Sept. 11, 1934. J. H. ASHBAUGH 1,973,033

ICE TRAY

Filed Jan. 23, 1933

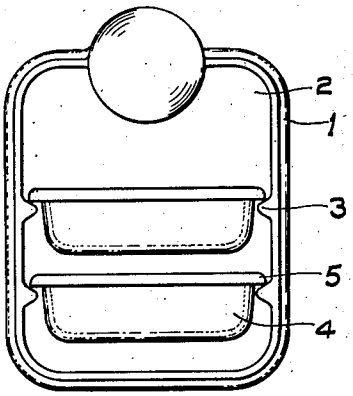
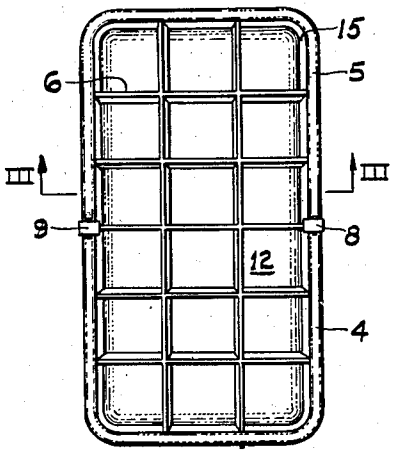


FIG. 1.

FIG. 2.



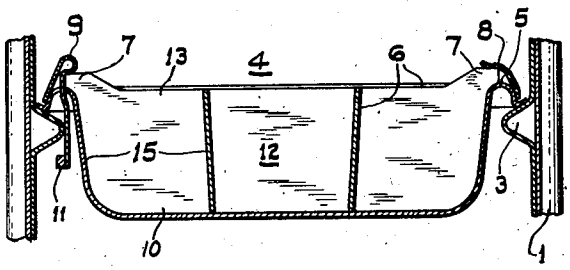


FIG. 4.

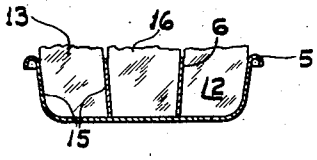


FIG. 3.

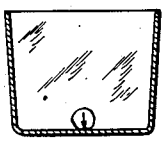


FIG. 5.

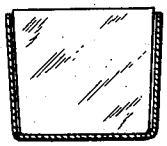


FIG. 6.

WITNESS
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UNITED STATES PATENT OFFICE

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ICE TRAY

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Application January 23, 1933, Serial No. 653,164
3 Claims. (Cl. 62—108.5)

My invention relates to a method of freezing liquids and apparatus therefor and particularly to a method and apparatus for freezing liquids in the freezing compartments of artificial refrigerators.

Many schemes have been proposed and are used in removing the ice cubes which are made in the freezing compartment of mechanical refrigerators. However, none of the schemes are fully satisfactory from the user's standpoint and most of the schemes require additional parts and expense for the ice trays, which is unsatisfactory from the manufacturer's standpoint.

I have found, by disposing an ice tray having a grid normally rigidly disposed therein of limited, but not unusual, construction, that the force of expansion of the liquid which freezes in the tray, and which is controlled and directed by my scheme, breaks the bond between the frozen liquid and the other parts of apparatus in contact therewith and forces the already frozen liquid a substantial distance out of the tray, so that it may be easily removed. It is desirable to have a removable grid for cleaning purposes, and, therefore, some simple means for positioning the grid rigidly in the ice tray during freezing periods is provided.

It is an object of my invention, therefore, to provide an extremely simple and effective scheme for removing ice cubes from the ice trays of artificial refrigerators.

It is another object of my invention to provide a new and novel apparatus and method for freezing liquids in an ice tray disposed in the freezing compartment of artificial refrigeration apparatus without the addition of expensive construction or parts to the conventional ice tray now in common use.

These and other objects are effected by my invention as will be apparent from the following description and claims taken in accordance with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a front view of the freezing compartment and cooling unit of a conventional mechanical refrigeration apparatus and shows ice trays disposed therein in a manner in accordance with one embodiment of my invention;

Fig. 2 is a top plan view of an ice tray constructed in accordance with a preferred embodiment of my invention;

Fig. 3 is a sectional view of the ice tray taken on line III—III of Fig. 2, and shows the disposition of a cube of ice therein frozen in accordance with the method and apparatus utilized in practicing my invention;

Fig. 4 is an enlarged view of the ice tray and cooling unit shown in Fig. 1 and illustrates a preferred means for providing a rigid grid structure for freezing which is removable for cleaning;

Fig. 5 is a diagrammatic view of a single ice cube cell and illustrates the direction of the force of expansion of the liquid last to freeze;

Fig. 6 is a diagrammatic view of an ice cube cell showing the cube completely frozen and the broken bond between the frozen liquid and the tapered cell walls.

Referring specifically to the drawing for a detailed description of the invention, numeral 1 designates a cooling unit of a mechanical refrigerator having an enclosed freezing chamber 2 and provided with inwardly extending supports 3. Ice trays 4 are supported preferably by the supports 3 by means of a bead or flange 5 surrounding the ice tray. The ice tray may be formed of any material of good heat conductivity which is substantially rigid.

The ice tray is provided with a grid 6 which is preferably removably disposed in the tray 4 by means of ears 7 on the grid engaging retainer 8 on one side of the tray 4 and a spring clip 9 on the other side. The clip 9 may be forced away from the ears 7 by pressing a button 11 attached to the clip 9, whereupon the grid 6 may be removed from the tray 4.

The grid 6 is constructed so that it provides a plurality of cells 12 each having a closed end 10 an open end 13 and walls 15, the open end 13 being at least as large as and substantially of the same configuration as the closed end 10. To obtain such a construction the walls 15 of each cell 12 preferably are formed with a taper toward the bottom of the tray 4.

In practicing my invention, the tray 4 is filled with a liquid to be frozen, and the grid 6 is snapped into place by inserting one of the ears 7 under the retaining portion 8 on the tray 4, and forcing the other ear 7 past the spring clip 9. Since the bottom of the tray 4 is not in direct contact with the cooling unit 1, the liquid contained in the cells 12 freezes from the top downwardly since it is cooled by the cool air in the freezing compartment 2, and the best transfer occurring through the sides of the tray rather than through the bottom as in the conventional design. The open end 13, therefore, of the tray freezes first.

Referring to Figs. 5 and 6, as the liquid in the bottom of each receptacle 12 freezes, it ex-

pands, and since the walls 15 of the receptacle 12 are formed with a taper toward the bottom of the tray 4, and since the grid 6 is rigidly fixed in the tray, the force of expansion breaks the bond between the already frozen liquid and the walls 15 of the receptacle 12 and forces the cubes 16 out of the receptacle and out of contact with the walls 15.

From the foregoing description, it will be apparent that I have provided an ice removing scheme which is extremely easy to operate by my new and novel method and apparatus, and that very little additional cost is involved in practicing my invention over existing ice freezing method and apparatus of the conventional type wherein an ordinary ice tray and grid are utilized.

Although I have shown my invention in but one form, it will be obvious to those skilled in the art that it is susceptible to various changes and modifications without departing from the spirit and scope of the appended claims, and therefore only those limitations specifically set forth in the claims or present in the prior art are to be imposed thereupon.

What I claim is:

1. A device for freezing liquids in a mechanical refrigerator which comprises the combination of a cooling unit, an ice tray supported at its top on the cooling unit and having its bottom out of contact therewith, a grid normally rigidly disposed in the ice tray to form cells open at top, so that the path of least resistance for the heat of the liquid in said cells is near the top thereof to the cooling unit and to the ambient atmosphere adjacent to the cooling unit, whereby the liquid freezes from the top of the cells downwardly, said cell tops being at least as large as and substantially of the same configuration as the remainder of the horizontal areas of the cells, whereby the force of expansion of the liquid freezing at the bottom of the cells breaks the bond between the already frozen liquid in the cells and forces it out of the top of said cells, said grid being detachable from the tray for cleaning.

2. A device for freezing liquids in a mechanical refrigerator which comprises the combination of a cooling unit, an ice tray supported near its upper portion in metallic heat conducting relation with the cooling unit, a grid normally fixedly disposed in the ice tray to form cells open at the top whereby liquid placed in the cells freezes from near the top downwardly, said cell tops having at least as large a horizontal surface at the top as at the bottom, whereby the force of expansion of the liquid freezing near the bottom of the cells breaks the bond between the already frozen liquid and the cells and forces it outwardly of the cells, said grid being readily detachable from said tray.

3. A device for freezing liquids in a mechanical refrigerator which comprises the combination of a cooling unit, an ice tray supported near its upper portion in metallic heat conducting relation with the cooling unit, a grid disposed in the ice tray to form cells open at the top whereby liquid placed in the cells freezes from the top downwardly, means for normally fixedly securing the grid in the ice tray which means may be rendered ineffective for removing the grid from the ice tray, said cell tops having at least as large a horizontal surface at the top as at the bottom, whereby the force of expansion of the liquid freezing near the bottom of the cells breaks the bond between the already frozen liquid and the cells and forces the frozen liquid outwardly of the cells.

JOHN H. ASHBAUGH.