Nov. 6, 1945. L. J. AMORE 2,388,378

GRID STRUCTURE FOR ICE TRAYS

Filed April 29, 1944

FIG. 1.

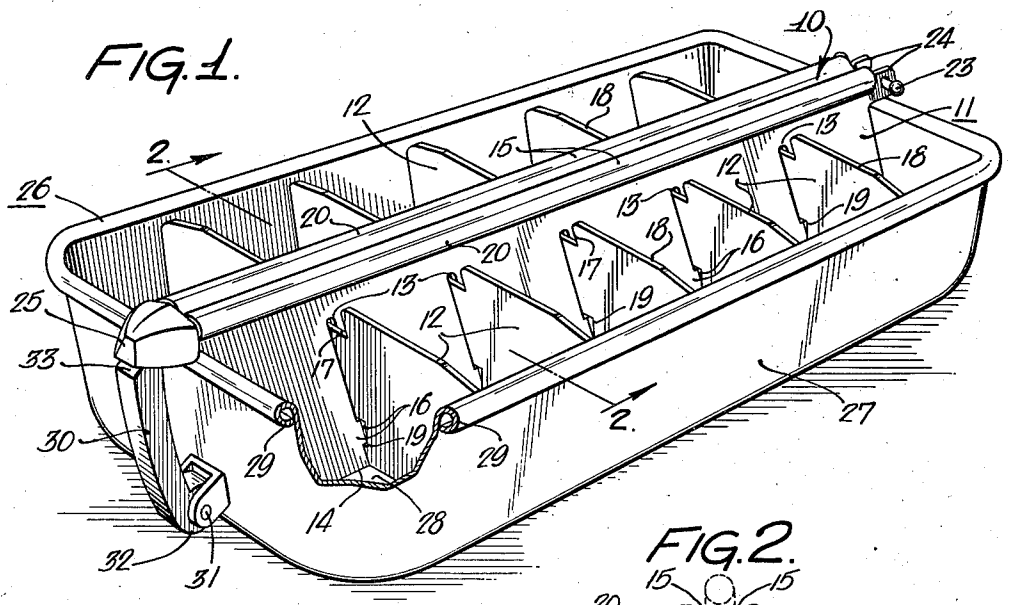


FIG. 2.

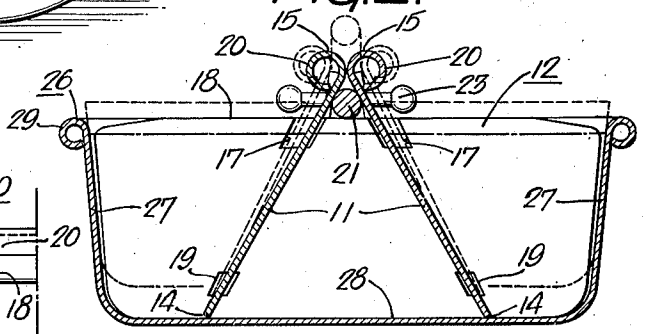


FIG. 3.

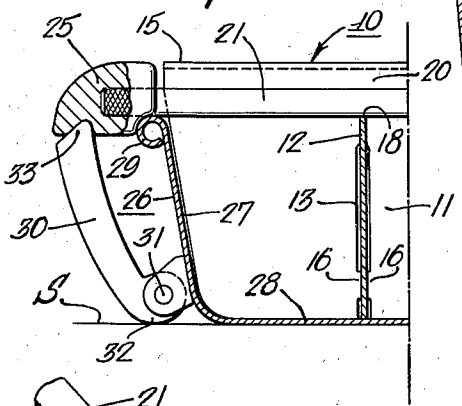


FIG. 4.

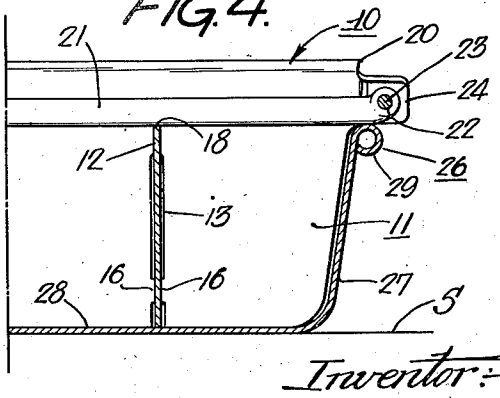
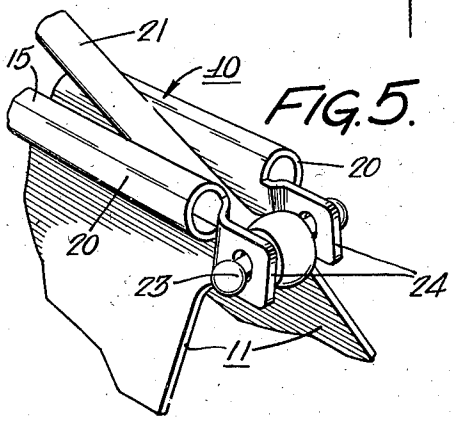


FIG. 5.



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GRID STRUCTURE FOR ICE TRAYS

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7 Claims. (Cl. 62—108.5)

The present invention relates to liquid freezing devices and more particularly to complementary grid and tray members of the type used for production of ice cubes in domestic refrigerators. More specifically the invention pertains to improvements in ice tray grid members of the type adapted for manipulation to free ice cubes for ready removal from the tray.

One object of the invention is to provide an ice cube grid of the aforesaid type incorporating novel and improved means for breaking the bond between the elements of the grid and the cubes and for simultaneously dislodging the cubes with respect to the walls of the tray so as to break the bond between the cubes and said walls.

Another object of the invention is to provide a grid and tray assembly of the stated type for use in conjunction with an evaporator of a refrigerating system, said assembly having means operable to release the tray from the evaporator and to loosen the ice cubes in the assembly so that the cubes may be immediately available and removable from the tray.

Still another object of the invention is to provide a device of the aforesaid character making possible removal of one or more ice cubes without removal of the grid from the tray so that the unused cubes may retain their positions in the tray with resultant avoidance of wastage.

The invention also contemplates an ice cube grid and tray assembly wherein provision is made for loosening the cubes from both the grid and tray without actual removal of the grid from the tray, and also for lifting the loosened ice cubes in the tray so that individual cubes may be removed without displacing the remaining cubes from their position in the tray.

Other objects and advantages of the invention will appear hereinafter. In the accompanying drawing:

Fig. 1 is a perspective view of the improved ice cube grid within the ice tray.

Fig. 2 is a transverse cross-sectional view taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary cross-sectional view illustrating one end of the grid and tray assembly;

Fig. 4 is a view similar to Fig. 3 but illustrating the other end of the assembly; and

Fig. 5 is a fragmentary perspective view of the grid portion shown in Fig. 4 illustrating the operation of the grid actuating means.

With reference to the drawing, a preferred embodiment of the invention includes a unitary grid member designated generally by the reference numeral 10. The member 10 comprises a pair of separate elongated rigid wall elements 11, in the form for example, of metal strips, and a plurality of substantially rectangular non-flexible wall elements 12 which may suitably take the form of metal plates and which transversely intersect the said strips 11 at spaced points along the length of the latter. The nature of the intersections is such as to afford a loose connection between said strips and plates permitting the strips to move relatively to each other in the transverse direction or longitudinally of the plates. Although various constructions may be utilized to accomplish this result, I prefer to employ that illustrated in the drawing wherein each elongated strip 11 is formed with spaced substantially vertical slots 13 for reception of the plates 12, said slots extending from the bottom edge 14 toward the top edge 15 of the strip and terminating at a point below said top edge, and each having a restricted portion formed by projections 16. Each of the plates 12 is formed with spaced notches 17, 17 at the top edge 18 and with spaced apertures 19, 19 in the lower portion thereof. In assembling the plates with the strips, the former are slid into the correspondingly positioned slots 13 from the lower edges of the strips and into positions wherein the upper ends of the said slots lie in the notches 17 and the projections 16 in the apertures 19 in the plate thereby interlocking the said plates with the strips.

As best seen in Fig. 2 the apertures 19 in the lower portion of each of the plates 12 are spaced further apart than the notches 17 at the top edge of the plate, so that the strips 12 are supported in upwardly converging relation defining in effect an inverted V, the apex of which extends longitudinally of the assembly.

It is to be noted that in the assembly the respective upper edge portions of the strips 11 extend an appreciable distance above the top edges 18 of the plates 12. It is to be noted also that the widths of the notches 17 and of the aperture 19 are such as to permit limited pivotal movements of the strips 11 about their lower edges 14, the said strips being free to swing bodily toward and away from each other between positions represented in full and dotted lines in Fig. 2 of the drawing.

Because of the manner in which the strips are supported, they will tend normally to assume the position shown in the full lines in Fig. 2, that is, the position in which the upper portions of the strips lie together or in close proximity. The normal tendency of the strips to assume this position may be increased by forming the upper

portions of the strips with rolled edges, such as represented at 20, which provide additional weight acting to bring the converging upper portions of the strips together. Such rolled edges further provide additional rigidity to resist bending when force is applied to said edges as hereinafter described for the purpose of moving the strips away from each other to the position shown in dotted lines in Fig. 2.

Such movement of the strips is preferably obtained through the medium of a rigid rod 21 normally located within the apex of the inverted V defined by the strips 11 and seating upon the adjacent portions of the upper edges 18 of the plates 12. For convenience of operation, the rod 21 may be pivoted at one end, and for that purpose the said end may be formed with an eye 22 (Figs. 4 and 5) for reception of a pin 23 which preferably is carried loosely in wing-like extensions 24 on the ends of the strips 11. The other or free end of the rod 21 may have a knob 25 attached thereto to afford convenient means for grasping said end and for manually moving the rod upwardly between the edges of the strips 11 to force the strips apart as described.

The grid member 10 is adapted to fit into an ice tray 26 of conventional type. The tray is made of rigid metal and has side walls 27 slanting outwardly from a bottom wall 28. The walls 27 preferably terminate with rolled edges 29 providing a continuous rim around the top of the tray.

If desired a handle 30 may be mounted on the tray 26 and preferably is of the kind represented in Figs. 1 and 3. The handle is pivoted to the tray as shown at 31 and is provided with a cam portion 32 which, when the handle is drawn outwardly and downwardly, is adapted to bear forcibly upon the underlying tray-supporting surface. The upper end 33 of the handle normally fits into a recess in the underside of the knob 25 and also functions as a cam when the handle is retracted to elevate the rod 21.

In use, the grid member 10 is placed in the tray 26 in the position illustrated more clearly in Fig. 1. In this position the rod 21 rests between the strips 11 and immediately beneath the apex of the inverted V formed thereby. As best seen in Fig. 2 the strips 11 and plates 12 of the grid 10 form within the tray 26 a plurality of compartments within which water may be frozen as individual ice cubes.

In conventional practice the tray, filled with water, will be placed on the shelf of an evaporator, so as to utilize the cooling effect of the evaporator to freeze the water within the compartments. When ice is desired, the tray may readily be removed by manipulating the handle 30, that is to say, by manually drawing the handle away from the tray about the pivot 31. The cam portion 33 then acts to force the rod 21 upwardly, while the cam 32 presses against the underlying surface S of the evaporator and breaks the tray free from said surface. The tray may then be removed from the evaporator and the rod 21 further elevated about the pivot pin 23 so as to pass between and to separate the rolled upper edges of the grid strips 11. The said strips are thus forced to move from the position shown in full lines to the position shown in dotted lines, see Fig. 2, thereby applying laterally and upwardly directed forces to the ice cubes which break the bond between said cubes and the walls of the grid and tray. Also by reason of the force applied to the cubes and because of the downwardly converging relation of the grid strips 11 and the side walls of the tray, the ice cubes are elevated in the manner represented in broken lines in Fig. 2. Thus any one or more of ice cubes may be lifted from the tray without disturbing the position of the remaining cubes. If all the cubes in the tray are needed, the grid member 10 may be removed, all the cubes then becoming immediately accessible, including those occupying the compartments within the inverted V of the strips 11.

It is to be understood that the preferred construction described above is subject to modification without departure from the invention as defined in the appended claims.

1. In an ice tray, a receptacle comprising a pair of fixed relatively spaced rigid walls, a pair of movable walls interposed between said fixed walls and extending in spaced longitudinal relation thereto, said movable walls being arranged substantially in inverted V formation, and a pivotally mounted rod arranged to pass between said walls at the apex of said formation and by wedging action upon the upper edges thereof to force the walls away from each other and toward the respective fixed walls.

2. In an ice tray, a receptacle comprising a pair of fixed relatively spaced rigid walls, a pair of movable walls interposed between said fixed walls and extending in spaced longitudinal relation thereto, said movable walls being arranged substantially in inverted V formation, a rod having one end pivotally attached to said movable walls at an end of the latter and arranged to occupy a normal position under the apex of and within said inverted V, said rod being adapted when elevated from said normal position to pass between the upper edges of said movable walls and by wedging action upon said edges to force the walls away from each other and toward the respective fixed walls.

3. In an ice tray, a receptacle having a bottom wall and rigid side walls extending upwardly and outwardly from said bottom wall, a grid member including a pair of elongated rigid strips arranged substantially in inverted V formation together with a plurality of plates projecting transversely through apertures in said stripes, said plates being loosely jointed with the strips so as to permit movement of the strips relative to each other in directions substantially longitudinally of the plates, a rod pivoted to said strips and movable between the upper edges of said strips so as to force the strips away from each other and toward said side walls, and a handle pivoted to the receptacle and having camming engagement with said rod whereby pivotal movement of the handle away from the receptacle will effect an automatic elevation of the rod between the contiguous edges of said strips.

4. A grid for ice cube trays, said grid comprising a pair of elongated rigid walls and a plurality of wall elements projecting transversely through apertures in the walls of said pair at spaced points along the length thereof, said walls being loosely connected so as to afford movement of said elongated walls transversely and relative to each other, said elongated walls converging upwardly toward each other and having their upper edges normally substantially uniformly spaced throughout, and a rod pivotally attached at one end to and between said elongated walls and normally extending substantially parallel to and below said upper edges, said rod being wider than said normal space between said edges whereby the rod

when elevated at the free end may operate by wedging action between said edges to force the walls away from each other.

5. In a grid structure for ice trays, a pair of elongated strips arranged substantially in inverted V formation, a plurality of plates transversely intersecting said strips and interlocked therewith, means affording limited pivotal movements of said strips about their lower edges with respect to the plates, and means for applying manual force to the upper edges of the strips to move said edges away from each other, said last-named means comprising an element normally resting upon the upper edges of said plates below and within the apex of said V and forcibly movable upwardly between the said edges of the strip, said element being of greater width than the normal space between the upper edges of the strips at said apex and acting as a wedge between said edges when moved upwardly to move said edges away from each other as described.

6. In an ice tray, a receptacle comprising a pair of fixed relatively spaced rigid walls, a pair of movable walls interposed between said fixed walls and extending in spaced longitudinal relation thereto, said movable walls being arranged substantially in inverted V formation, an element arranged for insertion between the edges of said movable walls at the apex of said V to forcibly separate said walls, and a handle pivoted to the receptacle and having camming engagement with said element whereby pivotal movement of the handle may effect the said forcible insertion of said element.

7. In an ice tray, a receptacle comprising a pair of fixed relatively spaced rigid walls, a pair of movable walls interposed between said fixed walls and extending in spaced longitudinal relation thereto, said movable walls being arranged substantially in inverted V formation, an element arranged for insertion between the edges of said movable walls at the apex of said V to forcibly separate said walls, and a handle pivoted to the receptacle and having camming engagement with said element whereby pivotal movement of the handle may effect the said forcible insertion of said element, said handle being arranged also for camming engagement with a receptacle-supporting surface so that said pivotal movement may effect a forcible elevation of the receptacle from said surface.

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