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J. ROBERTS

2,340,693

ICE CUBE RELEASE DEVICE

Original Filed Jan. 29, 1936

Fig. 1.

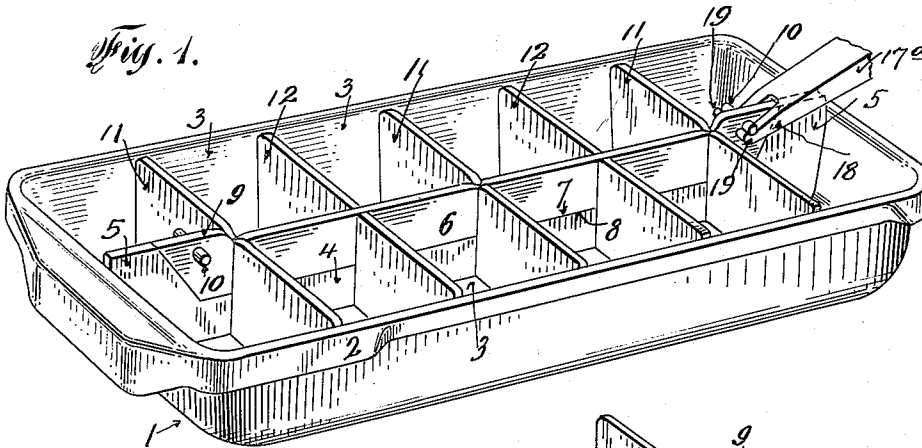


Fig. 2.

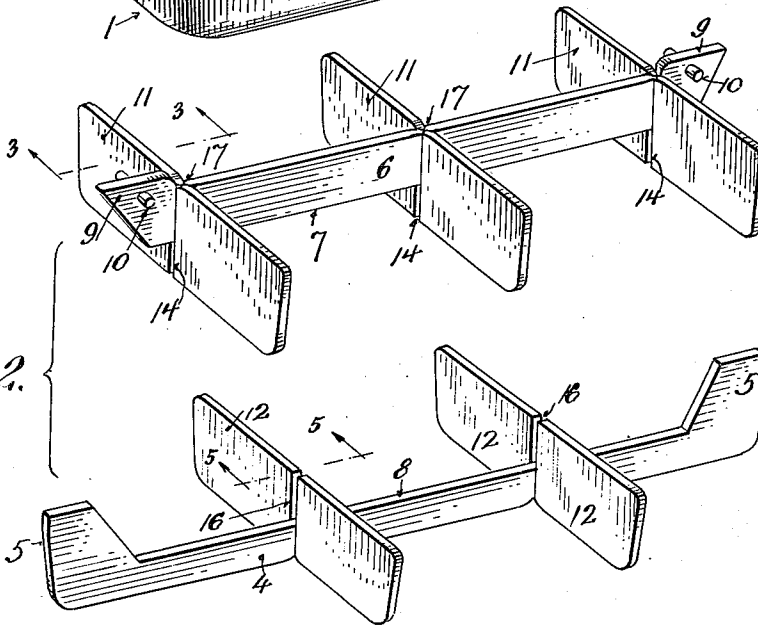


Fig. 3.

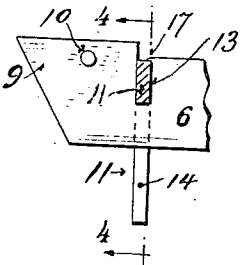


Fig. 4.

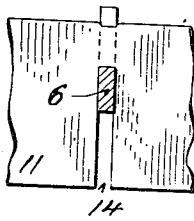


Fig. 5.

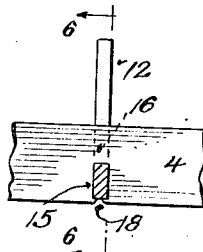
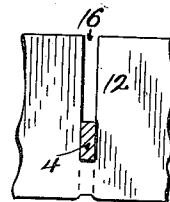


Fig. 6.



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2,340,693

ICE CUBE RELEASE DEVICE

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Application January 29, 1936, Serial No. 61,282
Renewed October 12, 1937

15 Claims. (Cl. 62—108.5)

In my co-pending application Serial No. 701,602, I showed and described an ice cube tray with a removable grid adapted for use in freezing ice cubes in mechanical refrigerators, the device embodying novel means for separating elements of the grid to break the adhesion of the cubes to the grid and to the tray. The present invention relates to the same general subject matter.

The object of the present invention is to provide a grid for ice cube trays, made of separable parts, adapted to be forced apart by suitable means, preferably a lever. The longitudinal portion of the grid consists of two members lying in the same vertical plane to form a longitudinal dividing wall to divide the cube tray lengthwise. In the present case instead of the lateral fins all being attached to the upper longitudinal member, some are attached to the lower longitudinal member and other fins are attached to the upper longitudinal member, and in the preferred construction those which are attached to the upper longitudinal member alternate in position with those attached to the lower longitudinal member.

With this arrangement, when the longitudinal members are forced to separate, part of the fins move upwardly with the upper longitudinal member while other fins remain down with the lower longitudinal member. This arrangement insures a complete separation of the cubes not only from the tray but from the sections of the separable grid to insure a complete release of the cubes when the grid sections are forced apart.

Furthermore, the fins attached to the upper and lower longitudinal members are more accessible for cleaning and for drying than where all of the fins are attached only to the upper longitudinal member.

Another advantage in the present device is that no abutments or other holding means need be applied to either section of the grid to create resistance to the movement of the cubes because the adhesion to the upper and lower sections of the grid by the cubes is substantially equalized. The grid sections, therefore, may be made without any obstructions or protrusions. All of the advantages and objects recited in my said co-pending application are attained in the present device in addition to the advantages set forth above. The present device is very compact and neat and it is almost as economical to manufacture as a plain metal grid because the parts may be stamped from sheet metal with blanking dies only.

In the drawing forming part of this application,

Figure 1 is a perspective view of an ordinary ice cube tray in which my cube release device has been applied,

Figure 2 is a perspective view of the upper and lower grid sections about to be assembled for placement in the tray,

Figure 3 is a sectional view taken on the line 3—3 of Figure 2,

Figure 4 is a sectional view taken on the line 4—4 of Figure 3,

Figure 5 is a sectional view taken on the line 5—5 of Figure 2, and

Figure 6 is a sectional view taken on the line 6—6 of Figure 5.

The grid device shown herein may be applied to any ordinary ice cube tray or to any special tray, the only requirement being that the grid device be so proportioned as to fit within the tray and to divide it off into separate compartments.

In Figure 1 I have shown a tray 1 consisting of a bottom, side, and end walls, preferably integral and drawn from sheet material. There is a rim or flange 2 shown as extending around the upper edge of the tray to protect the edge and to protect the user as well as to form means for gripping and handling the tray. This type of tray is in general use in refrigerators.

The grid is shown as dividing the tray off into two rows of ice cube compartments 3 although it will be understood that the grid may be made to divide the tray off into any greater number of rows of compartments and with any number of individual compartments in each row. For convenience I have shown the grid in the drawing as dividing the tray off into two parallel rows of compartments with six compartments in each row, without intending to limit my invention to any particular number of rows of compartments or to any number of compartments in each row.

The grid consists, in part, of the lower longitudinal member 4 which rests in the tray in a vertical position, and as shown in the drawing, extends down the middle of the tray with its lower edge resting on the top surface or the bottom of the tray. Preferably, at each end this longitudinal member is provided with an upwardly extending projection or horn 5 which extends to a point adjacent the top surface of the upper longitudinal member to form abutments for the lever for separating the grid sections.

The upper grid section consists, in part, of the longitudinal member 6, the lower edge 7 of which rests on the top edge 8 of the lower longitudinal member 4; and this upper longitudinal member rests in the same vertical plane as the lower

longitudinal member so that they both form a vertical dividing wall extending lengthwise of the tray.

The upper longitudinal member is shown as provided with short extensions or horns 9 rising slightly above the major portion of the top edge of the longitudinal member and with the top edge of these horns lying flush with the top edges of the horns 5 of the lower longitudinal member. I have shown pins 10 extending through the horns 9 and fastened therein, for a purpose to be hereinafter described, these pins being disposed so that they will be above the top of the cubes formed in the adjacent compartments, in order to permit the lever to be applied against the pins.

There are attached to or integral with the upper longitudinal member a number of fins 11 which extend crosswise of the tray and there are a number of fins 12 secured to or integral with the lower longitudinal member to extend laterally thereof, and in the preferred form of my invention the fins attached to the upper longitudinal member and those attached to the lower longitudinal member alternate in position when the grid is assembled in the tray, as shown in Figure 1. Preferably, the top edges of the upper longitudinal member and the top edges of all of the fins lie flush with or slightly above the top edge of the tray.

It will be noted that the edges 7, 8 of the upper and lower longitudinal members meet on a line which is slightly below the longitudinal center of the tray as I have found that this particular location of the meeting edges is preferable in the operation of the device, although it is not critical.

The several fins 11, 12 may be made integral with the upper and lower longitudinal members respectively, or they may be made separately and attached to them in any desirable manner. I prefer to form these parts and assemble them in the following manner:

As shown in Figures 2, 3 and 4, the upper longitudinal member is provided with a slot 13 for each fin 11 which is to be attached to this member, the slot extending vertically downwardly from the upper edge of the longitudinal member to approximately the middle line thereof, as shown in Figure 3. The fins attached to this longitudinal member have slots 14 extending vertically upwardly from the bottom edge to a point in line with the horizontal middle line of the upper longitudinal member when the parts are in assembled position.

When the fins 11 are applied or slid downwardly onto the upper longitudinal member, as shown in Figure 2, the slots 14 will permit these fins to straddle the portion of the upper longitudinal member below the bottom edge of the slot 13 and the solid portion of the fins above the slots 14 will extend into the slots 13 of the longitudinal member so that the top of the fins and the top of the longitudinal member will be approximately on the same level. This leaves the lower portions of the slots 14 open to permit the lower portion of the fins 11 to straddle the lower longitudinal member when the sections of the grid are assembled to be placed in the tray; that is to say, the lower longitudinal member will be received in the portions of the slots 14 of each fin which is below the lower edge of the upper longitudinal member.

The lower longitudinal member is provided with slots 15 extending upwardly from its bot-

tom edge, and preferably about to the middle horizontal line of the member 4, these slots being disposed at the localities where the fins 12 are to be attached.

The fins 12 have slots 16 extending downwardly from the top edge, and these slots are of such depth that when the fins 12 are moved upwardly straddling the longitudinal member 4, the fins will come to rest with their lower edges flush with the lower edge of the member 4 or in the position shown in Figure 2. The slots 16 above the top edge 8 of the member 4 remain open for the purpose of receiving therein the upper longitudinal member 6.

Any means may be employed to attach the fins to the longitudinal members, such as soldering or welding, but the simplest method is that shown in the drawing. I have shown the edges of the metal of the upper longitudinal member adjacent the slots 13 upset or peened, as shown at 17, to engage the top edges of the fins 11. This prevents separation of these fins from the longitudinal member 6. The metal of the lower longitudinal member 4 is likewise upset or peened at 18 adjacent the slots 15 so that this metal projects over the edge of the lower fins 12 and thus prevents these fins from separating from the member 4.

It will be noted in the description of the operation of the device that when the grid members are pried apart the force does not tend to loosen the upset portions because the forces so act as to tend to tighten the fins on the respective longitudinal members and the upset portions merely serve to prevent displacement of the fins while the grid sections are being handled.

The operation of my device is as follows: The grid sections are preferably assembled before the grid is placed in the tray, although if desired the lower grid section may be first placed in the tray and then the upper grid section may be applied over it.

In either case the upper grid section is brought down upon the lower grid section during which operation the lower longitudinal member 4 is received into the open ends of the slots 14 of the fins 11 and the upper longitudinal member 6 is received into the open upper ends of the slots 16 of the fins 12. When the upper grid section has been completely lowered into the lower grid section the edge 7 will come to rest on the edge 8, so that the two longitudinal members form a complete vertical dividing wall through the middle of the tray as shown in Figure 1.

The upper edges of the fins 12 lie flush with the top edge of the upper longitudinal member 6 and the lower ends of the fins 11 lie flush with the bottom edge of the longitudinal members 4. The horns 9 fit edgewise against the slanting edges of the horns 5. The fins 12 alternate in position along the tray in relation to the fins 11, so that on one side of each compartment 3 the ice cubes will engage against a fin 11 and on its opposite side against a fin 12, except at the end-most compartments where the cubes will engage at one side against the end walls of the tray as well as against one of the fins 11. As there is an odd number of fins, I prefer to have the lesser number of fins 12 as part of the lower grid section and the greater number of fins 11 as part of the upper grid section.

When the grid is assembled in the tray, as shown in Figure 1, the compartments 3 are supplied with water or other liquid to be frozen, and the water may be brought to any level within the

tray, even to the top edge of the tray if desired, so that it is unnecessary to be exact in filling the tray. The tray and grid are then placed in the refrigerator within the absorption coil, and left until the water has been converted into ice.

The tray is then removed from the refrigerator and the grid sections are separated to release the cubes. One convenient method of separating the grid sections is shown in Figure 1. There is shown a lever 17^a of any suitable length, and this lever is fork-shaped on its end to provide the two arms 18 for straddling the horns 5 and 9. The ends of these forks are provided with turned portions or hooks 19 to engage under the ends of one of the pins 10 as shown in Figure 1, while the rear portion of the lever rests against the top edge of one of the horns 5. By pressing downwardly on the outer, free end of the lever there will be a downward pressure on the horn 5 which is a part of the lower grid section, and there will be an upward pressure on the pin 10 which is part of the upper grid section, and as the lever is pressed downwardly the upper grid section will be moved upwardly while the lower grid section is held down and after a slight upward movement of the upper grid section adhesion of the cubes to the grid and tray will be broken and all the cubes will be released.

The upper grid section may then be lifted out of the tray and after that the lower grid section may be lifted out if desired, and all of the cubes which will have been released will lie in the tray and may be removed singly or the entire group may be dumped out of the tray. If desired, after the upper grid section has been removed, the lower grid section may be left in the tray and the cubes may be lifted singly out of their compartments. If it is desired to use at one time only a portion of the cubes, the grid sections may be placed back into position as shown in Figure 1 and the tray may be returned to the refrigerator until such time as it is desired to use the remaining cubes. When that time arrives the tray may be removed from the refrigerator and if through further freezing the cubes adhere to the tray and grid the above operations may be repeated.

If after applying the lever to one end of the grid to separate the sections, the upper grid section cannot be removed by the fingers, the lever may be applied to the pin 10 on the opposite end of the tray and the upper grid section lifted by the operation of the lever. In most instances the application of the lever to one end of the grid is sufficient.

By having the edges 7 and 8 meet on a line which is below the horizontal center line of the grid, the upper longitudinal member 6 is made deeper than the lower longitudinal member 8 so that the total adhesion to all parts of the upper grid section will be greater than the total adhesion of the cubes to the lower grid section to partly offset the adhesion of the cubes to the walls of the tray. Comparatively little force is required to operate the lever for separating the grid sections so that the operation may not only be performed by an adult but even by young persons.

While protrusions may be employed on either grid section to compel the cubes to move upwardly with the upper grid section or to stay down with the lower grid section during the releasing operation, I have found that in a device made as shown herein such protrusions are unnecessary and this simplifies the construction

considerably so that all parts of the grid except for the pins 10 may be made by simple blanking operations. The present device is very simple to manufacture and to operate and its appearance is similar to an ordinary metal grid. It is unnecessary to make a special type of tray for the device as the latter may be inserted in any tray providing its dimensions are made accordingly.

Having described my invention, what I claim is:

1. A grid for ice cube trays, composed of upper and lower relatively movable sections, each section having a longitudinal member and laterally extending fins for dividing the interior of the tray into cube compartments, said sections being so constructed that when assembled in a tray the fins of both upper and lower grid sections will lie in the same horizontal plane.

2. A grid for ice cube trays, composed of upper and lower, relatively movable sections, each section having a longitudinal member and laterally extending fins for dividing the interior of the tray into cube compartments, said sections being so constructed that when assembled in a tray the fins of both upper and lower grid sections will lie in the same horizontal plane and the fins of the upper and lower sections will alternate in position lengthwise of the tray.

3. A grid for ice cube trays comprising relatively movable upper and lower sections, said sections each having a longitudinal dividing member, said dividing members adapted to lie in a common vertical plane within the tray, lateral fins carried by the longitudinal member of said upper section and being of such depth as to project over the longitudinal member of the lower grid section, and lateral fins on the lower longitudinal member, and being of such height as to project over the longitudinal member of the upper grid section, the sections of the grid co-operating to divide the tray into a plurality of cube compartments.

4. A grid for ice cube trays, including a lower grid section having a longitudinal member adapted to form a longitudinal dividing member in a tray, an upper section including a longitudinal member adapted to lie in the same vertical plane with said lower longitudinal member, laterally extending fins carried by the longitudinal member of said upper section and extending below the bottom of said upper longitudinal member and having slots extending upwardly from the bottom thereof to receive the longitudinal member of said bottom section therein, lateral fins on said lower longitudinal member extending above the top of said lower longitudinal member and having slots extending downwardly from the top edge thereof to receive the upper longitudinal member therein, said grid sections being relatively movable to permit the cubes to be released therefrom.

5. A grid for ice cube trays, including a lower grid section having a member adapted to form a longitudinal dividing member in a tray, an upper section including a longitudinal member adapted to lie in the same vertical plane with said lower longitudinal member, laterally extending fins carried by said longitudinal member of the upper grid section and extending below the bottom of said longitudinal member and having slots extending upwardly from the bottom thereof to receive the longitudinal member of said bottom grid section therein, lateral fins on said lower longitudinal member extending above the top of said lower longitudinal member and having slots extending downwardly from the top edge thereof

to receive the upper longitudinal member therein, the fins of the upper and lower sections of the grid lying in alternate positions lengthwise of the tray when the grid is assembled in the tray, said grid sections being relatively movable to permit the cubes to be released therefrom.

6. A grid for ice cube trays including a lower section having a member to form a longitudinal vertically disposed dividing member in a tray, an upper section including a longitudinal member adapted to lie in a common vertical plane with said lower longitudinal member whereby said longitudinal members constitute a single vertical wall, laterally extending fins on the longitudinal member of the upper grid section and extending below the bottom of said longitudinal member, and laterally extending fins on said lower longitudinal member extending above said latter longitudinal member, said fins cooperating to divide the tray into individual cube compartments.

7. A grid for ice cube trays, including relatively movable upper and lower sections, said lower section including a longitudinal member adapted to lie in a vertical position lengthwise of a tray, and having upward extensions or horns at each end thereof, and an upper grid section having a longitudinal member adapted to lie in the same vertical plane with the longitudinal member of the lower grid section and adapted to lie between the upwardly extending horns of said lower longitudinal member, said grid having laterally extending fins on each section for dividing the interior of the tray into individual cube compartments.

8. A grid for ice cube trays comprising a lower grid section, including a longitudinal member adapted to lie in a vertical plane when the grid is inserted in a cube tray, an upper grid section having a longitudinal member co-operating with said lower longitudinal member, said upper longitudinal member having slots extending downwardly from its top edge, and laterally extending fins each having a slot extending upwardly from its bottom edge, said fins being assembled on the longitudinal member in such manner that the solid portion of the fin immediately above its slot is received in the downwardly extending slot of the longitudinal member, and the solid portion of the longitudinal member below the slot of said member is received into the slot of the fin.

9. A grid for ice cube trays, including upper and lower grid sections, each section having a longitudinal member, the longitudinal members of both sections lying in the same vertical plane, the longitudinal member of said lower grid section having slots extending upwardly from the bottom edge thereof, fins having slots extending downwardly from their upper edges, said fins being so assembled on said lower longitudinal member that the solid portion of the fins in line with the slots of said fins are received in said slots of the lower longitudinal member, and the solid portion of said lower longitudinal member in line with the slots of said longitudinal member are received in the slots of said fins.

10. A grid for ice cube trays comprising a lower grid section including a longitudinal member adapted to lie in a vertical plane when the grid is inserted in a cube tray, an upper grid section having a longitudinal member co-operating with said lower longitudinal member, said upper longitudinal member having slots extending downwardly from its top edge and laterally extending fins each having a slot ex-

tending upwardly from its bottom edge, said fins being assembled on the longitudinal member in such manner that the solid portion of the fin immediately above its slot is received in the downwardly extending slot of the longitudinal member and the outer portion of the longitudinal member below the slot of said member is received in the slot of the fin, the lower portion of the slot of each of said fins adapted to receive the lower longitudinal member therein to permit the upper and lower longitudinal members to lie edge to edge.

11. A grid for ice cube trays including upper and lower grid sections, each section having a longitudinal member, the longitudinal members of both sections lying in the same vertical plane, the longitudinal member of said lower grid section having slots extending upwardly from the bottom edge thereof, fins having slots extending downwardly from their upper edges, said fins being so assembled on said lower longitudinal member that the solid portion of the fins in line with the slots of said fins are received in said slots of the lower longitudinal member, and the solid portion of said lower longitudinal member in line with the slots of said longitudinal member are received in the slots of the fins, the upper portions of the slots of the fins adapted to receive therein the upper longitudinal member whereby said longitudinal members may lie edge to edge.

12. The combination of an ice tray and a grid removably disposed therein, said grid comprising a partition wall extending longitudinally of the ice tray and a series of spaced fins carried by said longitudinal wall and extending substantially across the width of the ice tray and cooperating with the longitudinal wall to divide the ice tray into a plurality of ice cube compartments, said fins being arranged to have movement one relative to another, said longitudinal wall being composed of a plurality of relatively movable sections disposed in substantially the same vertical plane and more than one of which partitions the ice tray, said grid being so constructed that relative movement of the longitudinal sections will cause said relative movement of the spaced fins.

13. The combination of an ice tray embodying side and bottom walls and a grid removably disposed therein and arranged to cooperate therewith for forming ice cubes, said grid embodying a plurality of relatively movable longitudinally extending sections disposed substantially in the same vertical plane, and a series of spaced, single wall substantially rigid transverse fins extending across the width of the ice tray, said longitudinal sections having slots adapted to receive fins therein, said grid being open at its bottom so that the ice cubes contact the bottom wall of the ice tray, said fins being arranged to have movement one relative to another and said grid being so constructed and arranged that relative movement of the longitudinal sections will cause said relative movement of the spaced fins.

14. A grid adapted to be removably disposed in an ice tray comprising, a longitudinal partition composed of relatively movable upright portions disposed adjacent one another and a plurality of rigid members extending transversely and continuously through the plane thereof, each portion of said longitudinal partition having a plurality of spaced apart slots therein receiving said members whereby said members cooperate with one another and with

said partition to provide a plurality of walls of ice block forming compartments, means engaging each of said portions of said longitudinal partition and operable independent of contact with the tray for applying force between said partition portions to move one portion relative to the other portion thereof, and said relative movement of said partition portions breaking a bond between ice blocks and certain of the compartment walls and causing a relative sliding movement between the ice blocks and certain other of the compartment walls.

15. In combination with an ice tray, a grid including a lower section forming a longitudinal

dividing wall in the tray and an upper movable section both removable from the tray, said grid having a plurality of substantially inflexible transverse partitions extending across the interior of the tray through the plane of one of said sections and removable therefrom with said grid sections, and a detachable lever engaging each of the sections of said grid and operable independent of contact with the tray for applying force between said sections to move the movable section of the grid relative to the other section thereof and to cause relative movement between the transverse partitions.

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