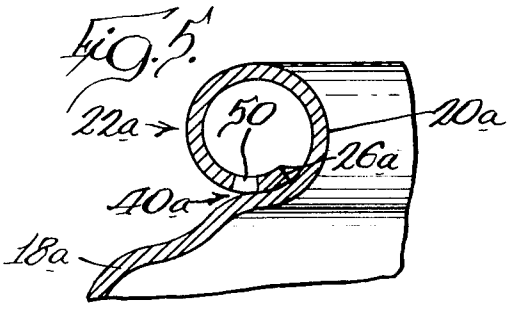


Fig. 5.



VENTED CURL FOR AEROSOL DOME

BACKGROUND OF THE INVENTION

The present invention relates generally to containers and more particularly to container ends of the type having an outwardly turned wall producing a curl, or, a bead, surrounding an opening in the end of the container.

One type of container that has been extensively used is commonly called an aerosol container and consists of a container body having a container end secured thereto. The container end is commonly referred to as an aerosol dome which has a lower end portion connected to one free end of the cylindrical container body with the upper end of the dome having an opening which is designed to receive a mounting cup supporting a conventional valve mechanism. Generally, the aerosol dome has an outwardly deformed or turned wall which produces a bead for supporting the mounting cup, which includes an annular downwardly opening channel that receives and is crimped to the bead or the curl.

Experience has shown that, in many instances, it is desirable to have an end portion adjacent the free edge of the outwardly turned wall located in overlapping contacting relationship with the adjacent outer surface of the end panel forming the aerosol dome. The overlapping and contacting relationship results in sufficient integrity of the bead to prevent any distortion of the bead while the mounting cup is crimped to the dome.

While such an arrangement has been found satisfactory to maintain the integrity of the bead, problems have been encountered with this arrangement. It has been determined that in some types of filling operations, such as the "under-the-cap" filling, the propellant and/or product will enter the closed internal area of the bead and become trapped therein after the filling is terminated and the valve cup is crimped to the container end. Both the trapped propellant and the trapped product are undesirable and may result in discarding the entire container including the contents. The propellant, which is in a gaseous state at room temperature and substantially atmospheric pressure, will tend to escape from the enclosed area of the bead while the container is being tested for leakage. Generally, this test encompasses immersing the entire container in a body of warm water and making a visual inspection of whether bubbles are produced in the body of water. During such a test, it has been found that the propellant will tend to escape from the enclosed area of the bead and will falsely indicate a "leaker" resulting in the discarding of the entire container when in reality the container is of satisfactory construction and no contents are actually leaking from the container itself.

The trapped liquid within the enclosed area of the bead or curl is also undesirable since it has been found that many times the trapped fluid will tend to leak out after the container has been shipped to the retailer and will indicate to the retailer that the container is leaking, again resulting in discarding the entire container and contents.

Thus, there still remains a need for an aerosol dome having a valve mounting cup supporting bead which has sufficient integrity to prevent distortion while the mounting cup is secured to the bead and prevent the trapping of propellant and/or product within the internal area of the bead.

SUMMARY OF THE INVENTION

The present invention contemplates the formation of a bead which has sufficient integrity to prevent distortion while the mounting cup is secured thereto and still be designed to prevent the trapping of any propellant or product within the internal area of the bead. The present invention contemplates the formation of a bead surrounding an upper open end of an aerosol dome or container end which is formed by outwardly turning an upwardly extending cylindrical wall or neck to place the free edge and the adjacent end portion of the wall in overlapping engagement with the outer surface of a panel forming the container end.

According to the present invention, the entire circumferential length of the bead is rolled to define an enclosed area having a uniform cross-sectional configuration throughout the circumferential length thereof and the wall has means extending therethrough for venting the enclosed area to the surrounding atmosphere. The uniform cross-sectional internal area or configuration of the bead is defined by rolling the outwardly turned wall to a substantially constant radius and the venting means takes the form of an opening extending through the wall at a point spaced from the free end portion which is in overlapping engagement with the adjacent outer surface of the body or panel.

In one embodiment, the opening is defined by producing a recess in the wall extending from the free edge through the free end portion and terminating at a point spaced from the adjacent outer surface of the aerosol dome. In an alternative embodiment, the opening is provided by forming an aperture through the wall which is spaced from the free edge a sufficient distance to have at least a portion of the aperture spaced from the adjacent outer surface of the aerosol dome. It is also contemplated that the vent means be located at circumferentially spaced locations on the bead.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF DRAWINGS

FIG. **1** shows a fragmentary side elevation view of an aerosol container having a valve mechanism secured in the upper open end of the aerosol dome;

FIG. **2** is a perspective view of the aerosol dome showing the upwardly extending wall or neck before being deformed to its final configuration;

FIG. **3** is a fragmentary vertical section of the upper end of the aerosol dome showing the cylindrical wall in its deformed final configuration;

FIG. **4** is a perspective view similar to FIG. **2** showing an alternative embodiment of the invention; and

FIG. **5** is a sectional view similar to FIG. **3** showing the final configuration of the alternate embodiment of the present invention.

DETAILED DESCRIPTION

While this invention is susceptible of embodiment in many different forms, there is shown in the drawings and will be herein described in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principals of the invention and is not intended to limit the invention to the embodiments illustrated.

FIG. **1** of the drawings discloses an aerosol container **10** including a generally cylindrical container body portion **12** having a container end or aerosol dome **14** fixedly secured to the open upper end thereof by a well-known double seam **16**. The container end or aerosol dome **14** includes a panel or body **18** having its lower end attached to the cylindrical container **12** by the double seam **16** and an upper end having an opening **20**. The opening or upper open end **20** is surrounded by a bead or curl **22**. The bead or curl **22** is formed by outwardly displacing or deforming an upwardly extending cylindrical wall or neck **24** to place the free edge **26** of the wall and an adjacent end portion or segment **34** of the wall in overlapping or contacting engagement with the adjacent outer surface of the body or panel **18**. The outwardly turned wall thus cooperates with the adjacent outer surface of the panel **18** to produce a closed internal area **30** having a uniform cross-sectional configuration throughout the circumferential length of the bead **22**. Stated another way, the outwardly turned wall has what will be referred to as a substantially constant internal radius to define the uniform cross-sectional configuration of the internal area of the bead. It will be appreciated that there is a small variation in the internal radius at different locations of the outwardly deformed wall because the free edge **26** and the adjacent end portion or segment **34** are actually in overlapping

relation to the outer surface of the body or panel **18**, which forms the initial part of the internal enclosed area **30** of the bead **22**. The container end, of the present invention, incorporates means in the wall **24** for venting the closed internal area of the bead to the surrounding atmosphere.

In the embodiment illustrated in FIGS. **1**, **2**, and **3**, the means for venting the enclosed internal area **30** of the bead **22** takes the form of a plurality of circumferentially spaced recesses **36**, each of which extends from the free edge **26** through the overlapping segment **34** with the base portion **38** of the recess terminating at a point spaced from the adjacent outer surface of the body **18** to produce an opening, generally designated by the reference numeral **40**. The opening **40** is rather small but is sufficient in size to allow the propellant, which is in a gaseous state at room temperature and substantially atmospheric pressure, to be released from the internal area **30** after the pressure filling head has been removed. Likewise, any trapped propellant, which is in a liquid state at room temperature and at atmospheric pressure, will be allowed to drain from the internal enclosed area **30** of the bead.

A slightly modified embodiment of the present invention is disclosed in FIGS. **4** and **5** wherein like reference numerals have been utilized and the suffix *a* added. In the modified embodiment, the circumferentially spaced openings **40***a* are produced by forming a plurality of circumferentially spaced apertures **50** on the upstanding wall or neck **24***a* at a point spaced from the free edge **26***a*. The apertures extending through the wall **24***a* are spaced from the free edge a sufficient distance to have at least a portion of each of the apertures spaced from the adjacent outer surface of the body or panel **18***a*, as is clearly illustrated in FIG. **5**.

Thus, it will be seen that the present invention provides a simple and effective manner for venting the internal enclosed area of a bead while still maintaining the integrity or rigidity normally required to prevent any distortion of the bead or curl while the valve cup is being crimped thereto. It will be appreciated that the present manner of venting can readily be incorporated into the normal method of forming the aerosol dome as part of one of the several steps normally utilized in the formation of the dome or as a separate step in the formation process. The vented curl or bead forming part of the dome can be incorporated into any dome structure without any substantial additional cost in the manufacturing process.

What is claimed is:

1. In an aerosol dome of the type having a dome body portion attached to a container and with a wall terminating in a free edge and an upper end with an opening defined by a vented curl formed by an outwardly turned portion of said wall, said curl defining a closed internal area, and a mounting cup within said opening and having a bead surrounding and crimped to the major external portion of said curl, the improvement in said curl comprising: a segment of said outwardly turned portion adjacent said free edge being in overlapping engagement with and in a plane parallel to an adjacent outer surface of said dome body portion; said closed internal area having a uniform cross-sectional configuration throughout its circumferential length; an opening means extending through said outwardly turned portion in an area between said overlapping portion and said major portion of said curl to which said mounting cup is crimped, for venting and draining said closed internal area to the surrounding atmosphere.

2. An aerosol dome as defined in claim **1**, in which said last means comprises a recess extending from said free edge and having a base spaced from said outer surface and said overlapping segment.

3. An aerosol dome as defined in claim **1**, in which said last means comprises an aperture defined by said wall, said aperture having at least a portion spaced from said overlapping segment.

4. An aerosol dome as defined in claim **1**, in which said last means comprises a plurality of circumferentially spaced recesses defined by said wall and extending from said free edge through said end portion and terminating at a point spaced from the adjacent outer surface.

5. An aerosol dome as defined in claim **1**, in which said last means comprises a plurality of circumferentially spaced openings extending through said wall and spaced from the free edge a sufficient distance to have at least a portion of the opening spaced from the adjacent outer surface.

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