Nov. 13, 1934. H. S. SADTLER 1,980,734

LOOSENING ICE CUBES

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Fig 1

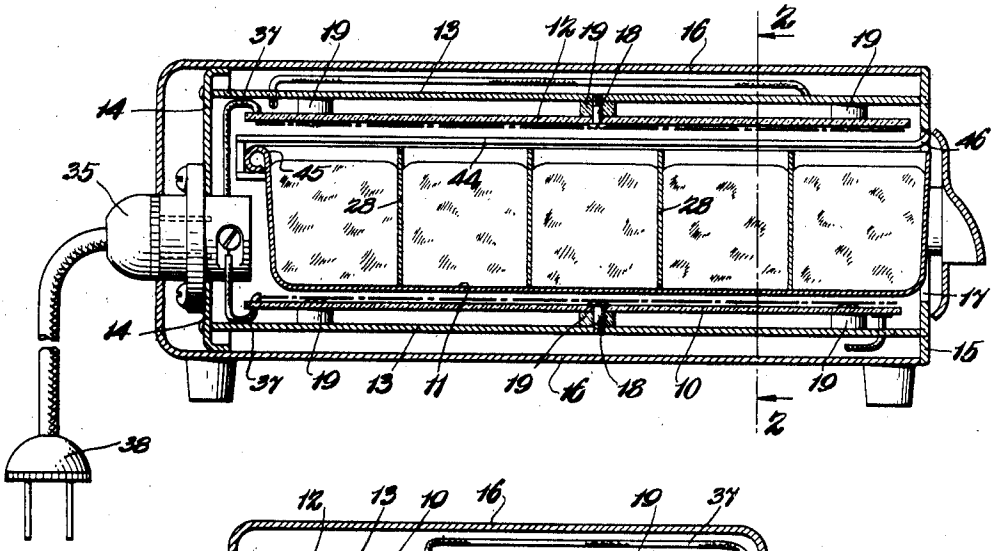


Fig 2

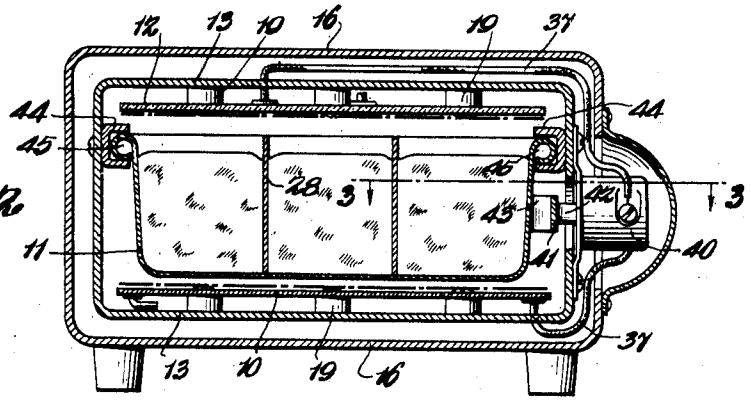
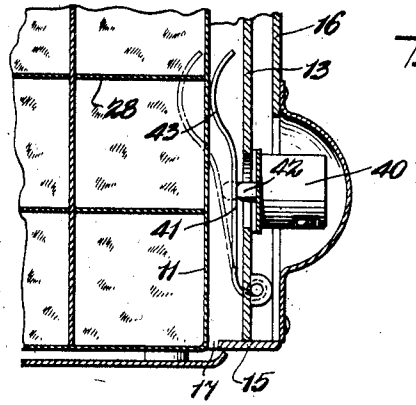


Fig 3



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Fig 4

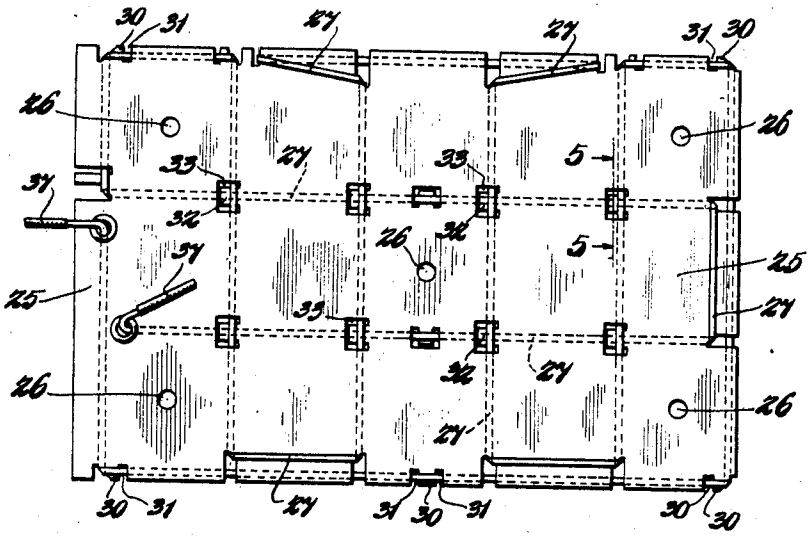
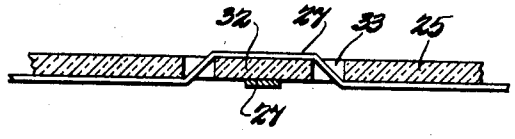


Fig 5



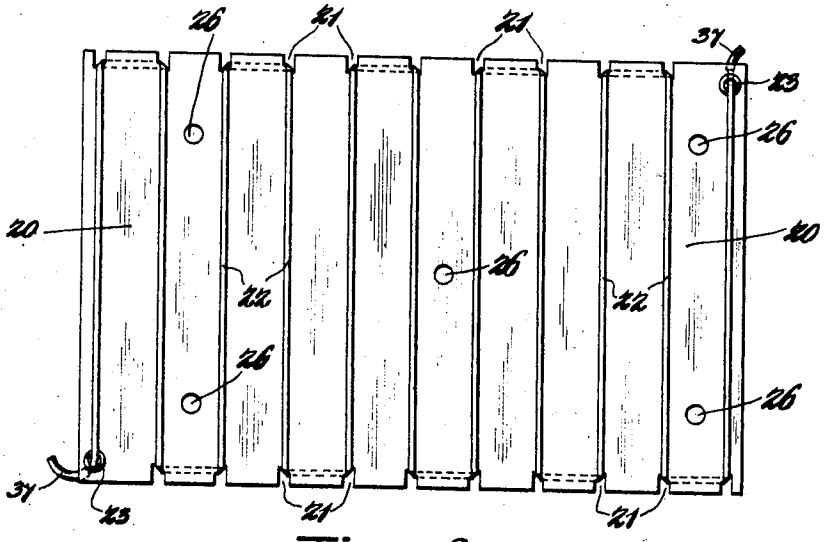


Fig 6

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UNITED STATES PATENT OFFICE

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LOOSENING ICE CUBES

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3 Claims. (Cl. 219—19)

The present invention relates to a novel and useful method of and apparatus for loosening ice cubes and more particularly to such a method and apparatus particularly adapted for the loosening of ice cubes in the ice trays of domestic refrigerators.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

Of the drawings:—

Fig. 1 is a central, vertical section through the present preferred and illustrative embodiment of the present invention;

Fig. 2 is a transverse section taken on the line 2—2 of Fig. 1;

Fig. 3 is a detail section taken on the line 3—3 of Fig. 2;

Fig. 4 is a detail top plan view of a heater element forming a part of the embodiment illustrated in Fig. 1;

Fig. 5 is a detail section taken on the line 5—5 of Fig. 4; and

Fig. 6 is a detail top plan view of another heater element forming a part of the illustrated embodiment.

The present invention has for its object the provision of a novel apparatus and method for loosening the ice cubes in the ice trays of domestic refrigerators. A further object of the invention is the provision of a simple, economical and efficient apparatus which will loosen all or only a portion of the ice cubes formed in a domestic refrigerator tray, thereby avoiding the necessity of removing more cubes than are required for use at the time. Still another object of the invention is the provision of such an apparatus which will loosen the ice cubes quickly and avoids the annoyance of heating the ice tray with water in the manner now usually used.

In accordance with the present invention, resistance heating means are employed for heating the top and bottom portions of the ice tray, and the separating partitions which separate the tray into the individual cubical spaces. These heating means are preferably spaced from each other a distance slightly more than the height of the ice cube tray and are adapted to receive the tray between them. For loosening only a desired portion of the ice cubes in the tray, the heating elements are so positioned with respect to each other that the tray can be positioned with the heating elements partially or completely covering the tray, and the heating element for the upper portion of the tray is preferably formed with the portions which are heated the hottest spaced similarly to the partitions in the tray whereby the partitions may be alined or registered with these relatively intensely heated portions thereby concentrating the heat on the partitions and preventing unnecessary melting of the ice in the tray. Preferably, and as embodied, there are provided means for closing the circuit supplying the heating elements with electrical energy upon the placing of the tray within the heater so that the heater remains energized only while the heater actually is in use. Other means are also provided for spacing the tray from the heating units and insulating the tray therefrom to prevent contact of the tray with the heating elements.

Other features of the invention will be initially pointed out in connection with the following detailed descriptions of the present preferred embodiment of the invention, and it will be understood that the foregoing general description and the following detailed description are both exemplary and explanatory, but not restrictive of the invention.

Referring now in detail to the present preferred and illustrative embodiment of the invention as shown in the accompanying drawings, there are provided a heating element 10 for heating the bottom of the ice cube tray 11 and a heating element 12 for heating the upper portion of the ice cube tray. These heating elements being of a form which will be more fully described below, are spaced from each other a distance only slightly greater than the height of the ice cube tray and are attached to the upper and lower inner faces of a casing 13 into which the ice cube tray is received. This casing is preferably formed of sheet metal and at its ends is attached to supports 14 and 15. Support 14 is tightly fitted within the outer casing 16, and the other support 15 closes the front end of outer casing 16 and is provided with an aperture 17 through which the ice cube tray is received. The heating elements 10 and 12 are fastened to the inner casing 13 by means of

small screws 18 and are spaced from the casing by means of the insulating washers 19 which are placed between the casing 13 and heating elements 10 and 12.

The heating element for heating the bottom of the ice cube tray is shown in detail in Figure 6 and, in the present embodiment, comprises a sheet of insulating, heat resisting material 20, such as mica, of a size slightly larger than the bottom of the tray 11 and notched along its side edges, as at 21, to receive the resistance wire 22. Preferably, and as shown, the resistance wire is strung back and forth across the upper face only of the sheet of mica, so that the heat therefrom is transmitted directly to the bottom of the ice tray without passing through the sheet, thereby increasing the speed and efficiency with which the bottom of the ice tray is heated sufficiently to melt that portion of the ice necessary to loosen the ice cubes. Suitable fastening means 23 are provided, of conventional construction, for securing the ends of the resistance wire to the insulating supporting sheet 20.

The heating element for heating the upper portion of the ice cube tray is shown in detail in Figures 4 and 5. This heating element comprises a supporting sheet of insulating, heat-resistant material 25, such as mica, provided with a plurality of holes 26 by which it is attached to its supporting casing 13, and this supporting sheet has secured to it the resistance wire 27 to be heated by the energizing current. As shown, the resistance wire is strung on the supporting sheet in such a manner that the major portion of the wire lies on the under side of the sheet and is adjacent to the upper portion of the ice tray, and the stretches of wire are preferably spaced from each other and arranged on the supporting sheet so that they register with the separating partitions 28 of the ice cube tray.

One end of the resistance wire 27 is fastened to the supporting sheet and from there is stretched around the edges of supporting sheet 25 and back and forth across the under side of the sheet, both longitudinally and transversely to provide one stretch of resistance wire directly overlying each separating partition 28 and the sides of the ice cube tray. Around the edge of the supporting sheet, the wire is secured by looping it over and under the small tabs 30 between adjacent notches 31 formed in the edge of supporting sheet 25, while the transverse and longitudinal stretches of the wire 27 are insulated from each other at their crossings by means of the small bridges 32 formed by notching the sheet and passing one stretch of the wire through the notches 33 and the other stretch over the small bridging tab 32 formed by the notches. Certain of the notches 34 around the edge of the sheet are cut deeper than others and these permit the resistance wire 25 of one transverse stretch to be passed to the next transverse stretch without contacting with the wire at the edge of the sheet.

For connecting the heating elements together and to the current source, a separable connector 35 is provided which is supported on the end support 14 at the rear of the casings 13 and 16 and is connected in the usual manner with leads 37 from the heating elements and to the outlet connecting plug 38.

As shown in the preferred embodiment, means are preferably provided for closing the heater circuit automatically as the ice trays are positioned within the apparatus, and a small quick acting switch 40 is mounted on the inner casing 13, in circuit with the heating elements 10 and 12, to control the supply of current thereto. This switch is adapted to be closed by the positioning of the ice cube tray 11 within the heater, and for this purpose, a pivoted finger 41 is mounted on the inner casing 13 near the front end thereof, overlying and pressing against the switch operating plunger 42, and is provided with a curved portion 43 near its rear end to contact with and be moved by the side of the ice tray 11, thereby closing the switch and the heating circuit.

For positioning the ice cube tray 11 within the apparatus and between the heating elements and for guiding the tray as it is moved into heating position for preventing contact of the metallic tray with the heating elements 10 and 12, there are provided guiding channels 44 suitably positioned on the sides of the inner casing to receive and guide the edges 45 of the tray and to support the tray while the ice cubes are being loosened. As embodied, channels 44 are provided with flared mouths 46 of sufficient size to prevent the tray being pushed into the heater with the edges 45 above or below the channels 44.

For facilitating the registration of the partitions 28 with the wires 27 of the heating unit 12 when only a portion of the cubes is to be loosened, indicating means are provided to guide the user in positioning the tray. As embodied, the front support 15 is so positioned with respect to the transverse stretches of wire 25, that registration is secured by alining any transverse partition with the front edge of the support 15.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. A heater for loosening ice cubes in a domestic refrigerator tray including in combination a casing adapted to receive and closely surround the tray from which the ice cubes are to be loosened and into which one end of the ice tray is received and resistance heating elements supported by and within said casing, one of said elements extending over the bottom of the tray and positioned below said tray and the other of said elements being positioned above said tray, the heater for the top of the tray having its parts spaced from each other similarly to the spacing of the partitions in the tray to register with said partitions.

2. A heater for loosening ice cubes formed in a domestic refrigerator tray having separating partitions including in combination a casing adapted to enclose the top, bottom sides and one end of the ice tray, a pair of heating elements supported by said casing, one of said elements extending over the area of the bottom of said tray and positioned below said tray and the other of said elements positioned above said tray and positioned in registry with the partitions in said tray and guides engaging with the sides of said tray for supporting said tray between said elements and out of contact with said elements.

3. A heater as claimed in claim 2 provided with a switch controlling the supply of energy to said heating elements and closed by the insertion of said tray within said casing.

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