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2,115,944

ICE CUBE RELEASING MEANS

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FIG. 1.

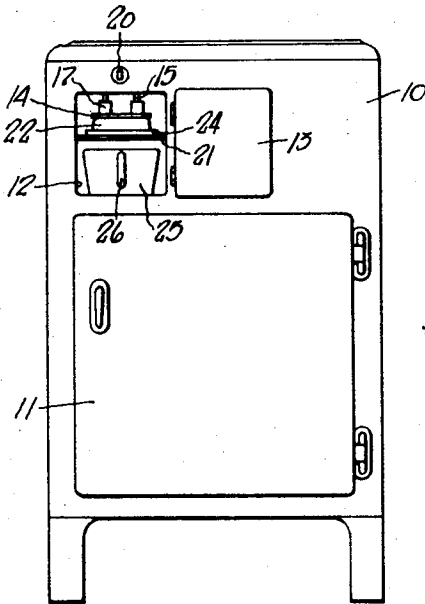


FIG. 2.

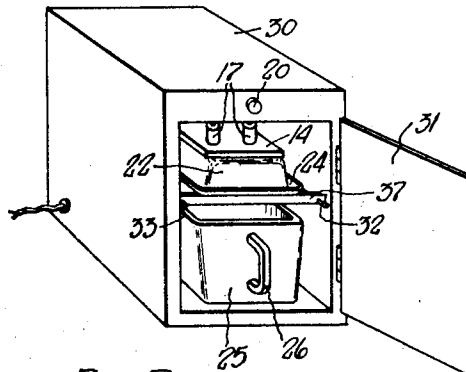


FIG. 7.

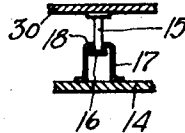


FIG. 5.

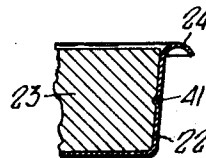


FIG. 3.

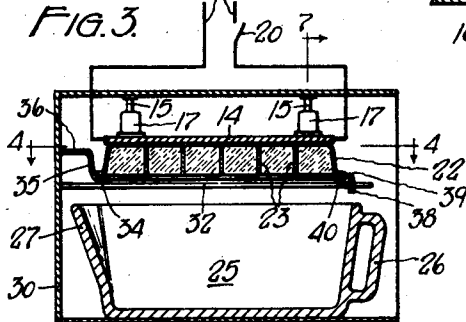


FIG. 4.

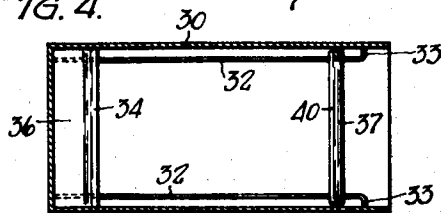
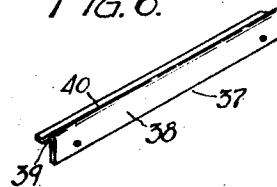


FIG. 6.



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ICE CUBE RELEASING MEANS

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3 Claims. (Cl. 62-113)

This invention relates to ice cube releasing means, and particularly to means for removing ice cubes from the trays in which the same are frozen in electrical or other mechanical refrigerators.

Considerable difficulty and bother is commonly attendant on the removal of ice cubes from their freezing trays, together with objectionable handling of both cubes and tray. The usual procedure in removing the cubes from their tray involves holding the cube filled tray below a water tap to permit warm water to play over the tray until the frozen bond between cubes and the tray is broken and the cubes and their partitioning frame are released from the tray as a unit; and then permitting the water to play over the cubes and frame until the frozen bond between the individual cubes and the frame is broken. This procedure entails holding of the parts, including the cubes, for a sufficient time to chill the hands, and involves the likelihood of splashing of water on the clothes; and hence is always a disagreeable task.

It is therefore the primary object of this invention to provide means whereby the individual ice cubes may be removed from their freezing compartments in a tray without handling of the cubes.

A further object is to provide a device of this character which comprises a heating element, a receptacle therebelow, and means interposed between the element and the receptacle for supporting an ice cube tray in inverted position whereby the cubes may fall into the receptacle when the heat of said element breaks the bond between the cubes and the tray.

A further object is to provide a device of this character wherein the heating element automatically assumes a position in engagement with the bottom of an inverted tray mounted on a fixed support to permit the tray to be rapidly heated by conduction to break the frozen bond between the tray and its contained ice cubes.

A further object is to provide a device of this character with novel means for supporting the cube tray only at its margin and adjustable to accommodate trays of various sizes and shapes.

Other objects will be apparent from the description and the appended claims.

In the drawing:

Fig. 1 is a front elevational view of a domestic refrigerator having my ice cube releasing means incorporated therein.

Fig. 2 is a perspective view of the device as an independent unit.

Fig. 3 is a central longitudinal vertical sectional view of the device illustrated in Fig. 2.

Fig. 4 is a horizontal transverse sectional view taken on line 4-4 of Fig. 3.

Fig. 5 is a fragmentary vertical sectional view of an ice cube tray.

Fig. 6 is a perspective view of a part of the tray supporting means.

Fig. 7 is a fragmentary vertical sectional view taken on line 7-7 of Fig. 3 and illustrating the means for adjustably mounting the heating element.

Referring to the drawing, which illustrates the preferred embodiments of the invention, the numeral 10 designates a conventional domestic refrigerator having the usual food storage and ice cube freezing compartments to which access is afforded by door 11. Conventionally, the remainder of the cabinet 10 houses the operating means of the refrigerator, such as the motor, compressor, etc.; but I find that it is possible to subdivide that remaining space in the cabinet to provide a small supplemental compartment 12 which may be provided with a door 13.

Within the compartment 12 and adjacent the upper wall thereof, I position a heating element 14. This heating element is preferably of substantially rectangular plate form and is horizontally positioned. As here illustrated the heating element is of the electrical resistance type, though it will be understood that any other type of heating element may be employed if desired. To adjustably mount the element 14, a plurality of studs 15 are secured in depending relation to the upper wall of the compartment, and each stud has an enlarged head or flange 16 at its lower free end. A plurality of upright cylindrical members 17 are carried by the heating element and project upwardly therefrom. Each of the members 17 is provided with an upper intumed flange 18, and they fit around the studs 15 loosely with said flanges overlying the stud heads, whereby the heating element is vertically shiftable and is normally suspended by interengagement of flanges 18 with heads 16. In the use of an electrical heating element, the cylinder 17 is preferably formed of a non-conductor to insulate the refrigerator cabinet from the heating element, although any desired insulating arrangement for this purpose may be employed. The operating circuit 19 for the heating element is provided with a suitable control switch 20 which employs a time control feature for automatically opening the switch a predetermined time after the same has been closed.

It will, of course, be understood that the electrically energized heating element, if such is employed, must be suitably electrically insulated from the cube tray also. Any suitable construction, as is well understood in the art, may be employed for this purpose.

Positioned within the compartment 12 below the normal position of the heating element 14 is a frame 21 in horizontal position. The spacing between this frame and the normal or lowermost position of the heating element is preferably less than the vertical dimension of the smallest ice cube tray 22 employed in the freezing compartment of the refrigerator. Therefore when a tray 22 is inserted in compartment 12 on frame 21, the heating element must be slightly raised and therefore the heating element bears fully upon and is supported by the tray in operative position. The frame 21 may be of any suitable construction which will support an inverted cube tray 22 at two or more of its marginal edges in a manner to permit the cubes to drop from the tray when the same have been released. For this purpose it is obvious that the frame must be entirely open at its center, and must not underlie the cube compartments of the cube tray at any point. In refrigerator units where the trays 22 are all of the same length and width, the supporting frame 21 may be of a fixed type. In other units, where trays having various dimensions of length or width must be accommodated, an adjustable construction may be provided, as hereinafter more particularly set forth.

Each of the cube trays 22 is provided with the usual separators or partitions 23 therein to form separate compartments for the individual ice cubes. The tray and the partitions are both preferably formed of metal, such as aluminum; and the partitions must be maintained in fixed relation to the tray at all times, for which purpose the partitions are either formed integrally with or are fixedly secured to the tray. As is customary, the trays 22 are provided with out-turned marginal flanges 24 to facilitate handling thereof and to provide portions in outwardly spaced relation to the freezing compartments for engagement with the supporting frame 21 in a manner not to interfere with gravity release and discharge of the cubes from the tray in the operation of the device.

The space between the bottom of compartment 12 and supporting frame 21 is of sufficient depth to receive a suitable receptacle 25. As here illustrated this receptacle may consist of a pitcher open at its top and of a length and width at least equal to the corresponding dimensions of the cube tray 22. The receptacle 25 may be provided with a suitable handle 26 and with a broad pouring spout 27.

In the use of the device, a tray of ice cubes is removed from the freezing compartment of the refrigerator, and mounted on support 21 in inverted position with only its marginal flanges 24 in engagement with said support and without any obstruction beneath the cube compartments of the tray. In positioning the tray on support 21 the heating element 14 must be raised above normal or inoperative position by reason of the normal spacing of the element from the support a distance less than the height of the cube tray. The support 21 being of open character as above described, the tray itself may be used to raise the heating element as is obvious. When the tray is inserted in the compartment in operative position, the heating element will bear upon the in-

verted bottom thereof in full face engagement. At the same time the tray is inserted in the compartment, the receptacle 25 may also be inserted therein in proper position below the tray. The compartment door may then be closed and the switch 21 closed to energize the heating element 14. The engagement of the heating element with the inverted bottom of the tray, together with the metal character of the tray and the separators 23 which are rigidly held in place in the tray, insure quick transfer of heat from the heating element to the tray and separators, whereby the frozen bond between the tray and its separators and the contained ice cubes is rapidly broken by the heat transfer effected by the heat conduction through the metal parts. As soon as this frozen bond is released, the cubes will drop into the receptacle 25. After a predetermined time adequate to insure release of all cubes from their trays, the switch 20 automatically opens to prevent unnecessary heating of the compartment, and to prevent unnecessary melting of the cubes by reason of unnecessary heat generated by the heating element. In this way, it will be seen that it is not necessary to pay close attention to the device, nor to remove the cubes therefrom immediately after their release. It will also be seen that the heating of the tray by conduction through the metal thereof, rather than by radiation, permits the compartment as a whole to remain substantially unheated, and thereby permit storage of the released cubes for a substantial period before use. It will also be seen that, by virtue of the collection of the released cubes in the receptacle, the cubes need never be manually handled during the releasing operation and preparatory to use, which eliminates chilling of the hands and washing of the cubes. It will be obvious, by reason of the adjustability of the heating element, that as long as the various ice cube trays differ from one another only with respect to their depth or vertical dimension, the operation of the device with any of them is the same, inasmuch as the positioning of the heating element is in all cases determined and adjusted automatically by the tray itself by virtue of the direct bearing of the heating element on the tray in all instances.

A modified embodiment of the device is illustrated in Figs. 2 to 6. In this embodiment the device is incorporated in an independent unit or utensil housed in a suitable casing 30 having door 31 at its front. The parts of the device are all arranged in the same manner and are of substantially the same construction in this device as in the compartment 12 above described. However, inasmuch as the trays 22 of different makes of refrigerators vary in length and width, the support 21 for the trays must be laterally adjustable to accommodate any size of tray without forming an obstruction beneath the ice cubes which would prevent collection thereof in receptacle 25.

The support for the cube trays used in such an independent utensil preferably comprises a pair of guides extending from front to rear of the compartment at each side thereof. As here shown these guides are in the form of wires or rods 32 secured to the rear wall of the housing and extending forwardly therefrom in parallel relation and closely spaced to the side walls of the housing. At their forward ends, preferably spaced inwardly from the door 31, the guides terminate in outwardly directed portions 33 which are secured to the side walls of the housing. At the rear of the housing is fixedly mounted a trans-

verse supporting member comprising a lip 34 supported by the guides and of narrow width from which projects an upwardly directed intermediate portion 35 extending a substantial distance above the guides. A substantially horizontal flange portion 36 extending from the upper end of portion 35 serves to space the lip 34 and portion 35 in proper relation to the rear wall of the housing. A front supporting member 37 is slidable on the guides, and preferably comprises a sheet metal strip shaped to provide a front substantially vertical flange 38 having apertures at its sides through which the guides 32 slidably pass. The flange 38 extends upwardly in spaced relation above the guides and is downwardly return bent in rearwardly curved form at 39 and terminates in a narrow horizontal lip 40 which rests upon the guides 32.

In the use of this device, the tray is inserted in the housing in inverted position with its rear marginal edge 24 bearing on the narrow lip 34 and positioned in proper relation to said lip by engagement of the said rear marginal edge with the vertical wall portion 35 of the rear support. The front supporting member 37 is then slid on the guides 32 to a position wherein the lip 40 underlies and supports the front margin of the cube tray and the portion 39 serves to prevent forward movement of said tray relative to said support. The tray is positioned intermediate the guides 32, and the space beneath the ice cubes is therefore unobstructed. The operation of the device, including the vertical adjustment of the heating element 14 for full face engagement with the inverted bottom of the cube tray, is the same as that previously described.

Inasmuch as the separators 23 of the cube trays of conventional refrigerators are removable from said trays, and the utensil form is intended

for use with existing refrigerator equipment, such separators must be secured to their trays before the device can properly be used. For this purpose, as illustrated in Fig. 5, the side walls of the cube tray may be indented as 41 at a point opposite the edge of a separator, which is likewise indented, and several of such indents will serve to hold the separator fixed to the tray for use with the utensil.

I claim:

1. A tray heating and supporting device for removing ice cubes from an inverted tray on the support, said device comprising a marginal support for the inverted tray, a heating element above the tray and adapted to engage the bottom on the inverted tray on the support, said heating element being substantially horizontally positioned and vertically movable, a support above the heating element, downwardly extending headed members carried by the support, said heating element at spaced points being vertically movable on the headed members.

2. A device as set forth in claim 1 wherein the connections between the headed members and the heating element are loose whereby not only a vertical movement of the heating element may be obtained but a limited amount of tilting action.

3. The combination with a substantially horizontal heating element disposed above a support for an inverted ice cube tray and through which support dislodged ice cubes pass to a receptacle, a support above the tray, of a connection between the heating element and the support whereby said heating element may move vertically while remaining in a horizontal position on its connection or slightly tilt from a horizontal plane in any direction.

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