

July 26, 1949.

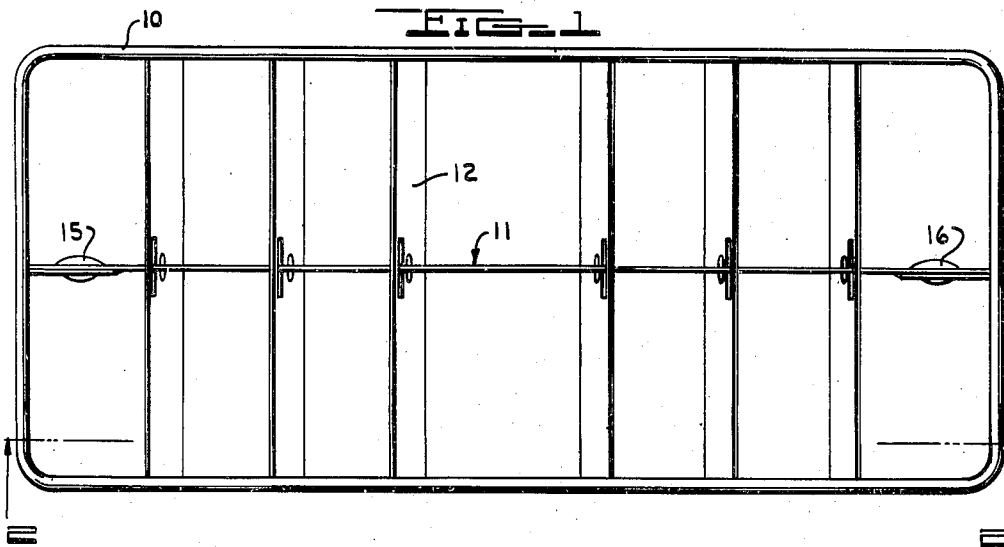
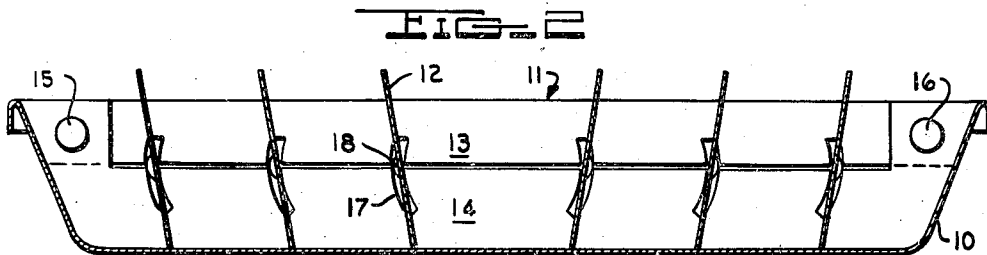
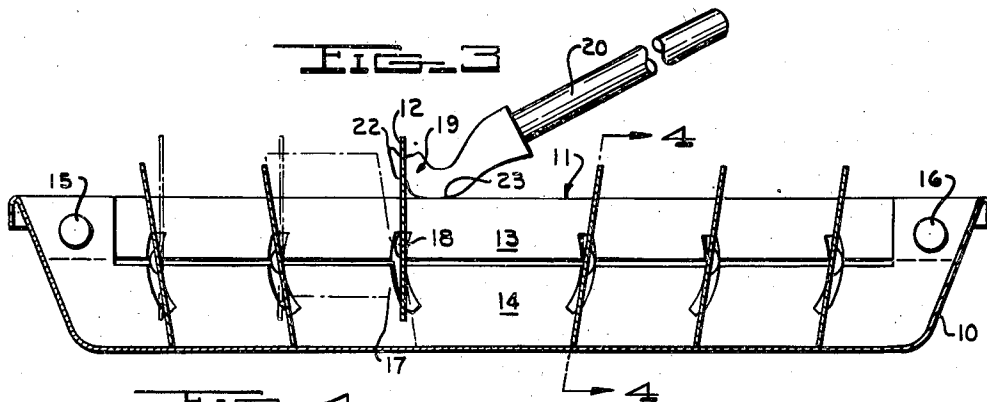
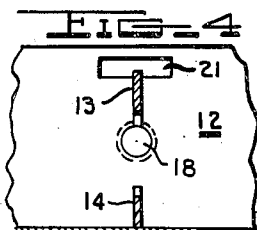
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2,477,286

ICE TRAY GRID

Filed Oct. 10, 1946

2 Sheets-Sheet 1



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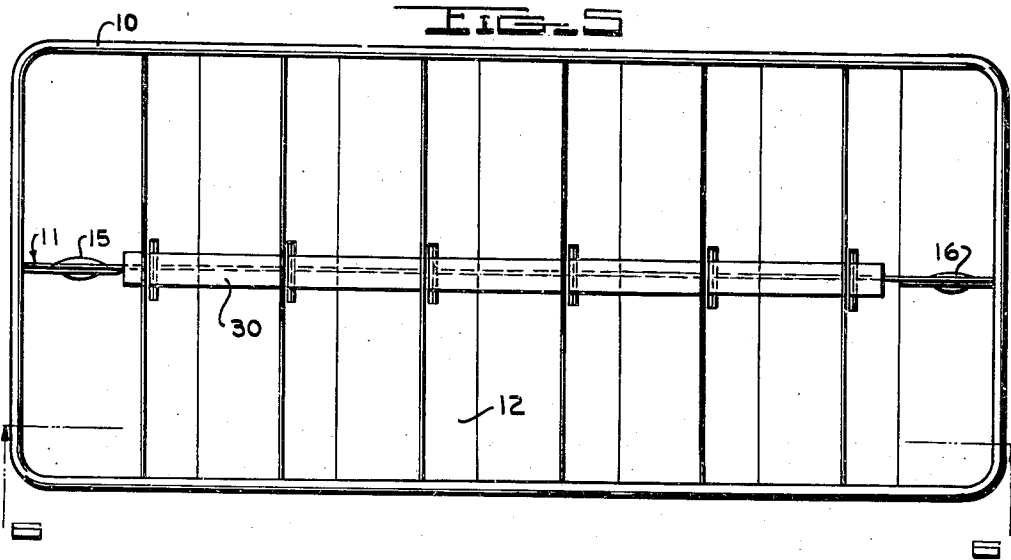
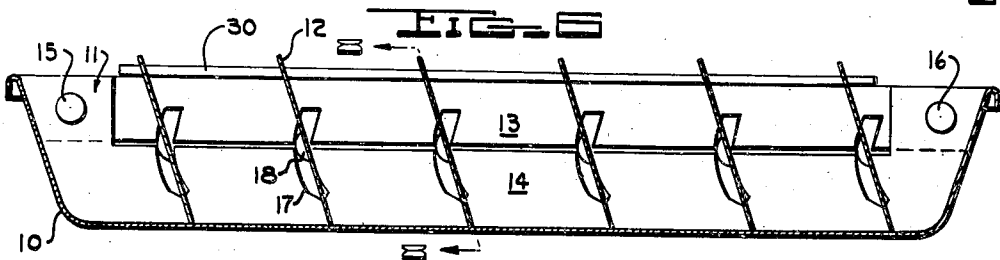
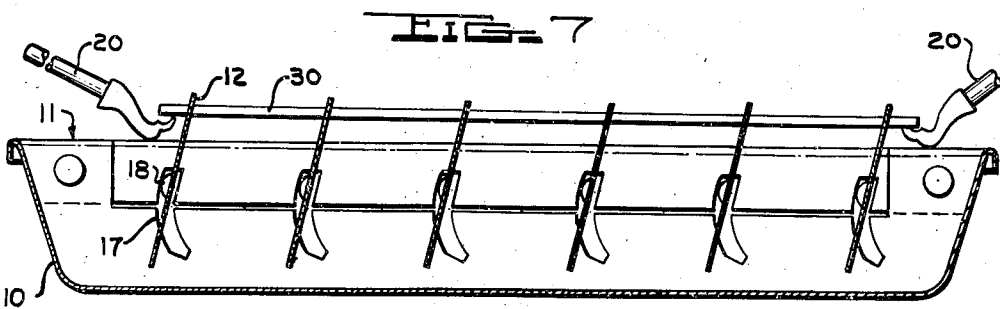
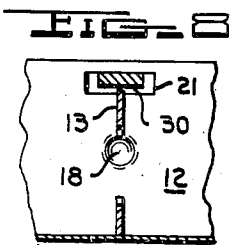
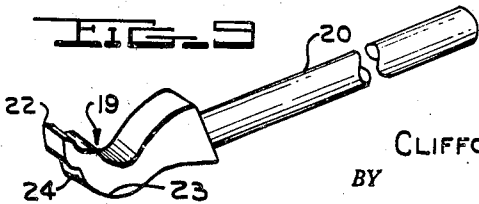
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ICE TRAY GRID

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2 Sheets-Sheet 2



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2,477,286

ICE TRAY GRID

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Application October 10, 1946, Serial No. 702,496

4 Claims. (Cl. 62—108.5)

1

The present invention relates to ice tray grids and more particularly to ice tray grids which are removable from an ice tray, and which may be readily operated, either separately or as a unit, to secure the release of ice cubes therefrom.

The problem of freeing ice cubes from a tray in which they are frozen in a conventional type of mechanical refrigerator is one which has been long present in this art. Grids having rigid partitioning members, certain of which are movable relative to other of the members for the purpose of breaking the adhesion between the ice cubes and the rigid elements of the grid construction have been suggested previously as a solution to this problem. In such prior grids, the grid mechanism and the ice when frozen present a rigid mass in which the grid is locked rigidly in the ice block and the articulation of the grid elements is destroyed. The adhesion of the ice to the various portions of the grid members renders these grids immobile to the extent that they are for all practical purposes a rigid grid structure at the beginning of the ice breaking operation. In order to free such grids from the ice cubes, it is necessary to apply a force thereto of sufficient magnitude to move one of the movable grid members relative to the other grid members, and after having thus initiated the ice-freeing movement, to then follow it with movement of other of the grid members. This requires operation of the movable grid elements in a pre-determined sequence.

As distinguished from such previously known types of grids, the grid of the present invention is composed of a plurality of separate elements freely joined together in such a manner that any one of the grid members may be freely actuated at any time by a lifting force applied to the top portion thereof to provide a fracturing of the ice block, the freeing of cubes therefrom, and the ejection of the ice cubes from the grid and pan.

An object of the present invention is, therefore, to provide an ice tray grid structure having a plurality of transverse grid members each movable relative to the other grid members and loosely held for movement in their assembled position by a cam slot in the longitudinal partition member.

A further object of the present invention is to provide an ice tray grid structure in which the longitudinal separator is formed of a plurality of members, the end portions of which are joined during the assembly of the grid to lock the transverse members in their assembled positions in

2

cam slots provided in said longitudinal member.

A further object of the present invention is to provide an ice tray grid formed of a plurality of separate rigid elements so united in the assembled structure that each element is relatively movable with respect to the other elements making up the composite structure, and in which relative movement is initiated in the grid while frozen in an ice block by a lifting force applied to the top portion of the transverse grid member to effect movement thereof relative to the longitudinal grid member in a path determined by a cam slot provided in the longitudinal member which contacts a cam element affixed to the transverse member.

It is a further object of the present invention to provide an ice tray grid constructed of a plurality of separate rigid grid elements loosely joined for relative movement of the parts relative to each other in directions determined by the shape and size of cam slots in the longitudinal element which guide the movement of the transverse members when a lifting force is applied thereto to cause the ready fracture of the ice block in the pan or tray into a plurality of separate cubes, and the release of the grid structure therefrom.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 is a top plan view showing an ice tray grid of the present invention in position in an ice tray.

Fig. 2 is a section taken substantially on the line 2—2 in the direction of the arrows, Fig. 1, and showing the grid in position in the pan for freezing of ice therein.

Fig. 3 is a view similar to Fig. 2 but shows the movement of certain of the grid members to ice freeing position.

Fig. 4 is a fragmentary section taken substantially on the line 4—4 in the direction of the arrows, Fig. 3.

Fig. 5 is a top plan view of a modified form of grid embodying the present invention mounted in a tray in the position for freezing ice therein.

Fig. 6 is a longitudinal section taken substantially on the line 6—6 in the direction of the arrows, Fig. 5.

Fig. 7 is a view similar to Fig. 6 but showing

the parts of the grid in the raised positions for freeing ice therefrom.

Fig. 8 is a partial section taken substantially on the line 8—8 in the direction of the arrows, Fig. 6.

Fig. 9 is a perspective view of a lifting tool for use in connection with an ice tray grid of the present invention and showing a portion of the handle broken away.

Before explaining the present invention in detail it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

A grid embodying the present invention is designed to be placed in an ice tray or pan 10 of any conventional type adapted to be placed in the freezing chamber of a mechanical refrigerator. The interior of the tray 10 is subdivided into a plurality of smaller compartments by means of the grid member, which, in the present instance, comprises a longitudinal member 11 and a plurality of transverse members 12. The longitudinal grid member 11 comprises a top member 13 and a lower member 14 which are joined at their ends in any suitable manner, as by rivets 15 and 16. A plurality of slots 17 are provided in the assembled longitudinal members. The slots 17 act as cam slots and are curved as shown. The transverse members 12 are each provided with a rounded cam follower 18 which contacts with a face of the curved cam slot 17. When a lifting force is applied to the top of the transverse grid members 12 as, for example, by the end 19 of the handle 20, as shown in Fig. 3, the projection 18 moves in the cam slot 17 and causes the transverse grid member 12 to move vertically and longitudinally of the grid. This component of movement not only frees the grid from the ice block but also exerts a lifting force on the ice block causing it to be raised and ejected from the pan, as indicated in the dotted line portion of Fig. 3.

As shown in Fig. 4, each of the transverse members 12 is provided with a slot 21 which is positioned above the top portion 13 of the longitudinal member 11. Thus a lifting force may be exerted by the end 19 of the handle 20 by contact with the slot 21 in the transverse members 12. The handle, as here shown in Figs. 3 and 9, is adapted to be applied successively to each of the separate transverse grid members 12 as shown in Figs. 1-4 inclusive. As shown in Fig. 9, the end 19 of the handle 20 comprises a flat portion 22 which is adapted to engage the slot 21 in each of the transverse members 12. The flat portion 22 terminates in a curved portion 23 which contacts the top portion of longitudinal grid member 11 as shown in Fig. 3 and provides a fulcrum at that point. The rounded portion 23 of the handle is provided with a flat face 24 which may exert a pushing force on the transverse grid members 12 immediately following the application of the lifting force thereto.

The construction shown in Figs. 5 to 8 inclusive is substantially the same as the structure shown in Figs. 1 to 4 inclusive, except that a longitudinally extending bar 30 is placed above the member 13 forming the top portion of the longitudinal grid element 11. The bar member

30, as shown in Fig. 8, extends through all of the aligned openings 21 in the transverse grid members 12. When in the position shown in Fig. 6, the actuating bar 30 lies on top of the member 13 forming the top portion of the longitudinal grid member 11 and each of the transverse members 12 occupy an angular position relative to the bottom of the pan 10. The cam members 18 are in contact with the curved portion of the cam slot 17 so that when a vertical lifting force is exerted on the bar 30 each of the members 12 is moved into the position shown in Fig. 7. This causes the transverse members 12 to move relative to the longitudinal member 11 in a vertical and longitudinal direction. This movement breaks the transverse grids 12 free from the ice block and the movement of the members causes the ice blocks to be raised therefrom. In the construction here shown, the handle member 20, constructed as hereinbefore described, may be placed adjacent each end of the bar 30 and a lifting force exerted thereon. If preferred, however, one of the members 20 may be used at one end of the bar 30. Also, it is to be understood that if desired, handle members may be attached either to the bar 30 or to the longitudinal member 11 so as to exert a lifting force on the bar 30 to cause the actuation of the grid as above described.

The assembly of the separate elements to form the grid structure herein shown may be economically achieved on a mass production basis by first stamping each of the parts separately and treating the parts, as may be desired, to provide a water repellent and friction-resisting surface thereon. In a typical instance, the members 12, 13, and 14 will be stamped separately from aluminum sheet stock and thereafter anodized and sealed and treated to render them impervious to water. The parts thus treated are much simpler to process than is the case when the parts are in an assembled position.

In assembling the grid, the lower longitudinal member 14 is placed in a suitable holding fixture and the transverse cross-members 12 are placed in the slots in the member 14. When this has been done, the top longitudinal member 13 is dropped into place and the ends of the members 13 and 14 are secured together in any desired manner, such as by the rivets 15 and 16. It will be seen that this method of assembly lends itself to economical, large scale mass production of the grid element and will, therefore, effect substantial economies in the manufacture and assembly thereof.

Since the application of force to the transverse members 12 is a lifting force, it will be seen that the initial movement of the transverse members 12 is in an inclined vertical plane. This causes the breaking of the grid members free from the ice block and the freeing of the ice block from the grid and from the pan. The continued application of a lifting force to the transverse members 12 causes them to move in the cam slots provided in the longitudinal member and the cam slots direct the movement in such a way that a longitudinal component movement is imparted to the transverse members 12. This causes the ice blocks to be ejected from the grid and the pan. Since the initial movement of the movable transverse members is thus chiefly in an upward direction, it will be readily apparent that the force required to effect movement of the individual transverse grids when frozen in an ice block is much less than would be necessary if it were

required to move all of the transverse grid members in a direction longitudinally of the pan to effect a movement and breaking of the ice cubes from the pan by the exertion of a crushing or shearing force thereon. The grid of the present invention thus provides for a direct application of a mechanical force on the upper portions of the transverse grid members and the simultaneous application of a downwardly directed force on the longitudinal members. Due to the relatively short levers which are required in the present construction and the direct mechanical application of forces thereto, it will be seen that the conditions responsible for much of the distortion and breaking of parts experienced in conventional types of grid construction are eliminated in a grid embodying the present invention.

In constructing a grid of the present invention, I prefer to use a heat transmitting material, such for example as sheet aluminum alloys, magnesium alloys, or the like, the surfaces of which have been treated to render them non-adherent to water. One satisfactory method of accomplishing this is to subject the parts to treatment in an anodizing bath and thereafter to wax the anodized surfaces. Another satisfactory method is to polish the surfaces and thereafter to treat the polished surfaces with a water-proofing material such for example as a finish containing a water impermeable plastic substance in which silicon has been substituted for carbon in the molecule, such products are commercially known as "Silicone" resins, and are available commercially under this name. Such a coating composition is disclosed in my co-pending application Serial No. 702,498.

It will be seen from the foregoing that the construction herein proposed permits operation of the grid by actuation of any single transverse grid member at any time. This is possible because the initial breaking movement of such grid is in an upward direction which pulls the grid upwardly in the ice block to break the adhesion between the grid and the ice. The ejection of the ice cube follows this initial breaking movement. The transverse grid members are suspended from the end of the handle 19, or from the bar 30, after being broken loose from the ice block. When so suspended they are free to move in response to the action of the cam slots 17 and the follower 18.

From the foregoing it will be understood that a grid construction embodying the present invention may be readily assembled from a plurality of parts, each of which may be separately fabricated. The parts are loosely held in their assembled relation so as to drop into position and occupy a predetermined position in the ice pan. This also permits ready anodizing and sealing of the grid after its complete assembly in those instances where such method is preferred.

I claim:

1. An ice tray grid comprising a longitudinal partition having a plurality of curved cam slots spaced longitudinally thereof, a rigid transverse member mounted in each of said cam slots to permit relative movement of said rigid transverse members both longitudinally and upwardly relative to said longitudinal partition, each of said transverse partition members having a cut-away portion adapted to receive a force applying member to lift said transverse partition members upwardly of said grid, and a cam follower portion on each of said transverse partition members and

adapted to follow said cam slots and move said transverse members longitudinally of said longitudinal partition during the lifting of said transverse partition members.

2. An ice tray grid comprising a longitudinal partition, a plurality of arcuate cam slots spaced lengthwise of said partition, a rigid transverse partition member mounted in each of said arcuate cam slots for movement vertically and longitudinally relative to said longitudinal partition, and a rounded cam follower on each of said transverse partition members and engaging with the arcuate cam slot in which the partition member is mounted and a slotted portion adjacent the upper edges of each of said transverse partition members and overlying the top edge of said longitudinal partition member to receive the end of a force applying member to exert a lifting force thereon whereby said partition member is simultaneously moved both vertically and longitudinally relative to said longitudinal partition.

3. An ice tray grid comprising a longitudinal partition, a plurality of arcuate cam slots spaced lengthwise of said partition, a rigid transverse partition member mounted in each of said arcuate cam slots for movement vertically and longitudinally relative to said longitudinal partition, and a rounded cam follower on each of said transverse partition members and engaging with the arcuate cam slot in which the partition member is mounted and a slotted portion adjacent the upper edge of each of said transverse partition members and overlying the top edge of said longitudinal partition member, and a bar extending through said slotted portions and spaced vertically above said longitudinal partition to permit the application of a lifting force to said bar and to the transverse partition members to effect a simultaneous vertical and longitudinal movement of said transverse partition members relative to said longitudinal partition.

4. An ice tray grid comprising a longitudinal partition, a plurality of arcuate cam slots spaced lengthwise of said partition, a rigid transverse partition member mounted in each of said arcuate cam slots for movement vertically and longitudinally relative to said longitudinal partition, and a rounded cam follower on each of said transverse partition members and engaging with the arcuate cam slot in which the partition member is mounted, and a force applying member connected with said transverse partition members to lift said members upwardly relative to said longitudinal partition to effect a simultaneous vertical and longitudinal movement of said transverse partition members relative to said longitudinal partition.

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