April 18, 1950 A. E. WHITECAR 2,504,911

REFREEZABLE REFRIGERANT UNIT

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FIG. 1

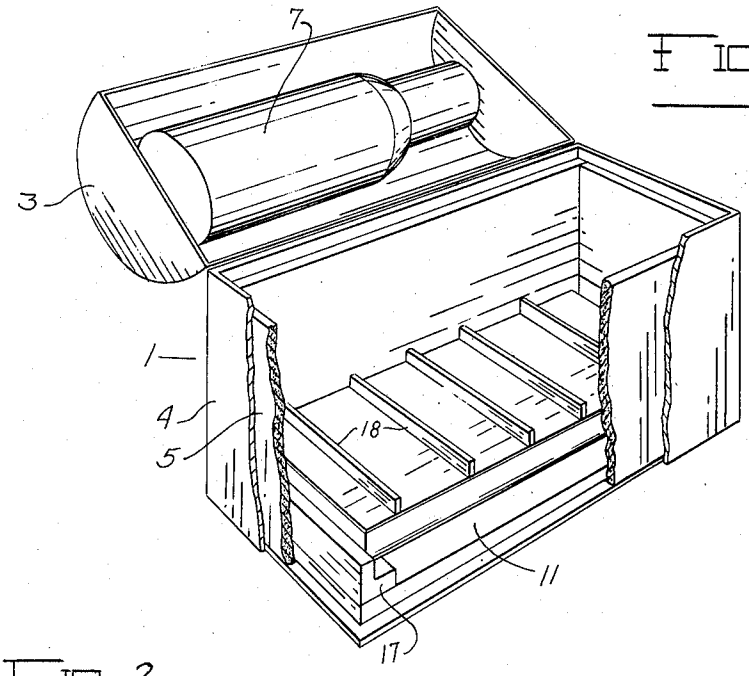


FIG. 2

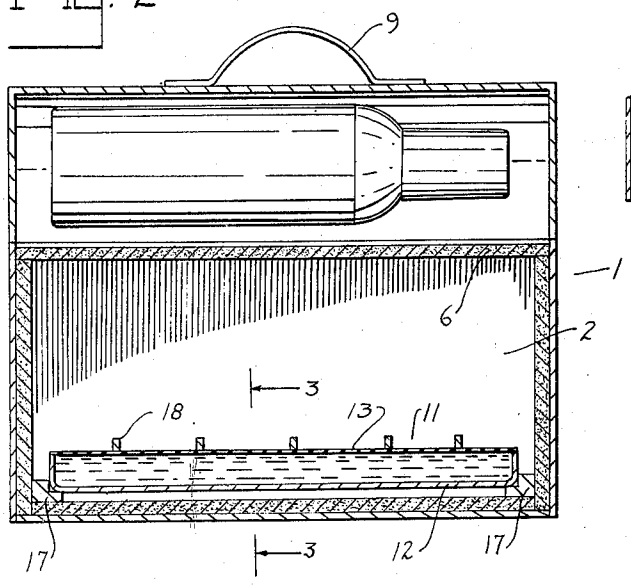


FIG. 3

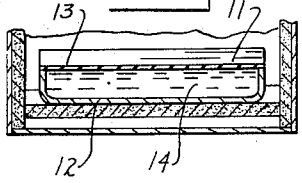
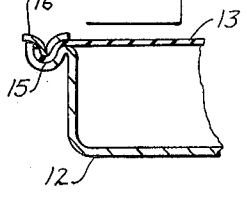


FIG. 4



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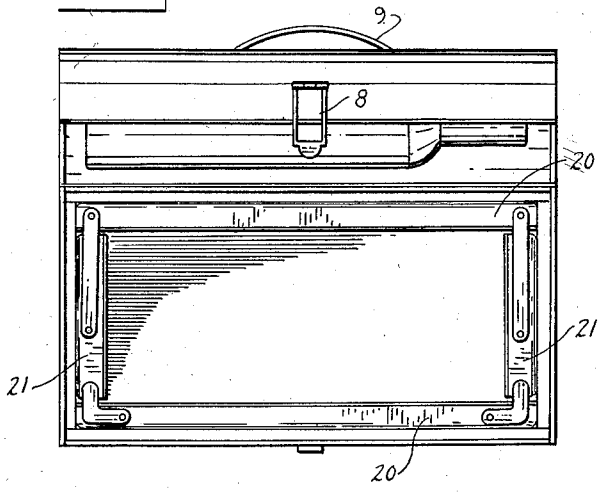
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REFREEZABLE REFRIGERANT UNIT

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FIG. 5



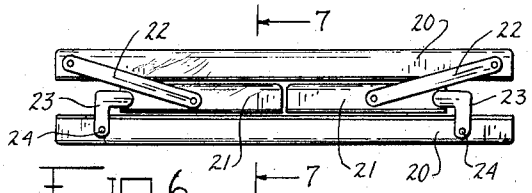


FIG. 6

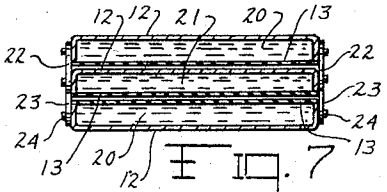


FIG. 7

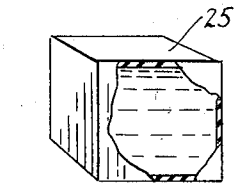


FIG. 8

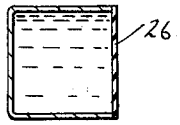


FIG. 9

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UNITED STATES PATENT OFFICE

2,504,911

REFREEZABLE REFRIGERANT UNIT

Alten E. Whitecar, Westville, N. J.

Application November 20, 1946, Serial No. 711,187

2 Claims. (Cl. 62—95)

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The present invention relates to a removable refreezable unit, especially adapted for the refrigeration of a portable lunch box, picnic basket or like kit.

Heretofore, various forms of refrigeration for lunch boxes, picnic baskets and the like have been proposed, but they have met with indifferent success, chiefly because of defective design from the standpoint of sanitation, compactness and similar reasons. In all prior art structures of which I am aware, there is no conception of having a refreezable refrigerant unit which could easily be renewed by a similar unit, or the cooling medium thereof refrozen and used repeatedly.

The principal object of the present invention is the provision of a renewable refrigeration unit, more particularly such a unit containing a substance which is adapted to be refrozen indefinitely.

Another object is the provision of a refreezable unit embodying a safety feature which provides for any expansion of the refrigerant occasioned by the process of freezing.

Another object of the invention is the provision of a refrigerant element which may be designed to fit a given compartment or receptacle, or which may be used independently of any receptacle per se, but cast at random among comestibles desired to be maintained in a cold condition, as for example in a picnic basket or the like.

A more specific object is the provision of a collapsible unit consisting of multiple sections or cells which may be folded during the freezing operation, and when unfolded after the refrigerant is congealed, constitute a lining for a container, such as a lunch box which lining affords a refrigeration compartment for the reception of foodstuffs.

A further object of the invention contemplates the provision of a container, partly or wholly of elastic material, which is self-sustaining and adapted to contain a fluid either in liquid or solid form, said unit when frozen simulating ice cubes.

Other objects of the invention will manifest themselves as the description proceeds.

For a full and more complete understanding of the invention, reference may be had to the following description and accompanying drawings, wherein:

Figure 1 is a fragmentary perspective of a lunch box embodying the invention;

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Figure 2 is an elevational view, partly in section, showing the construction in Figure 1;

Figure 3 is a section on line 3—3 of Figure 2;

Figure 4 is a fragmentary sectional view showing a modification of the refrigerant container;

Figure 5 is a plan view showing an adaptation of the invention to a collapsible removable multiple cell unit;

Figure 6 is a plan view of the removable multiple cell unit collapsed, showing the individual cells in nested formation;

Figure 7 is a section on the line 7—7 of Figure 6;

Figure 8 is a perspective view, partly broken away, of a modified form of a single cell simulating an ice cube; and

Figure 9 is a sectional elevation of the cell shown in Figure 8.

The basic idea of my invention is the provision of a removable and/or refreezable refrigerant unit that may consist of a single cell or a multiple of cells forming part of a collapsible structure, which when folded, forms a compact body in which the several cells are in removable formation. Irrespective of whether the refrigerant unit is of a single or multiple cell construction, it is contemplated that the unit be adapted for repeated use by making it a closed receptacle provided with suitable means for compensating for the expansion of the refrigerant when solidifying said refrigerant being permanently contained within the receptacle.

By having the refrigerant sealed within a permanent container makes possible the refrigeration of the unit in a suitable refrigerator. It will be understood that the contained refrigerant may be any fluid capable of being frozen or congealed, but for the convenience of describing a preferred form of the invention, it will be assumed the refrigerant is water.

Referring more particularly to the drawings, it will be seen that the invention has been applied to a lunch box, which may be designated generally by the reference character 1 and consist of a lower compartment 2 having a hinged upper compartment 3. The lower compartment may comprise an outer casing 4 and an inner casing 5, the outer casing being of any suitable material such as sheet metal, fibre or the like, and the inner casing being of insulation material. To further insulate the lower compartment 2, a cover plate 6 of insulation is provided which normally rests upon the ledge formed by the top edges of the inner casing 5. As a matter of design, the upper compartment 3 may be semi-

cylindrical in shape and adapted to contain a Thermos bottle 7 which may be secured therein in any suitable manner, as for example, by clips (not shown). A clasp 8 is provided for locking the upper compartment 3 to the bottom compartment 2, and as a matter of convenience for carrying the box 1, a handle 9 is provided at the top thereof.

The refrigeration unit, designated generally by the numeral 11, may comprise a metal container in the form of a tray 12 (see Figure 3) having a top cover 13 of elastic sheet material, such as rubber or the like. In one form of construction, the cover 13 may be bonded to the upper edges of the tray 12 by a suitable bonding agent, such as cementing, heat treating or the like. This is done preferably with the water in the tray at the time of making the bond between the cover 13 and the tray 12, but obviously it may be done with the tray empty and the water subsequently added through a small opening made in the cover 13 for that purpose, which opening is then closed by a suitable patch or the like. As the invention contemplates the repeated or continuous use of the refrigerant, there is no necessity to provide means for refilling the tray 12, but it is obvious that suitable means could be provided for this purpose if desired.

Figure 4 shows a modification of the refrigerant unit just described, in that the cover 13 is made removable by providing an outwardly formed peripheral groove 15 on the upper edge of the tray 12, and a substantially V-shaped clamping ring or frame 16 is provided. The edges of the cover 13 are adapted to overlie or overlap the groove 15 and be depressed and frictionally held therein by the frame 16, when the latter is snapped into locking position within the groove 15. This construction permits the renewal of the refrigerant or easy replacement of the elastic cover 13 if desired.

The refrigerant unit 11 in the present instance is designed to be inserted in the bottom of the compartment 2 and is preferably substantially of the same side and end dimensions of the inside of said compartment 2. It is preferable to have the bottom of the tray 12 spaced from the adjacent surface of the inner casing 5 so as to provide a circulation of air between said surfaces. A simple expedient for doing this is the provision of spacers or support blocks 17 transversely arranged, said members being provided with a ledge upon which the bottom of the tray 12 may rest (see Figures 1 and 2). It may also be desirable to provide small strips 18 placed across the top of the cover 13 as an expedient to allow an air space underneath sandwiches or other articles of food packed or laid over said cover.

Referring to Figures 5, 6, and 7, I have shown a modification of the refrigerant unit just described, which modification is of a collapsible nature and includes multiple cells. More particularly, this removable unit may comprise opposing side wall cells 20 and end wall cells 21, said cells being movably connected by a link construction comprising links 22 and 23. The links 22 are pivotally secured at their respective ends to one of the side sections 20 and one of the end sections 21, and are adapted to permit an outward and upward movement of the side sections 21. During this pivotal action, the sections 21 pivot about a pivotal point 24 of the links 23, so that when the complete unit is unfolded, it assumes the shape shown in Figure 5. To collapse the unit, the reverse actions or movements of the parts involved take place, i. e., the end units 21 are folded downwardly and inwardly and are adapted to assume a nested formation, as shown in Figures 6 and 7. When thus collapsed, the multiple cells are compacted and require a comparatively small space when placed in a refrigerator, such as the well-known domestic ice box, in order to refreeze the water contained in the several cells. Of course, this reconditioning of the unit does not require that it be collapsed, which is primarily done as a matter of convenience.

When it is desired to insert the portable refrigerant unit into the lunch box 1, it is removed from the refrigerator and unfolded, in which position it assumes a rectangular-shaped caisson corresponding substantially in dimensions to the inner walls of the lower compartment 2. Consequently, when inserted within the box 1, it constitutes a liner within the insulated chamber of said compartment and the cooling effect is thus more evenly distributed over the entire contents of food or the like, which may be packed in said compartment.

A further modification of my refreezable unit is shown in Figures 8 and 9. In Figure 8, a small single cell, which may be regarded as a simulation of the conventional ice cube, consists of a cubical container 25 hermetically sealed and if desired made of a plastic material. A commercial form of suitable plastic material is known under the trade name of "Tygon." The plastic from which the container is made may be sufficiently elastic to provide for any expansion which may occur from the solidification of a volume of water approximately equal to that of a conventional ice cube.

In Figure 9, I have shown a container 26 also simulating an ice cube, which is somewhat similar to the container 25 shown in Figure 3, but differing in that it may have only one wall consisting of an elastic material such as rubber, which may be vulcanized to the edges of the surrounding wall portions, which may be non-elastic as in the case of the larger single cell unit 12.

By making the refrigerant unit correspond to the conventional ice cube, it will be appreciated that they may be used casually or placed at random in packing a picnic basket or the like. That is to say, such single cell units may be tossed among the contents of the picnic basket, and when the refrigerant has become melted, it does not in any way spoil or mess the contents of the basket or the basket itself, as would be the natural result by the melting of ice cubes similarly used.

I have found it preferable to fill completely the refrigerating unit, whether of the single or multiple cell type, with the contained liquid because otherwise an air space or pocket is created within the container, and this lowers the efficiency of the unit in many obvious respects. As set forth above, whatever expansion occurs in the freezing of the refrigerant is fully compensated for by the elasticity of the material from which the unit is fabricated, and therefore, there is no necessity to have an air space for expansion purposes.

It should also be appreciated that whatever materials the refrigerant unit may be constructed of, it is preferred that the container proper be of a form or kind of construction material that is self-supporting, and will retain its original or general configuration, irrespective of whether the refrigerant is in a liquid or solid state. Further-

more, it will be noted that in the case of units simulating the conventional ice cube, such units are especially adapted for the cooling of beverages or the like, where it is desired that no dilution of the beverage be caused by the cooling agent, as for example, by the melting of ice cubes used principally for their cooling effect.

It is obvious that certain modifications of my invention, as illustrated, will occur to those skilled in the art, as for example, the hollow container may take a variety of forms not only with respect to its contour and duplication of cells, but also with respect to the materials employed for the container, such materials being either metal, all rubber, semi-plastic and plastic, etc. The constructional details may also vary from a completely sealed receptacle, to one provided with means for renewing the refrigerant from time to time; also with respect to whether the main container assumes the geometrical form of a pan, dish, or the like.

It is my desire and intention to include all such modifications as may be provided in putting the invention into practice within the purview of the appended claims.

What is claimed is:

1. In a lunch box including a storage compartment of rectangular formation defined by side, end, and bottom walls, a pair of containers corresponding in shape to said end walls but of slightly smaller dimensions, a pair of containers corresponding in shape to said side walls but of slighter smaller dimensions, a refreezable refrigerant in said containers, and means for forming said container into a collapsible rectangular structure whereby they are adapted to assume a vertical position in said compartment lining said side and end walls.

2. In a lunch box including a storage compartment of rectangular formation defined by side, end, and bottom walls, a pair of containers corresponding in shape to said end walls but of slightly smaller dimensions, a pair of containers corresponding in shape to said side walls but of slightly smaller dimensions, a refreezable refrigerant in said containers, and links pivotally connected to adjacent containers and joining them in a collapsible rectangular structure that is adapted to be positioned in said compartment lining said side and end walls.

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