

Reinnagel

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[54] SAFETY VENTING APPARATUS
COMBINED WITH AN AEROSOL
CONTAINER

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[58] **Field of Search**...220/89 A; 222/397, 5, 80, 396,
222/402.1

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[57] **ABSTRACT**

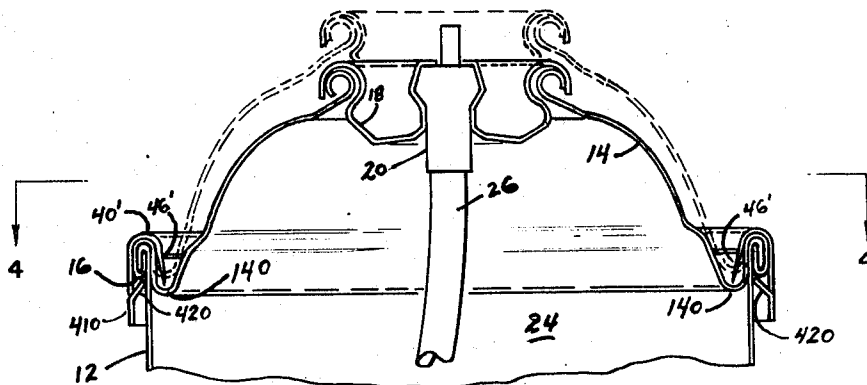
An aerosol container combined with apparatus to relieve excessive interior pressures in the form of a fluted stab located adjacent a pressure deformable portion of the container such that upon deformation thereof the stab will make contact and pierce an opening therethrough.

[56] **References Cited**

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2 Claims, 7 Drawing Figures



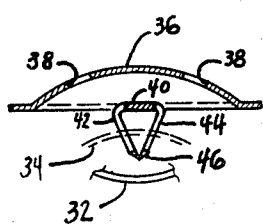
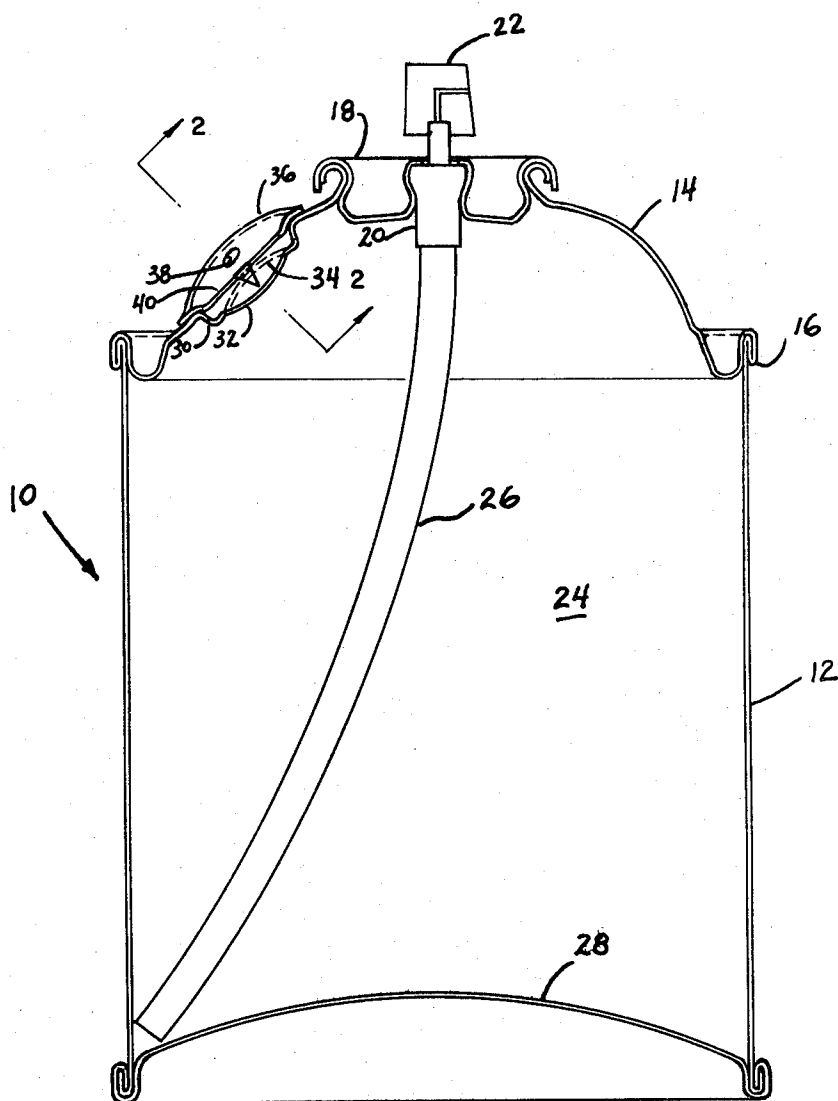


FIG. 1

FIG. 2

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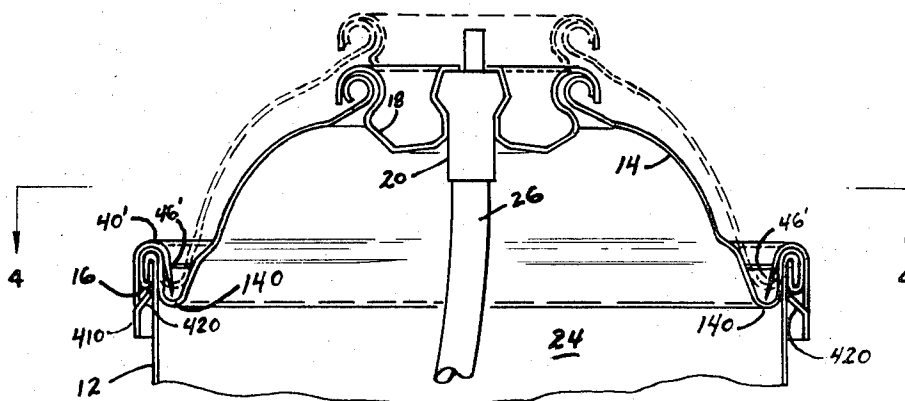


FIG. 3

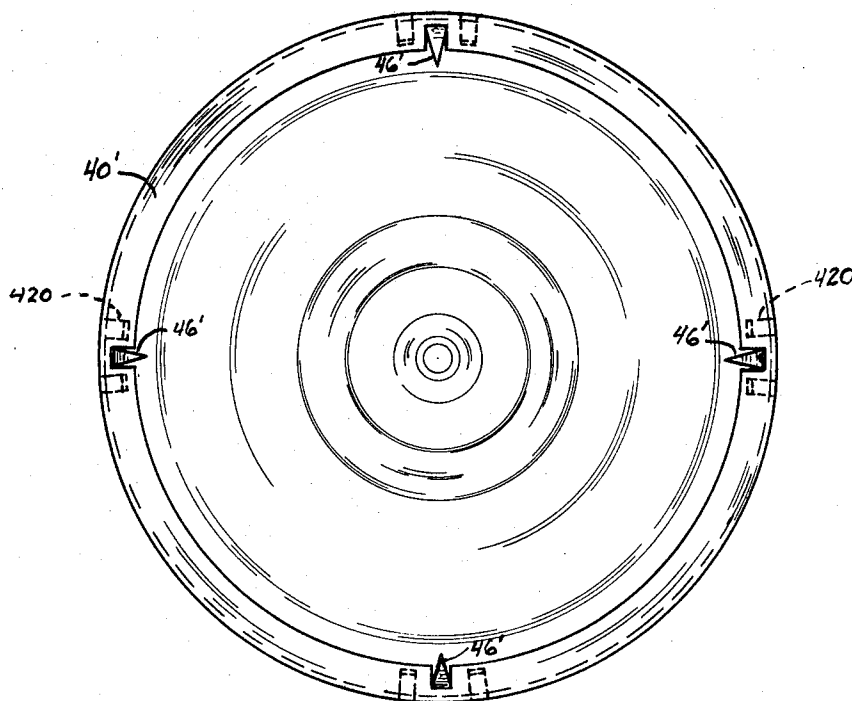


FIG. 4

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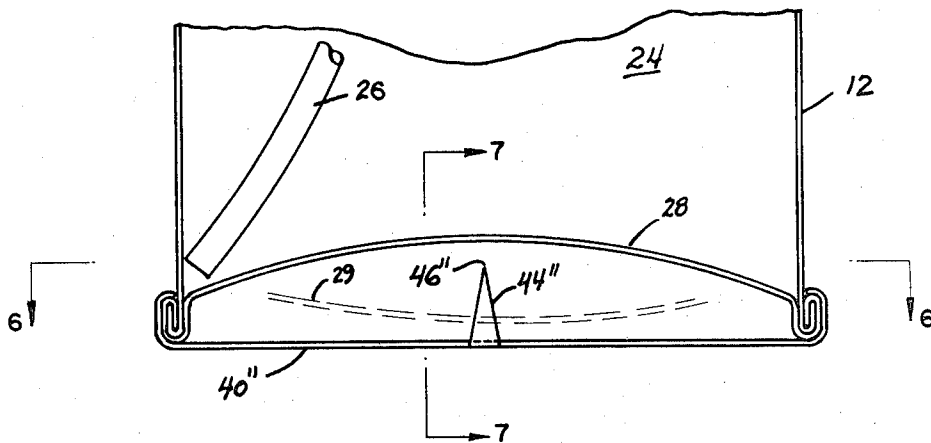


FIG. 5

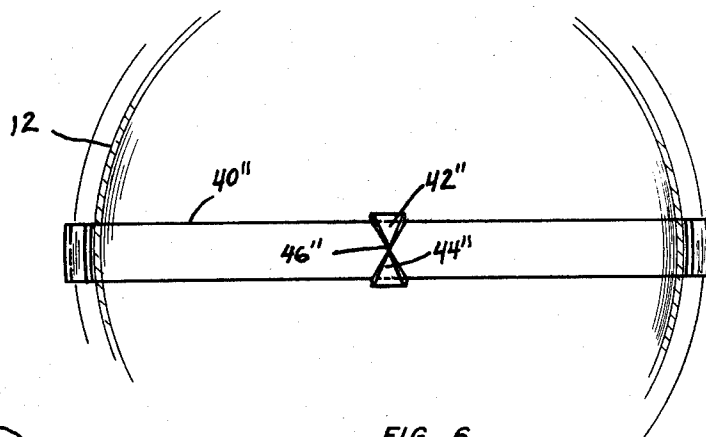


FIG. 6

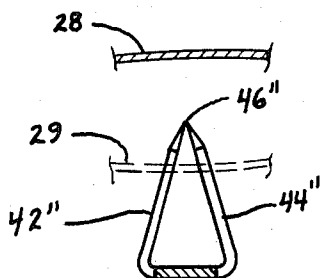


FIG. 7

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SAFETY VENTING APPARATUS COMBINED WITH AN AEROSOL CONTAINER

BACKGROUND OF THE INVENTION

The present invention relates to safety vents and, more particularly, to safety vents for pressurized aerosol containers.

When pressurized aerosol containers are subjected to high temperatures due to excessive heat they may burst violently and cause severe injury. Various types of venting devices have been suggested and are known, but these have been less than satisfactory for one or more of the reasons to follow.

Among the suggested prior venting devices are the following:

1. Blowout plugs. These introduce sealing and compatibility problems;
2. Safety Vents which operate through the existing aerosol dispensing valve. These do not provide an adequate level of safety because of the possibility of plugging the small orifice openings in the valve;
3. Reseal type of valves using springs or elastomeric materials. These are generally complex and costly;
4. Surface scoring methods for pressure venting. These have not proved reliable because material thickness tolerances do not allow for accurate scored thickness control. Scoring also removes protective plating which introduces a corrosion problem.

SUMMARY OF THE INVENTION

The foregoing shortcomings, as well as other disadvantages, of prior art devices are overcome according to the teaching of the present invention which provides an aerosol container overpressure venting structure which is inexpensive, reliable, easy to produce and compatible with existing aerosol container manufacturing techniques.

Basically the present invention provides a single operation rupture system which functions upon overpressure interiorly of the aerosol container. The overpressure may be caused by excessive heat or the like.

It has been found that when conventional aerosol containers are subjected to high internal pressures the bottom normally domed portion of the can convolutes whereas the top of the can generally expands at pressures below the rupture pressure of the can. According to one aspect of the present invention a spike or stab is placed adjacent the bottom end or the top of the can in such a position that when the bottom end convolutes or the top expands, the spike could make contact with and pierce these moving portions of the can to thereby release the pressure before rupture of the can occurs.

According to another aspect of the present invention a depression located in the top of the aerosol container in the form of a pressed dimple which expands outwardly in response to overpressures and makes contact with a spike or stab which pierces the moving dimple and allows the overpressure to vent.

The spike or stab is preferably fluted to prevent resealing of the pierced opening as may occur with a solid pin.

Basically, then, the present invention provides; an aerosol container pressure venting apparatus comprising; a pressurized aerosol container having a body section, a top wall section and a bottom wall section, at least a portion of at least one of said sections so con-

structed and arranged to deflect with respect to the remainder of the container in response to overpressure therein, and a stab having a sharp end portion supported on the exterior of said container adjacent and spaced from said deflecting portion such that said stab pierces said portion upon a predetermined deflection thereof to thereby vent said overpressure to the exterior of said container.

BRIEF DESCRIPTION OF THE DRAWINGS

For a fuller understanding of the present invention reference should now be had to the following detailed description of the same taken in conjunction with the accompanying drawings wherein;

FIG. 1 is a cross-sectional view of a typical aerosol container incorporating one form of venting apparatus of the present invention;

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a fragmentary view of a typical aerosol container incorporating a second form of venting apparatus;

FIG. 4 is a view taken along line 4—4 of FIGURE 3;

FIG. 5 is a fragmentary view of the bottom portion of an aerosol container incorporating a third form of venting apparatus;

FIG. 6 is a fragmentary view taken along line 6—6 of FIG. 5; and

FIG. 7 is a fragmentary cross-sectional view taken along line 7—7 of FIG. 5.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring now to the drawings and, more particularly, to FIGS. 1 and 2, a typical aerosol dispensing container is generally depicted at 10. As is conventional the container comprises a cylindrical body section 12 to the open upper end of which is sealingly attached a top wall section which comprises a substantially dome-shaped top 14 and a valve mounting cup 18. Top 14 may be attached to the body 12 by a rolled double seam as illustrated at 16. Of course, any other suitable method of attachment may be utilized.

Top 14 has a central opening through which is sealingly secured the valve mounting cup 18, as is conventional. An aerosol dispensing valve 20 is sealingly secured to cup 18, which valve is actuated by push button 22. The ingredients located within the interior chamber 24 of the container is delivered to the valve via an attached dip tube 26. Since the details of the valve, actuator and tube are conventional and form no part of the present invention, except in combination with the venting structure to be described herein below, no further description thereof is deemed necessary.

The lower or bottom end opening of body 12 is closed by a dome base 28 which is sealingly secured thereto.

The dome-shaped portion of top 14 has a depressed section extending inwardly toward the interior chamber 24, in the form of a cup-shaped dimple 30, the bottom portion 32 of which is capable of flexing with a snap-action to the position shown in dashed lines 34. Mounted exteriorly of chamber 24 and attached thereto by crimping or the like and directly located

above dimple 30 is a domed venting cap 36, having a plurality of venting ports 38. A spike supporting bridge 40 extends diametrically across the lower portion of the cap and is suitably attached to or made integral therewith. A fluted spike is formed by two tabs 42, 44 projecting from opposite sides of the bridge 40 and bent together such that the ends thereof remote from the bridge make contact at 46 and are spaced from and adjacent the center of flexing portion 32 of the dimple 30. As shown, the ends at 46 are pointed and sharp.

In operation of the FIG. 1 embodiment, when the interior pressure in chamber 24 becomes excessive, portion 32 of dimple 30 will flex with a snap-action to its dashed line position 34, whereupon the pointed and sharp ends 46, defining the fluted spike, will pierce an opening through portion 32 and allow the excessive pressure to be relieved through ports 38 to thereby prevent the aerosol can from bursting. The space between tabs 42 and 46 defining the fluted portion of the spike will insure that communication is maintained between the interior and exterior of the container once an opening is pierced through 32. This eliminates the possibility of the spike clogging the opening.

In the foregoing as well as the forthcoming embodiments to be described all portions of the container and venting structure are made of a thin and flexible sheet material such as tin plate.

Referring now to the embodiment illustrated in FIGS. 3 and 4, wherein parts similar to the FIG. 1 embodiment are depicted by similar numerals, the venting apparatus takes the form of an annular spike ring 40' which is snap fitted on to the annular rolled portion 16 of the container top 14. This fit is accomplished by a depending cylindrical skirt 410 having a plurality of flexible fingers 420 that flex over roll 16 and lock securely therebeneath.

A plurality of spikes 46' depend from ring 40' and are located adjacent a curved or annular rolled portion 140 of container top 14.

When the container pressure becomes excessive the tip 14 will be deformed to the dashed line position whereupon the rolled portion 140 will make contact with and be pierced by the spikes 46' to thereby relieve the excessive pressure.

In the embodiment shown in FIGS. 5, 6 and 7 the fluted stab is located adjacent the inwardly domed bot-

tom 28 of the aerosol container. To this end, a stab supporting bridge 40'' is suitably mounted across the bottom of cylinder 12 as by crimping or the like. A pair of tabs 42'', 44'' having sharp points that meet at 46'' project from the bridge 40'' upwardly toward and spaced from the central portion of bottom surface 28.

When the pressure in chamber 24 becomes excessive bottom 28 will deform to the dashed line position 29 with a snap-action whereupon pointed edge 46'' will pierce an opening therethrough and allow the excessive pressure to be safely vented.

Although preferred embodiments of the present invention have been illustrated and described, changes will obviously occur to those skilled in the art. For example, the stab or spike supporting structure could be carried by the valve mounting cup 18. Additionally the deformable dimple and its coacting stab could be located in any convenient portion of the aerosol container such as the body or bottom sections. It is therefore intended that the invention is to be limited only by the scope of the appended claims.

I claim:

1. A safety venting apparatus for aerosol containers, comprising;

A. a pressurized aerosol container having,

1. a body section,
2. a top wall section, and
3. a bottom wall section,

B. at least a portion of said top wall section so constructed and arranged to deflect with respect to the remainder of said container in response to excessive pressures,

C. an annular ring fitted onto said body section adjacent said top wall section,

D. stab means comprising a plurality of sharp ended portions circumferentially arranged on said annular ring adjacent to and spaced from said portion of said top wall section such that said sharp ended portions pierce said portion of said top wall section upon deflection thereof to thereby vent said excessive pressure to the exterior of said container, and

E. a dispensing valve mounted on said container actuable to normally deliver the contents of said container to a point of use.

2. The apparatus according to claim 1, wherein said ring is an annular snap ring.

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