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Beck

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[54] **SELF-CHILLING CONTAINER WITH SAFETY DEVICE AND METHOD OF MAKING SAME**

[76] Inventor: **William D. Beck,** 851 S. High St., Columbus, Ohio 43206

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[52] **U.S. Cl.** **62/294,** 62/371, 62/457

[51] **Int. Cl.** **F25d 3/10**

[58] **Field of Search** 62/294, 457, 371

[56] **References Cited**

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Primary Examiner—William J. Wye
Attorney, Agent, or Firm—Cushman, Darby & Cushman

[57] **ABSTRACT**

The present invention is related to a self-chilling container having a passage through which presurized refrigerant exits into the atmosphere. The container has a shield-like safety device over said passage and a means for insuring the positioning of the shield, when the container is open, so as to remain over the passage and deflect downwardly any unevaporated refrigerant. These structures are effective to prevent unevaporated refrigerant from contacting a user operating the container. The invention is also related to a method for fabricating the container which is not only economical in manufacture but further insures the proper positioning of the shield relative to the refrigerant passage.

11 Claims, 4 Drawing Figures

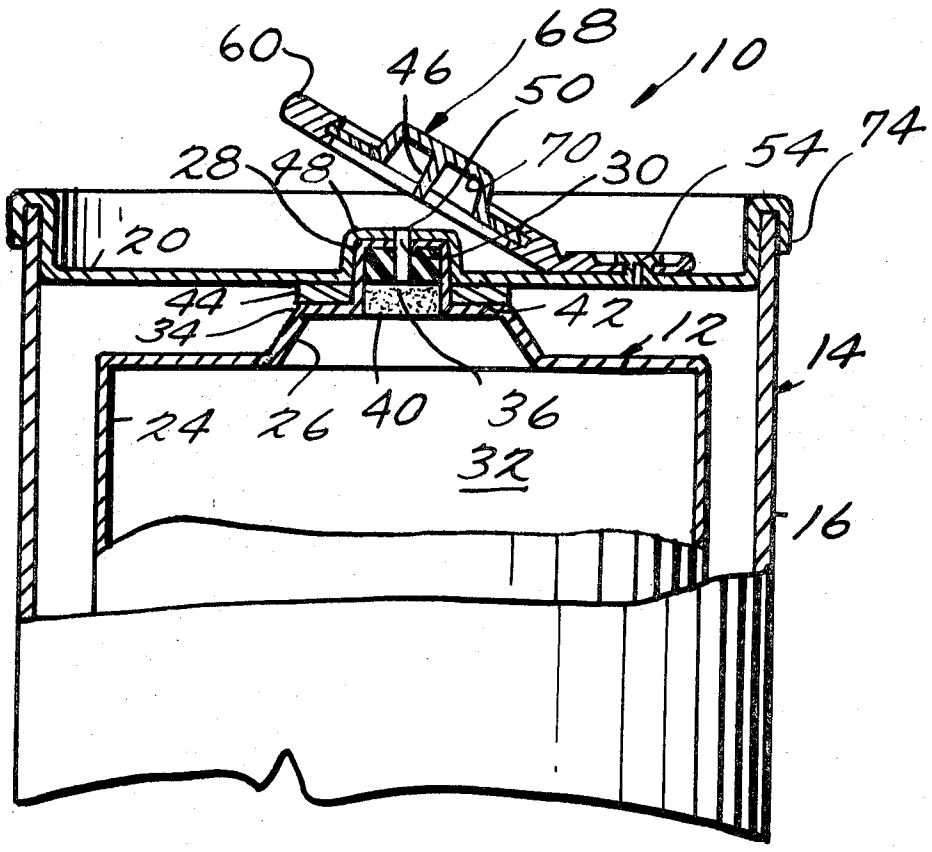


Fig. 1.

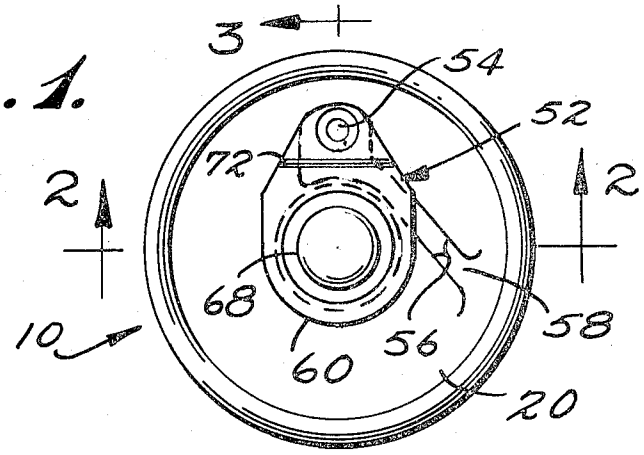


Fig. 3.

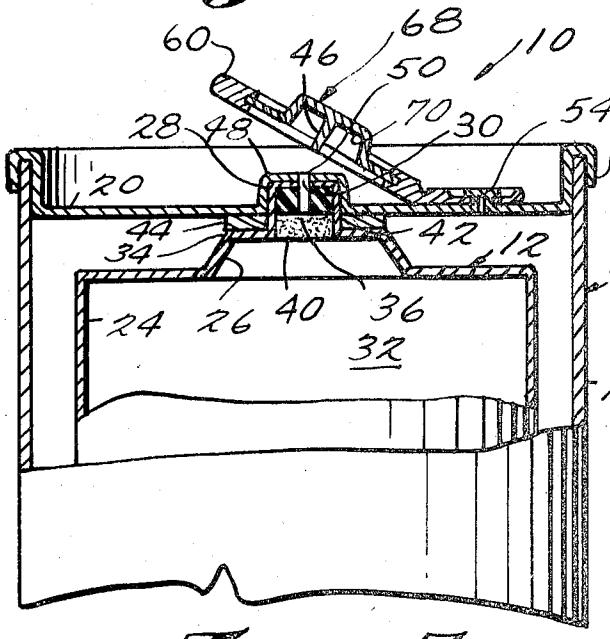


Fig. 2.

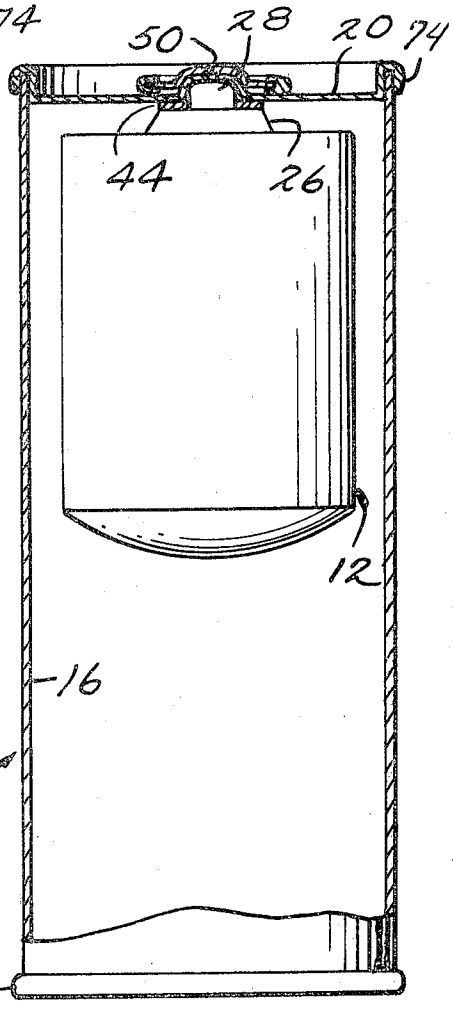
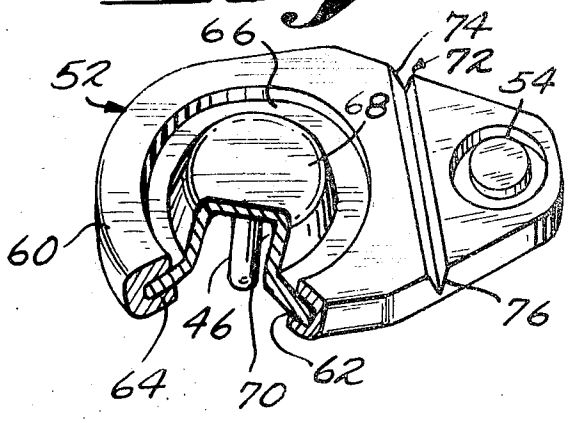


Fig. 4.



SELF-CHILLING CONTAINER WITH SAFETY DEVICE AND METHOD OF MAKING SAME

BACKGROUND OF THE INVENTION

The invention is directed towards a refrigerant unit that is disposed within a container having a beverage. The refrigerant unit is of the self-chilling type wherein the exposure of a refrigerant to the atmosphere will cause it to evaporate and thereby result in the chilling of the beverage. Although the material hereinafter described as being chilled is a beverage, it is to be understood that other materials can be chilled.

BRIEF DESCRIPTION OF THE PRIOR ART

There are numerous prior art cooling devices wherein a refrigerant device is centrally disposed within a container storing a beverage that is to be cooled. Such devices use refrigerant of the type which is under pressure. When exposed to the atmosphere, the refrigerant is evaporated and released thereto. If, however, the refrigerant is expelled from the container before it has evaporated, there is a risk of injury to the consumer, e.g., if some of the liquid strikes an eye. In addition, such devices are quite expensive, in part because of the number of manufacturing steps required. Typical of this prior art is U.S. Pat. No. 3,320,767 to Whalen, wherein a self-chilling disposable container is disclosed.

SUMMARY OF THE INVENTION

It is an object of the instant invention to provide a safety device for self-chilling containers and a method for producing the same, wherein the aforementioned disadvantages prevalent in the prior art are overcome. This object is accomplished in part by means of a shield device selectively removable from a refrigerant release passage and a control means therefor. The control means forms part of a typical tear-tab used on beverage containers; it is operatively connected with the shield device for insuring the proper positioning of the shield device over said passage as it is removed therefrom by a consumer lifting the tear-tab to dispense the contents of the container. By this arrangement, the cooperation of the shield device and the control means is effective to deflect and/or temporarily trap any unevaporated refrigerant, whereby the possibility of harm arising from pressurized unevaporated refrigerant contacting a consumer is greatly reduced. The said object of the invention is also accomplished in part by an improved method whereby the component parts are joined together in a simple operation. The method includes the steps of securing a stem-seal mounted on a filled refrigerant canister to a shield device which is operatively connected to the tear-tab on a lid for the container. By this arrangement, the shield device is appropriately secured and positioned relative to said passage so that, as the shield device is moved with the tear-tab to remove the contents from the container, the shield device will remain in such a position as to deflect and/or temporarily trap unevaporated refrigerant.

Other objects, advantages, novel features of the invention, will become apparent from the following detailed description of the preferred embodiment of the invention, when considered in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a container made in accordance with the principles of the invention;

FIG. **2** is a vertical cross-section partly in elevation of the container of FIG. **1**;

FIG. **3** is a cross-section, partly in elevation, on an enlarged scale, of the container of FIGS. **1** and **2** along line **3-3** of FIG. **1** and showing the container after it has been opened;

FIG. **4** is a detailed perspective view, partially fragmented, showing the shield device and the tear-tab of the container of FIG. **1**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Now referring to the FIGURES of the drawings, there is disclosed a self-chilling container **10** made in accordance with the principles of the present invention wherein a refrigerant unit **12** is centrally disposed and concentrically arranged within a container means **14.** The container is of a conventional type and is defined by an annular wall member **16** having a bottom member **18** located at one end and a top or lid member **20** located at the opposite end thereof. Any of a number of methods, such as crimping, are effective to secure the lid to the container. Container **14** is effective to hold the beverage that is to be chilled. It is to be understood that this material can be of any type that is desired to be cooled; preferably, it should be free-flowing.

As better seen in FIGS. **2** and **3,** the refrigerant unit **12** is comprised of a storage canister **24,** having a raised neck portion **26,** a head portion **28** and an aperture **30** located at the top of the head portion. The canister defines a chamber **32** wherein liquid refrigerant, such as Freon, is introduced and maintained under pressure, by means hereinafter to be described, for subsequent dispensing to the atmosphere through the aperture **30.**

A washer member **34** is preferably made from plastic material, such as polyurethane. The washer has an aperture **36** extending therethrough so that when the washer is inserted within the head portion **28,** the aperture **36** is in line with respect to the aperture **30.** A compoundtype sealant not shown is applied to the outer surface of the head portion **28** that is to come into contact with the lid **20.** This sealant compound is subsequently compressed, by means hereinafter described, so as to further provide an effective seal that will prevent contamination of the material **22.**

Located below the washer **34** is a porous disc **40** that acts as a diffuser member for the liquid refrigerant. Inasmuch as it is the evaporation of the liquid refrigerant that provides the cooling, it is necessary to insure that the evaporation will take place within the canister so as to maximize the cooling effect. The diffuser disc is effective to prevent as much as possible the escape of unevaporated liquid refrigerant from the canister **24,** so that a larger portion of the liquid is evaporated therein. The porous disc can be manufactured from any of a variety of materials as long as the materials are effective to diffuse liquid passing therethrough.

The self-chilling container is provided with another sealing means which is effective to prevent any intermingling between the pressurized refrigerant and the material **22,** thereby preventing contamination of the latter. As best viewed in FIG. **3,** a flat annular surface

42 is defined on the neck portion 26. This flat annular surface provides an annular seat for the reception thereon of a generally annular sealing collar 44. The sealing collar is preferably made of a plastic material and is so dimensioned as to be preferably snugly fitted over the head portion 28. As seen in the FIGS. 2 and 3 the sealing collar 44 is sandwiched between the annular surface 42 and the bottom of the lid 20. In this manner it cooperates with the sealant compound 38 and prevents any unevaporated liquid refrigerant from entering the container 14.

A flexible generally longitudinally extending stem-seal 46, preferably made of a plastic material, is inserted within the apertures 30 and 36 so that the topmost portion thereof extends above the head portion 28. The stem-seal is effective to prevent the refrigerant from escaping from the canister until the canister is opened.

The head portion 28 and the stem-seal 46 are both inserted within a recess 48. The recess is integrally and centrally formed on the lid member 20 and also has a central passageway or aperture 50 extending therethrough. The stem-seal is so positioned that it extends through this aperture 50.

Fastened on the lid member 20 is a typical off-center tear-tab 52 that is conventionally riveted or otherwise suitably fastened as shown at 54. Score lines 56 are also integrally formed about the riveted region on the lid member and define a frangible closure means 58 which, upon being opened, will provide an egress for the material stored in the container 14. The off-center tear-tab includes a conventional pull-ring 60 having a generally circular opening 62. A groove 64 extends along the periphery of this circular opening 62 and receives the improved shield device 66 made in accordance with the principles of this invention.

The shield device 66 can take any of a number of forms, however, in this particular embodiment it is shown as a generally convex member in the form of an inverted cup-shaped plug or dome-shaped member. The device 66 is comprised of a generally flat lateral edge or flange 68 and a generally inner concave surface 70. The generally flat flange 68 is snugly fitted within the groove 64 of the pull ring 60. The inner concave surface 70 is especially effective to deflect downwardly and/or temporarily trap any exiting unevaporated refrigerant. The inner concave surface 70 is also designed to contact the uppermost portion of the longitudinally extending stem-seal 46. Thereafter, the two are heat welded or adhesively bonded together when the head portion 28 is inserted within the recess 48 of the lid. In this manner the stem-seal becomes integral with the shield device 66 and the tear-tab opening means 52 (see FIG. 4).

A control means for controlling the relative ease with which the tear-tab 52 is pulled upwardly and to insure the proper positioning of the shield device 66 over the apertures 30 and 36, is defined by a groove or recess 72. Preferably the groove or recess takes the form of a substantially V-shaped channel that extends transversely to the longitudinal extent of the tear-tab. One side 74 of the recess 72 is larger in dimension than the opposite side 76. Both sides of this recess are effective to provide a means which limits the otherwise generally vertically upward movement of the tear-tab so as to insure the proper positioning of the shield device 66 in an inclined position above the aperture 52, thereby having the shield device downwardly deflect and/or temporarily trap any unevaporated liquid refrigerant.

Additionally, the recess 72 is effective to divide the generally upward movement of the tear-tab 52 into an "easy" segment and a "difficult" segment. By the term "easy", it is meant that the consumer applies less of a force in lifting the tear-tab 52 upwardly than during the "difficult" segment thereof. The segmented generally upward movements of the tear-tab are effective to promote an efficient cooling of the material 22 by permitting the refrigerant to be exposed to the atmosphere first, thereby promoting the chilling before the material is able to be dispensed through the closure means 58.

The self-chilling arrangement 10 made in accordance with the principles of this invention is manufactured in the following manner. After the washer 34 and the porous disc 40 are inserted, as hereinabove described, within the head portion 28, a pressurized liquid refrigerant is introduced through the apertures 30 and 36 respectively, so as to fill the chamber 30. The longitudinally extending stem-seal 46 is then inserted into said apertures so as to maintain the pressurized refrigerant within the canister. Thus, an independent refrigerant unit is produced that can be efficiently and effectively shipped from the manufacturer of the refrigerant to a manufacturer of the container. The result of this separate manufacture of the refrigerant units from the container units is a more efficient division of labor and cost.

The annular collar 44 is snugly fitted upon the raised neck portion 26 so as to be seated upon the annular surface 42. The remainder of the head portion is coated by the sealant compound 38. Thereafter, the head portion and the extending stem-seal are inserted within the recess 48 so that the stem-seal extends through the aperture 30 within said recess 48. Conventional means such as rolling or crimping are then applied so as to effectively press the recess 48 about the head portion, and thereby sealing secure the two together. As aforenoted, the tear-tab 52 and the shield device 66 attached therewith are riveted to the lid 20 by the rivet 54. As is more clearly shown in FIGS. 1 and 2 the tear-tab and shield are located so as to be in a generally horizontal position. In this horizontal position, as the refrigerant unit is inserted within the recess 48 on the lid 20, the top end of the stem-seal 46 abuts the inner concave surface 70 at the center thereof. The stem-seal is permanently affixed to the shield device by any of several conventional techniques, such as by heat welding or adhesive bonding. As is apparent, as the shield device is lifted upwardly with the tear-tab 52, the stem-seal is removed from the apertures 30 and 36 so as to expose the refrigerant to the atmosphere.

From the foregoing detailed description of the preferred embodiment it will be understood that the apparatus of the invention operates in the following manner. In order to effectuate the chilling process of the material 22, the pull-ing 60 is grasped by the fingers of a consumer and is lifted generally vertically upwardly. By lifting the pull-ring generally vertically upwardly, the stem-seal 46 is removed from the refrigerant unit 12 so as to expose the pressurized refrigerant to the atmosphere. As this occurs the refrigerant is permitted to evaporate to the atmosphere by exiting through the apertures 30 and 36, thereby cooling the material 22, within the container. If for any reason the diffuser disc

40 is not able to cause all of the refrigerant to evaporate within the canister chamber 32, the inner concave surface 70 and the lateral edge 68 attached therewith deflect downwardly and/or temporarily trap exiting liquid refrigerant. Thus, a consumer is protected from any deleterious harm arising from contact with the unevaporated refrigerant.

As hereinabove mentioned, the recess 72 is effective to maintain the shield device in this relatively inclined position so as to deflect downwardly the unevaporated refrigerant. A further consequence of this downward deflection is that a portion of the liquid refrigerant will fall upon the top surface of the lid and as the refrigerant evaporates, the container is further chilled.

Through the process of heat welding or adhesive bonding, the stem-seal 46 is integrally attached to the central portion of the inner concave surface 70. By fixing the stem-seal to the shield device 66, the stem-seal is removable from the apertures 30 and 36 upon the simultaneous upward lifting of the tear-tab 52. As noted, this first permits the refrigerant to evaporate so as to chill the material within the container prior to the tear-tab removing the frangible closure means 58. Also by attaching the stem-seal to the central portion of the inner concave surface 70, it locates the shield device over the exiting apertures 30 and 36 so that any unevaporated refrigerant is trapped temporarily and/or deflected downwardly by said inner concave surface so as to preclude contact with the consumer operating the self-chilling arrangement 10. Also by forming a recess 72 on the tear-tab that extends transversely to the longitudinal extent thereof, a control means is formed which insures the proper inclined position of the shield device 66 over the exiting apertures, while also segmenting the upward movements of the tear-tab. The two segments defined are effective to promote a uniform chilling of the material within the container.

As hereinbefore described, the recess 72 is located on the tear-tab so as to control the path as well as the rate and sequence at which the pull-ring is lifted upwardly. Until the sides 74 and 76 of the recess 72 abut each other the upward movement of the pull-ring 60 is effected rather easily, thereby permitting the evaporation of the refrigerant within the chamber 30, so as to commence the cooling of the material 22 within the container. After said sides of the recess 72 contact with each other, it is more difficult for the consumer to lift the pull-ring 60 upwardly so as to open of the frangible closure means 58 to permit dispensing of the chilled material. Thus, the recess 72 is effective to control the rate and sequence of upward movement of the pull-ring so that during the first or aforenoted "easy" segment of the movement (i.e., until the sides 74 and 76 abut each other), this movement is effected relatively quickly. During the subsequent second or "difficult" segment of the upward movement (i.e. after the sides 74 and 76 abut each other) the upward movement of the pull-ring so as to open the frangible closure means 58 is performed at a slower rate than during the "easy" segment. During the first segment of the upward movement of the pull-ring the refrigerant is permitted to evaporate, thereby chilling the contents of the container before the frangible closure means is opened. This prevents the dispensing of material 22 which may not be properly chilled. Therefore, the recess 72 not only insures the proper positioning of the shield device 66 over the openings 30 and 36 so as to deflect and/or temporarily trap the unevaporated refrigerant, but also it insures the uniform cooling of the material prior to dispensing from the container, by effecting the cooling before opening the frangible closure means 58.

Also as is apparent from the aforenoted description, the method whereby the lid 20 and the canister 24 are firmly secured together not only provides an economical means of assembly, but also centrally locates the stem-seal 46 relative to the inner concave surface 70 of the shield device 66. As noted, the use of a stem-seal provides a means whereby the manufacturer of the refrigerant unit 12 can effectively and economically transport the same to the manufacturer of the container.

Although the herein shown and described invention is conceived to be the most practical and preferred embodiment, it is recognized that departures may be made therefrom within the scope of the invention which is to be accorded the full scope of the claims so as to embrace any and all equivalent structures and methods for manufacturing.

What is claimed as novel and unobvious and desired to be protected by Letters Patent is set forth in the appended claims.

What is claimed is:

1. A self-chilling container arrangement for effectively chilling material in the container prior to the material being dispensed and for safely preventing exiting unevaporated refrigerant from deleteriously effecting a user of the arrangement comprising:

container means for housing the material that is to be chilled;

closure means connected to the container means for generally vertical movement so as to expose the material to the atmosphere for subsequent dispensing therethrough;

storage means disposed within a portion of the container means for storing refrigerant;

refrigerant means under pressure within the storage means for chilling the material housed in the container upon exposure to the atmosphere;

communication means defining a refrigerant passageway through both the container means and the storage means for permitting the refrigerant means to evaporate and exit therethrough to the atmosphere;

a shield means selectively movable in a generally vertical path between a first position whereat the shield means seals the communication means so as to prevent evaporation of the refrigerant means and a second position whereat during movement of the shield means between said first and second position, the shield means is in a generally inclined position relative to the communication means so as to permit the refrigerant means to evaporate into the atmosphere and thereby chill the material while also deflecting downwardly any unevaporated refrigerant exiting from the communication means so as to prevent any deleterious effects to a user of the arrangement;

lift means connected to both the shield means and the closure means for effecting the generally vertical movement of the shield means and the closure means;

control means cooperating with the lift means for insuring the proper positioning of the shield means over the communication means during movement

between said first and second positions and for insuring that said second position of the shield means is reached prior to the generally vertical upward movement of the closure means so as to expose the material to the atmosphere, thereby providing a more efficient chilling of the material by permitting the refrigerant means to evaporate prior to the exposure of the material to the atmosphere for subsequent dispensing.

2. The arrangement as defined in claim **1** wherein the shield means includes an inverted cup-shaped member having an inner surface means that is operative to cover the communication means so as to downwardly deflect any evaporated refrigerant means, and a vertically elongated seal means centrally connected with the inner surface means so as to move in unison therewith and being effective to seal the communication means when the shield means is in said first position, and permit the pressurized refrigerant means to evaporate during movement of the shield means to said second position.

3. The arrangement as defined in claim **2** wherein the shield means is made of plastic or other material.

4. The arrangement as defined in claim **2** wherein the control means cooperating with the lift means is a groove located adjacent one end of the lift means and generally transverse to the longitudinal extent thereof for effecting the generally vertical movement of the shield means.

5. The arrangement as defined in claim **4** wherein the lift means is a tear-tab having an aperture therein.

6. The arrangement as defined in claim **5** wherein the inverted cup-shaped member is connected within the aperture of the tear-tab so as to have the inner surface means cover the communication means in said first position.

7. The arrangement as defined in claim **1** wherein the communication means is defined by a pair of co-axial and co-extensive apertures, each of which are respectively formed within the container means and the storage means.

8. The arrangement as defined in claim **1** wherein a diffuser means is disposed within the storage means and adjacent the communication means so as to prevent unevaporated refrigerant means existing from the communication means.

9. The arrangement as defined in claim **2,** wherein an annular member defines the aperture in the storage means and cooperates with the elongated seal means to effectuate a sealing action.

10. The arrangement as defined in claim **2** wherein projection means on the storage means and receiving means on the container means cooperate with each other to join the storage and container means together.

11. The arrangement as defined in claim **10** wherein an annular seal is disposed about the projection means on the storage means for preventing the intermingling of the refrigerant means with the material.

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