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Rosenfeld et al.

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[54] METHOD OF COOLING CONTAINERS

[72] Inventors: **Nathan Rosenfeld**, Unit 11, 459 Old South Head Road, Rose Bay, New South Wales; **Stuart Frederick Fox**, 47 Lamrock Ave., Bondi Beach, New South Wales, 2026, both of Australia

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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, 371, 457

[56] **References Cited**

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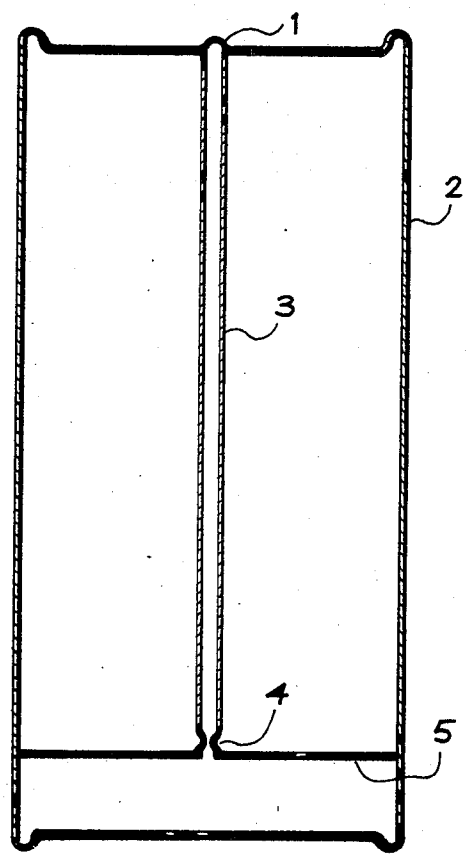
Primary Examiner—William J. Wye

Attorney—Finnegan, Henderson & Farabow

[57] **ABSTRACT**

A container of beverage is conveniently cooled by the provision of a small reservoir of a compressed nontoxic gas or nontoxic liquid in the interior of the beverage. The beverage is rapidly cooled when the gas is allowed to escape from the reservoir through a throttle, the device being generally in the form of a flat plate in the interior of the beverage.

7 Claims, 3 Drawing Figures



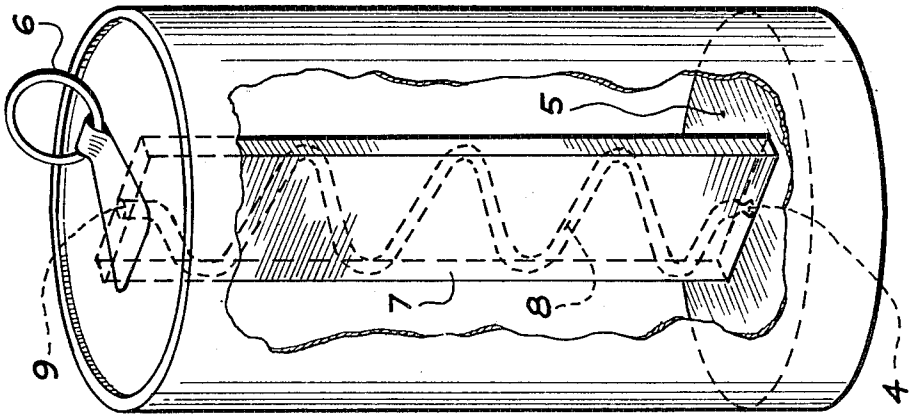


Fig. 2(b)

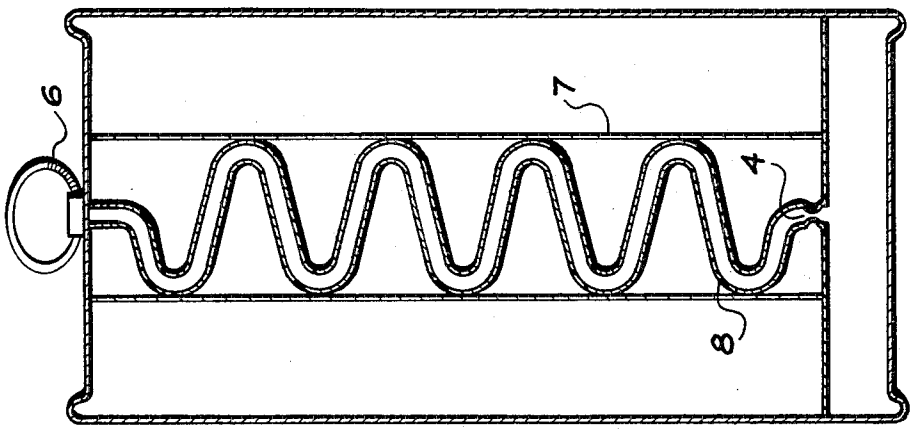


Fig. 2(a)

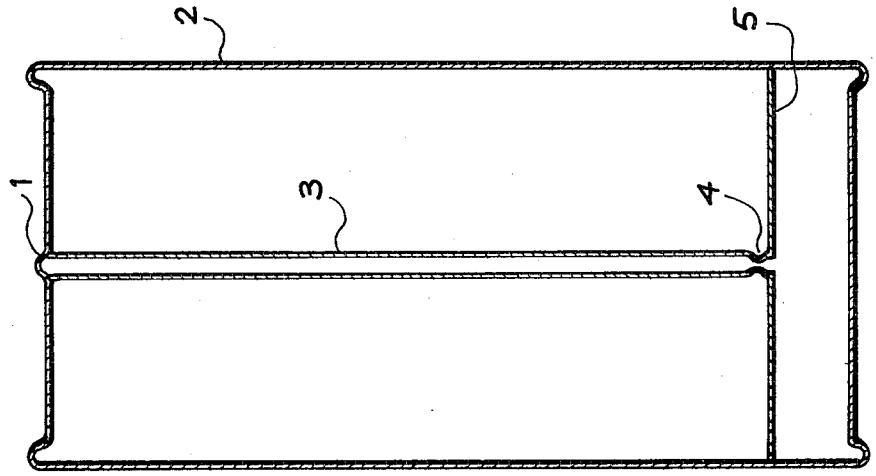


Fig. 1

METHOD OF COOLING CONTAINERS

This invention relates to a cooling means for beverages and, in particular, to a self-cooling container for beverages.

The main object of this invention is to provide a simple, cheap but effective means of cooling containers for beverages.

This invention, therefore, provides a cooling means for beverages, which comprises an auxiliary vessel situated in the interior of a main vessel and connected to the outer wall of the main vessel by perforable means, which auxiliary vessel in turn comprises a flat plate of a heat-conductive metal integral with a reservoir of compressed nontoxic gas or a nontoxic liquid which boils vigorously at ambient temperature and standard pressure, which reservoir is connected to the perforable means by way of an elongated tube in the interior of the flat plate.

The beverage is chilled by the evaporation of the nontoxic liquid and the expansion of the nontoxic gas through the perforation in the container.

The flat plate is preferably elongated in the direction of the greatest dimension of the main vessel.

More preferably the elongated tube forms a zigzag pattern in the interior of the flat plate.

Yet more preferably the reservoir is connected to the elongated tube by means of a release valve or throttle.

In a particularly preferred embodiment a channel or fins are provided at the edge of the plate.

In a further particularly preferred embodiment the compressed nontoxic gas or nontoxic liquid is a chlorofluoro-hydrocarbon, for example, a Freon ("Freon" is a Registered Trade Mark).

The reservoir and heat-exchange tube are made of a metal of high thermal conductivity, for example, aluminum. However, the main vessel may be made of any suitable material, for example, chromium coated steel, aluminum or an inert plastic.

The amount of gas or liquid, used in the case of a beverage, is preferably sufficient to reduce the temperature of the beverage to about 40° F.

It is recognized that the efficiency of the heat-exchange might be increased by placing fins on the heat-exchange tube or by placing grooves in the surface of the flat plate described above.

The efficiency of the heat-exchange may also be increased by slowing the rate of passage of the cool gas through the heat-exchange tube by, for example, packing the tube loosely with a metal "wool." In this case the cold packing yet further increases the efficiency of the heat-exchange.

It is, for example, convenient to assemble the entire auxiliary vessel from two metal stampings which have corresponding grooves or hollows to represent the reservoir, throttle and heat-exchange tube, but any other suitable method may be used. The edges of the tube are preferably extended in such a manner as to form channels or fins at the edges of the plates.

Examples of devices according to the invention are shown in the accompanying drawings.

FIG. 1 is a cross-sectional view of a simple form of a device according to the invention.

FIG. 2*a* is a cross-sectional view of a more complex device according to the invention.

FIG. 2*b* is a perspective view of the device shown in FIG. 2*a*.

In FIG. 1, numeral 2 designates a container of a beverage (for example, a can of beer); 5 designates an auxiliary reservoir of compressed nontoxic gas in contact with its liquid phase; 3 designates an elongated heat-exchange tube connecting the reservoir to the upper surface of the container; 4 designates a throttle; 1 designates a dimple on the upper surface of the container indicating the position of the elongated tube.

The container illustrated in this Figure is conveniently opened with a two-pronged punch, one prong of the punch being used to perforate the can at dimple 1. The liquid boils as the pressure is released and the gas escapes through throttle 4 and perforated dimple 1. The beverage in the main container is cooled by contact with the auxiliary reservoir and the heat-exchange tube which are in turn cooled by the evaporation of the liquid in the reservoir and the expansion of the compressed gas through the throttle.

In FIGS. 2*a* and 2*b*, numeral 8 designates a tube in the form of a zigzag in the interior of a flat plate 7; 6 represents a ring-tag device so positioned that it seals orifice 9 at the end of tube 8.

The operation of this container is essentially similar to that described with respect to FIG. 1. The ring-tag when pulled unseals orifice 9 and leaves a further opening which allows a cooled liquid to be poured from the main container. Plate 8 presents a large heat-exchange surface to the liquid in the main container.

As stated above, reservoir 5 can be integral with flat plate 7, allowing circulation of the beverage to be cooled around both plate and reservoir.

What we claim is:

1. A self-cooling container for beverages comprising:
a main vessel, an auxiliary vessel situated in the interior of the main vessel, perforable means connecting an outer wall of the main vessel to the auxiliary vessel, said auxiliary vessel comprising a reservoir, a flat plate of a heat-conductive metal integral with said reservoir and an elongated tube in the interior of the flat plate connecting the reservoir to the perforable means, said reservoir containing compressed nontoxic gas or a nontoxic liquid which boils vigorously at ambient temperature and standard pressure.

2. A self-cooling container as claimed in claim 1, wherein the flat plate is elongated in the direction of the greatest dimension of the main vessel.

3. A self-cooling container as claimed in claim 2, wherein the elongated tube forms a zigzag pattern in the interior of the flat plate.

4. A self-cooling container as claimed in claim 3, further including a release valve or throttle connecting the reservoir to the elongated tube.

5. A self-cooling container as claimed in claim 4, wherein a channel or fins are provided at the edge of the plate.

6. A self-cooling container as claimed in claim 4, wherein the compressed nontoxic gas or nontoxic liquid is a chlorofluoro-hydrocarbon.

7. A self-cooling container as claimed in claim 6, wherein the amount of chlorofluoro-hydrocarbon is sufficient to reduce the temperature of the beverage in the main vessel to about 40° F.

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