Sept. 18, 1934. A. A. BARNES 1,974,146

CUBE TRAY HEATING UNIT

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Fig. 1.

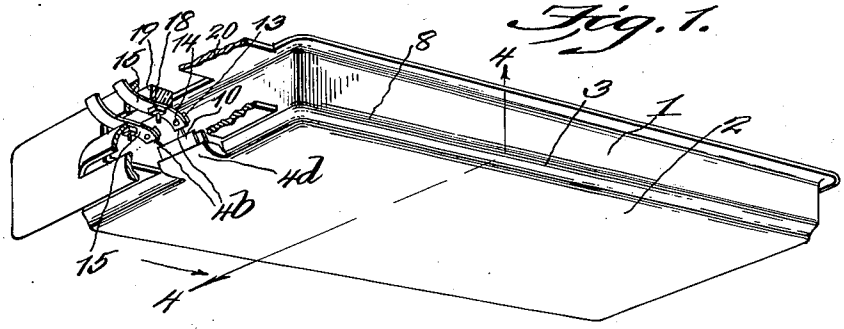


Fig. 2.

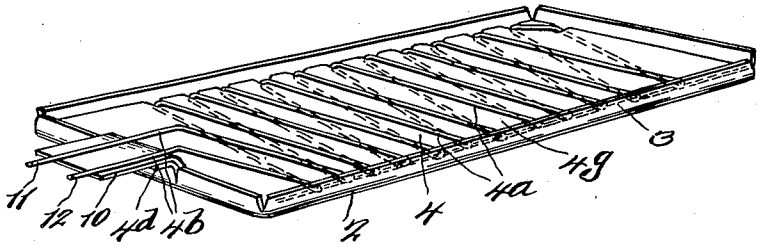


Fig. 3.

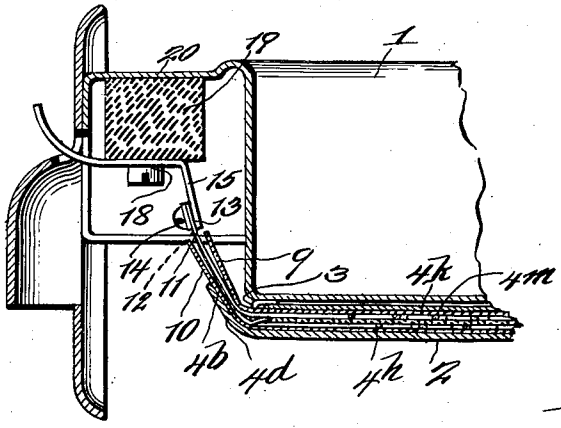
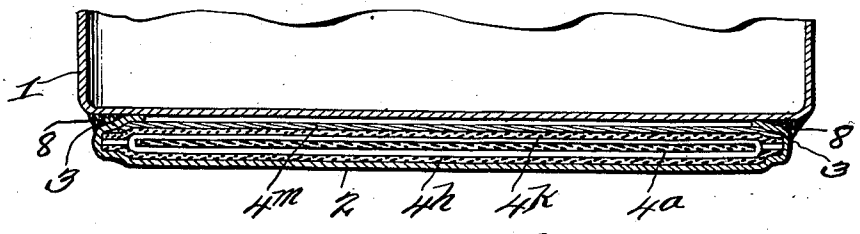


Fig. 4.



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Fig. 5.

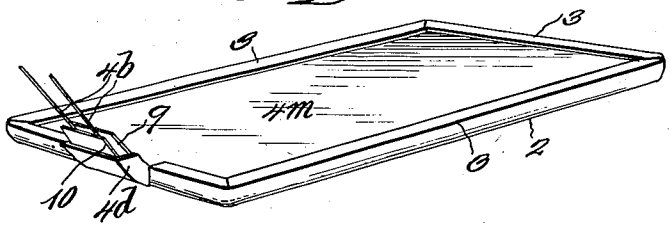
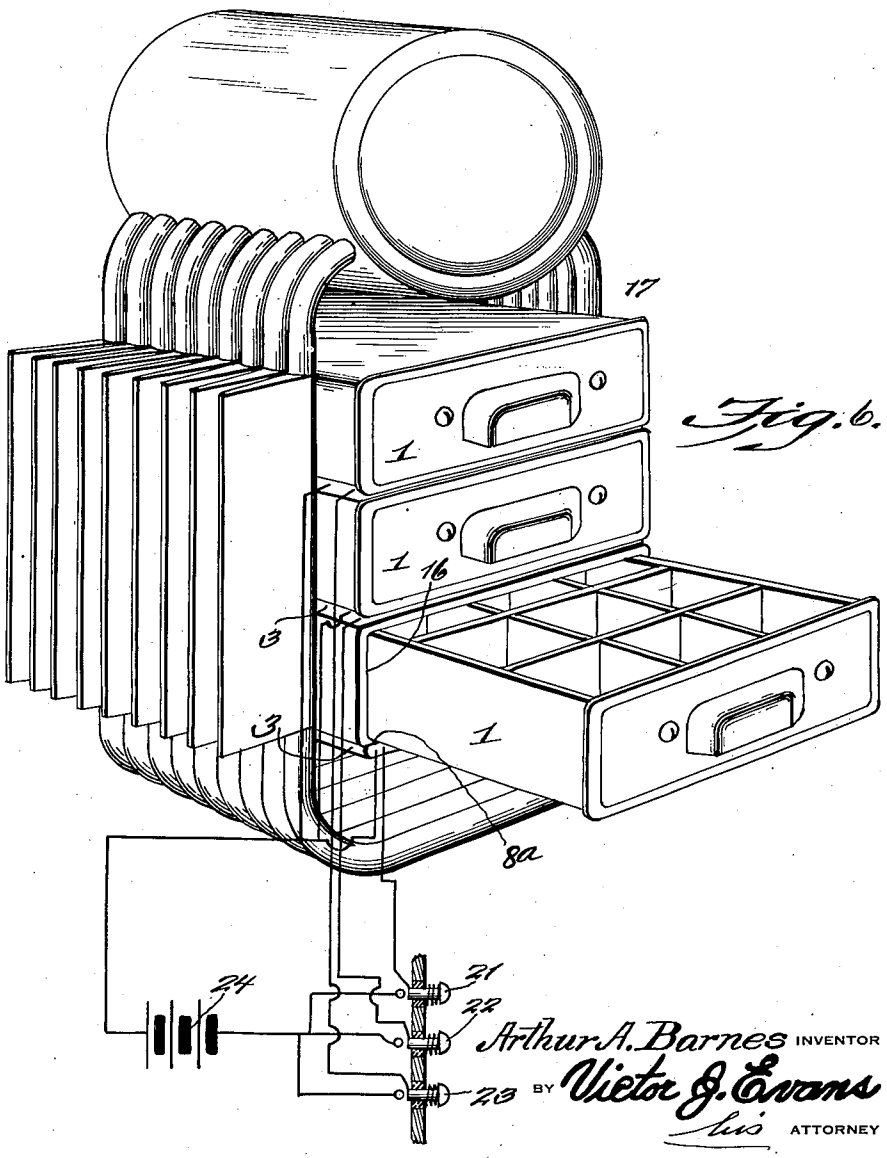


Fig. 6.



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UNITED STATES PATENT OFFICE

1,974,146

CUBE TRAY HEATING UNIT

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2 Claims. (Cl. 62—108.5)

This invention relates to refrigeration, and especially to electromechanical machines, and it is the purpose of the present invention to provide the cube trays of a refrigeration machine with a heating unit.

In forming the ice cubes in the trays, that is in the compartments caused to be formed by the grids, the trays freeze to the supports in the chilling compartments of the machine while the ice cubes freeze to the bottoms of the trays as well as to the grids. In many instances it is difficult to not only remove the trays, but more or less tedious to dislodge the ice cubes from the bottoms of the trays as well as away from the dividing walls of the grids.

The constant breaking of the frozen bond between the trays and their supports in the chilling compartment may tend to injure the supports, or otherwise cause wear and tear on the various parts.

In some cases persons may attempt to use a knife or other instrument for the purpose of prying the tray from its frozen position, consuming time and labor as well as causing injury to the various parts.

In view of these facts, it is the purpose to provide a means such as a heating unit for use in each chilling compartment or applied to the bottom of each tray, and which may be supplied with electric current for a very short while, in which case the bottom of each tray heats up just sufficiently to cause the ice bonding to melt so that the tray can be instantly removed, and the ice cubes easily taken from the tray.

Still another purpose is to provide a heating unit so applied to the tray as in Figures 1 to 4 or as applied in Figure 6 that it will not interfere with the insertion or the removal of the tray or the support of the same, and thereby will not prevent the forming of the ice cubes in any way.

It is obvious that the purpose of this invention is to utilize a heating element, either attached permanently to the bottom of the tray, or permanently to the bottom of the chilling compartment (which receives the tray) or merely insertable between the bottom of the tray and the bottom of the chilling compartment, in order to break the frozen bond therebetween, and thereby permit removal of the cube tray.

It is to be understood that the particulars herein given are in no way limitative, and that while still keeping within the scope of the invention, any desired modification of details and proportions may be made in the construction of the appliance according to circumstances.

The invention comprises further features and combination of parts to be hereinafter set forth, shown in the drawings and claimed.

In the drawings:—

Figure 1 is a perspective view of a cube tray, showing the bottom thereof equipped with a heating unit which is incased in a copper or other metal additional bottom carried by the tray, showing the terminals of a heating coil shown in dotted lines connected to contact lugs mounted upon an insulator carried by an extension of the tray.

Figure 2 is a view of the additional bottom, showing the heating unit in position.

Figure 3 is a sectional view of one end of the tray, illustrating how the terminal lugs are connected to the terminals of the heating unit.

Figure 4 is a cross sectional view on line 5—5 of Figure 1.

Figure 5 is a perspective view of a complete heating unit, which may be soldered, spot welded, or otherwise connected to the bottom of a cube tray or to the bottom of a chilling compartment, or removably inserted between such bottoms, the purpose thereof being obvious.

Figure 6 is a perspective view of a chilling unit for an electrorefrigerating machine, illustrating a plurality of chilling compartments with cube trays received therein, illustrating a plurality of heating units which may be selectively operated, for breaking the frozen bond between a tray and a chilling compartment.

Referring to the drawings 1 identifies a conventional type of cube tray used in refrigeration machines and 2 is an additional bottom, which may be made of any suitable sheet metal preferably copper, with its longitudinal and end edges rolled as shown at 3. These rolled edges act to support and retain a heating unit 4 of a conventional type in position. This heating unit proper comprises a mica sheet, about which, from one longitudinal edge to the other a heating wire or coil 4*a* is wound, the end portions 4*b* thereof terminate beyond an extension 4*d* of said additional bottom 2, and therefore constitute terminals 11 and 12. The opposite longitudinal edges of the sheet of mica 4*g* are notched, to keep the wire 4*a* from contacting with the rolled edges of the additional bottom 2. The sheet of mica 4*g* is placed in the additional bottom, but previous to so positioning the same a sheet of mica 4*h* is inserted for insulating the wire from the additional bottom 2. On top of the sheet of mica 4*g* a third sheet of mica 4*k* is positioned, and upon this a sheet of copper 4*m* is positioned, and

then the edges of the additional bottom 2 are bent over to hold all parts of the heating unit together. This construction of heating unit with its terminals 11 and 12 may be soldered, spot welded or otherwise fastened at 8 to the bottom of the cube tray 1, as shown in Figures 1, 3, and 4, or may be permanently fastened at 8*a* to the bottom of a chilling compartment 16 of a chilling unit 17 of an electrorefrigerating machine. The compartments 16 receive the cube trays. The complete heating unit as shown in Figure 5, the heating coil or wire being incased as described may be removably inserted between the cube trays and the bottoms of the chilling unit, or may be otherwise suitably applied, so that when electric current is supplied to the unit the frozen bond between the parts may be severed and allow the tray to be easily removed. It is preferable to use the heating unit as a permanently attached part to the bottom of the tray, in view of the fact that after the tray is removed current may still be supplied to the heating unit, in order to loosen the bond between the ice cubes and the bottom of the tray as well as from the walls of the grid in the tray.

The terminals 11 and 12 of the heating wire or coil as shown in Figures 1 and 3 are connected at 13 to binding screws 14, which are carried by conductor strips or lugs 15. The conductor strips or lugs 15 are secured at 18 to an insulating block 19, which is in turn attached to a metal extension 20 of the cube tray. The mica sheets 4*h* and 4*k* constitute insulation, and are provided with extensions 9 and 10 similar in shape to the extension 4*d* of the additional bottom 2, thereby protecting the terminals 11 and 12 of the heating wire or coil. However it is to be understood that the invention is not to be limited to this particular manner of construction, that is the construction of the arrangement of the terminals 11 and 12 and the conductor strips or lugs 15, for it is obvious that current may be transmitted to the heating wire or coil in any conventional way, for the invention really resides in the idea of the application of a heating unit, either to the bottom of the tray permanently or permanently to the bottom of the chilling compartment, or removably insertable between such bottoms, for the purpose of breaking or loosening the frozen bond between such parts.

When the tray is inserted in a chilling compartment of a refrigeration machine the additional bottom 2 formed of copper engages on the bottom of the chilling compartment and will no doubt become frozen to the support. In order to remove the tray it is only necessary to engage the terminal ends of two live electrical wires with the terminal lugs or conductor strips 15 long enough so that the bottom of the tray is heated sufficient to loosen it from its support. It is only a fraction of a minute that the bottom of the tray will heat sufficiently to allow its removal as well as the removal of the ice cubes without in any way distorting or injuring the various parts.

In Figure 6 there is illustrated a conventional diagram of supplying current to the heating units used in connection with the chilling compartments. This diagram comprises a plurality of depressible buttons 21, 22 and 23, which are in circuit with a source of current supply as shown at 24, and also in circuit with the heating wires or coils of the heating units. It is obvious that by depressing any one of the buttons 21, 22 and 23, the heating units may be selectively operated.

The invention having been set forth, what is claimed is:

1. In combination with a chilling unit having tray shelves and ice cube trays disposed on said shelves, an electrical heating unit comprised in each shelf to break the frozen bond existing between the tray and the shelf, an electrical energizing source for the heating units, and a switch between the source and each heating unit and yieldingly impelled to open position to be manually retained in closed position to energize each heating unit.

2. A chilling unit comprising a plurality of ice cube tray receiving compartments, one end of each compartment being open to permit of the reception of an ice cube tray, the bottom of each compartment constituting a shelf for the tray, a heating unit comprised in the bottom of each compartment acting to break the frozen bond existing between the tray and the shelf, a heat generating source operatively connected to the heating unit for conducting heat energy thereto, and control means normally inactive between the heat generating source and each heating unit to be manually operated to retain the control means active, and thereby supplying heat energy to each heating unit.

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