

[54] **AEROSOL SAFETY CAN**

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[51] Int. Cl. **B65d 83/14**

[58] Field of Search 137/179, 180; 222/396, 397; 220/44 R, 44 D

[56]

References Cited

UNITED STATES PATENTS

3,292,826 12/1966 Abplanalp 222/397

Primary Examiner—Stanley H. Tollberg

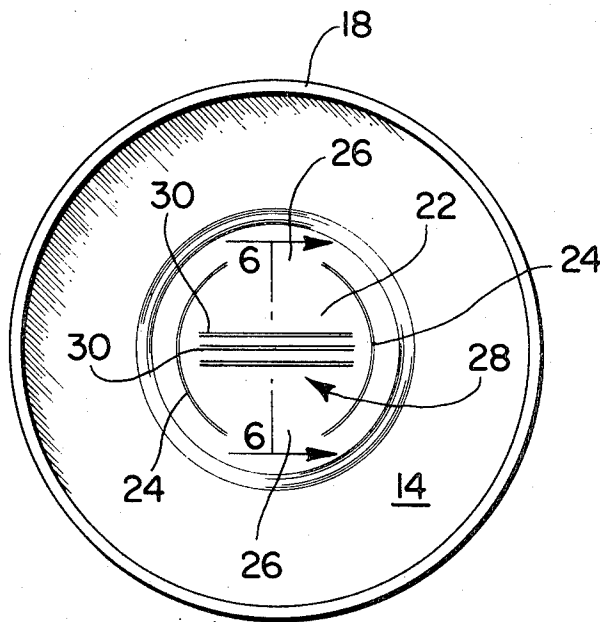
Attorney—Robert J. Doherty

[57]

ABSTRACT

This invention relates to a safety vent for pressurized containers in which a distinctive pattern of weakened lines forms a vent means for the controlled release of pressurized fluid from a container which is subject to pressure above a pre-determined safe limit such as by over heating or crushing.

8 Claims, 6 Drawing Figures



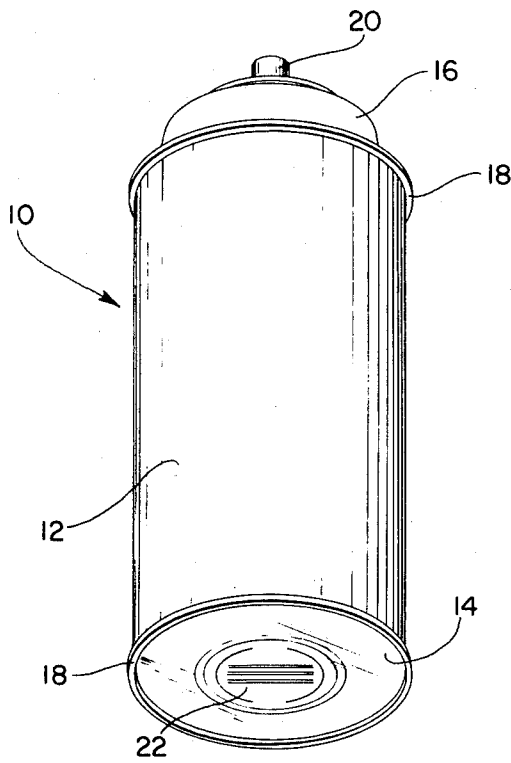


FIG. 1

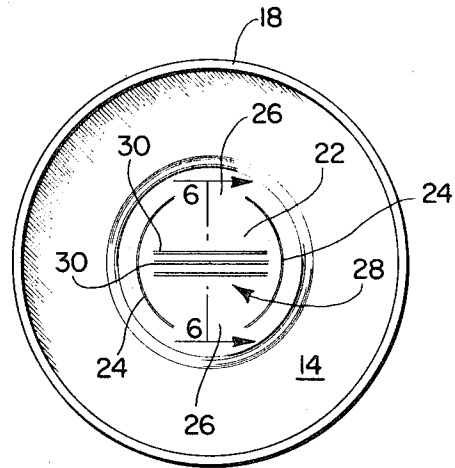


FIG. 2

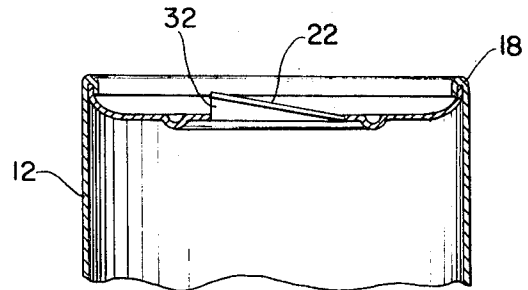


FIG. 4

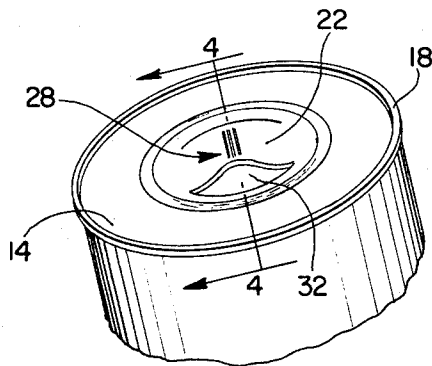


FIG. 3

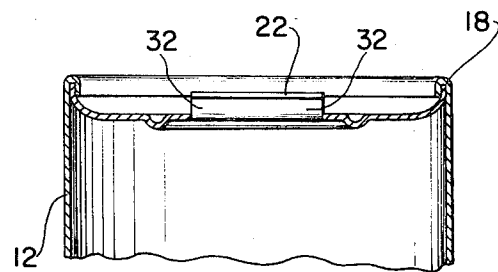


FIG. 5

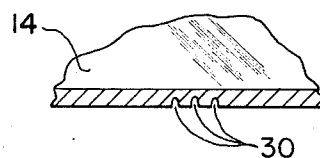


FIG. 6

AEROSOL SAFETY CAN

BACKGROUND OF THE INVENTION

Pressurized dispensing containers and the like are now well known and are widely used for packaging and dispensing such products as hair spray, shaving lather, and food products. Most often such products are mixed with a FDA approved propellant which is gaseous at room temperature and pressure. Most often such dispensing containers are referred to as aerosol containers. It is necessary that such aerosol containers be safely suited for utilization including their transportation from point to point and their ultimate disposal as through home or commercial incineration and/or compaction.

Several mechanisms for accomplishing the above objectives have been proposed by the container industry including a mechanism called "rim vent release" wherein slight notches or cuts are formed in the can stock which ultimately makes up that portion of the can known as the double seam so that upon inversion of the notched end of the container upon a pressure increase above a predetermined safe level, the movements of this end uncovers and splits such weakened areas to produce venting. Such a container is described in U.S. Pat. No. 2,795,350 to Lapin. To date such construction has not been fully commercialized.

Other mechanisms and constructions representing further approaches to provide a safety pressurized container of the type described have been suggested and proposed. One such approach includes the use of a weakened line or lines defining an area within the container wall which is subject to tearing or opening upon increased pressure beyond a certain predetermined safe pressure limit. It has been found, however, that in many cases these weakened areas are subject to complete and sudden removal from the container wall and thus although in part providing a vent means also present a related safety hazard of their own in the form of a projectile.

It has also been suggested to utilize heat fusible plugs tightly fitted into openings provided in the container walls. Such have proven satisfactory in those instances wherein the increased pressure above a predetermined safe level within the container is caused by an even application of heat. Obviously such ideal conditions are not always present nor has such proposed solution any application when increased pressures are caused by crushing forces such as would be brought about through the use of compaction devices such as those now finding increased use in household kitchens.

SUMMARY OF THE INVENTION

Accordingly, one object of this invention is the provision of a safety vent for pressurized containers which obviates the above difficulties of the prior art devices and which is virtually uncomplicated in design and structure, inconspicuous in application and inexpensive to incorporate into presently utilized pressurized container constructions.

Another object of the present invention is to produce a safety vent means for pressurized containers wherein a weakened area of the container is delineated by weakened lines and wherein such weakened area will not be subject to complete severance from the remainder of the container side wall.

This and other objects of the present invention are obtained by providing a pressure release area in at least one wall of a pressurized container wherein a first set of weakened line portions are formed in said wall to provide a pressure relief area and wherein a second set of weakened lines are provided within said pressure relief area so as to restrain and prevent the complete removal or severing of such pressure relief area from the remainder of the container wall.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the invention and several attendant advantages thereof will be readily apparent by reference to the following detailed description when considered in connection with the accompanying drawing wherein;

FIG. 1 is a perspective view of a pressurized dispensing container incorporating the safety vent means of my present invention;

FIG. 2 is a bottom plan view of the container shown in FIG. 1 showing the safety vent means provided in the container lower end wall, the vent means being depicted in a closed unvented state prior to subjection to forces above a predetermined safety level;

FIG. 3 is a perspective view of a base portion of the container shown in FIG. 1 on a slightly enlarged scale and showing the safety vent means provided therein in an open vented position;

FIG. 4 is a cross-sectional view taken on the line 4—4 of FIG. 3 showing one manner in which the vent means of the present invention operates;

FIG. 5 is a cross-sectional view similar to FIG. 4 wherein another manner in which the vent means of the present invention operates is shown; and

FIG. 6 is a partial cross-sectional view taken on the line 6—6 of FIG. 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing wherein like reference characters designate the same or corresponding parts throughout the several views and more particularly to FIG. 1 and FIG. 2 thereof, the safety vent of the present invention is shown. Therein an aerosol dispensing container 10 is depicted as formed from a cylindrical side wall portion 12 respectively provided with base and top wall closures 14 and 16. Such end walls 14 and 16 may be attached to the side wall portion 12 of the container 10 by means of conventional double seams 18. Alternately the container may be formed of two piece construction wherein the bottom wall 14 is integral with the side wall 12. It should also be understood that the safety means of the present invention may be incorporated to other areas of the container other than the base 14. Also while the present container will be referred to as an aerosol dispensing container, such term should be recognized as a term of art an inclusive of other pressurized containers. The container 10 is further provided with a dispensing means 20 of conventional construction.

The pressure relief area 22 is depicted of circular configuration but may take on other shapes and configurations within the following general constructional framework, wherein such pressure relief area 22 is comprised of a first set of weakened line portions 24 generally opposed to each other and separated by

spaced unweakened wall portions 26. A second weakened line portion 28 is positioned within the pressure relief area 22 and preferably comprised of an odd number of weakened lines 30; 3 being depicted in the drawings. Other odd numbers e.g. 1, 5, etc. lines 30 might be utilized for a purpose which will be hereinafter made apparent.

The weakened lines 24 as are the weakened lines 30 are formed in a conventional manner such as scored lines formed in the end wall 14 of the can 10. Such scoring can be formed on the ends while in a flat blank form and prior to being double seamed onto the container body 12. The scoring to form the weakened lines 24 is deeper than that forming the weakened lines 30, and accordingly pressure within the container 10 above a predetermined level will initiate rupture along either or both lines 24 while simultaneously permitting bending action along the second weakened line portion 28 such as best depicted in the cross-sectional views showing rupture pressure relief area configurations in FIGS. 4 and 5.

FIG. 4 shows the ruptured or open vented condition of the pressure relief area 22 wherein tearing or rupture was initiated along the left hand weakened line 24 and FIG. 5 depicts that condition wherein tearing was initiated along both weakened lines 24 simultaneously. The characteristic tent-like construction shown in both FIGS. 4 and 5 is brought about by the co-action of the end openings 32 formed by the tearing of one or more of the weakened line portions 24 and the second weakened line portion 28 permitting the upward travel of the pressure relief area 22 about the unweakened walls portions 26. Bending occurs along the central portion of the weakened line portion 28 which in turn contributes to the formation of a stiffening tent-like structure thus reducing the chance of continued tearing along the weakened lines 24 into the unweakened wall portions 26 which could cause undesirable complete or partial tear-out of the entire pressure relief area 22. The use of an odd number of weakened lines 30 contributes in the formation of a central bend line which in turn forms the central ridge of the pressure resisting tent-like configurations shown in FIGS. 4 and 5 of the drawing.

Obviously, numerous modifications and variations of the present invention are possible in light of the above teachings. By way of example more than two weakened line portions 24 may be provided. For example should three such areas be provided and each spaced from each other the second weakened line portions 28 would be more radially disposed within the pressure relief area 22 and directed towards the midpoint of one or more of such weakened lines. Also, depending on the differential pressure contemplated, several parameters such as container material and thickness, as well as scoring depths to form weakened line portions 24 and 28 may be provided. Thus the individual lines 30 making up the second weakened line portion 28 may vary in scored depth, such variation decreasing outwardly so as to emphasize the tent effect described above. Other modifications will readily sug-

gest themselves to those skilled in the art and such are encompassed within the spirit of the invention disclosed herein and claimed herein.

I claim:

1. A safety vent for pressurized containers such as aerosol containers and the like comprising a pressure relief area provided in at least one wall of said container, a first set of weakened line portions formed in said wall and separated from each other by spaced unweakened wall portions, said first set of weakened line portions being in spaced opposed relationship to each other, said pressure relief area defined by said first set of weakening lines and said spaced unweakened wall portions, a second weakened line portion, said second weakened line portion disposed within said pressure relief area and generally normally disposed between and terminating short of opposed weakened line portions of said first set.

2. The structure of claim 1 wherein said first set of weakened line portions are weakened to a greater extent than in said second weakened line portion.

3. The structure of claim 2 wherein said second weakened line portion comprises an odd numbered plurality of weakened lines each parallel to each other.

4. The structure of claim 3 wherein outwardly disposed lines of said second weakened line portion terminate short of the more centrally located said lines.

5. The structure of claim 2 wherein at least one end of said second weakened line portion terminates in connection with the one of said first weakened lines adjacent thereto.

6. A container for pressurized material having safety vent means for the prevention of explosions due to increased pressure within said container, said container of generally cylindrical construction and having a base, sidewalls connected thereto and upwardly extending therefrom and a closure member connected to said sidewalls at the opposite end thereof, said end closure provided with means for dispensing said material, said vent means formed in said base and generally centrally thereof and comprising a first set of weakened lines formed in said base in spaced opposed relationship to each other and partially defining a pressure relief area therebetween, said pressure relief area having unweakened base portions separating said first set of weakened lines and further defining said pressure relief area and a second set of weakened lines, said second set of weakened lines disposed entirely within said pressure relief area, said second set of weakened lines positioned generally normal to said first set of weakened lines and terminating in spaced relation thereto at opposite ends thereof.

7. The container of claim 6 wherein there is less residual strength in said first set of weakened lines than in said second set of weakened lines to permit initial tearing in said first set of weakened lines and initial bending in said second set of weakened lines.

8. The container of claim 7 wherein a least one end of said second set of weakened lines terminates in connection with one of said first weakened lines.

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