

June 1, 1943.

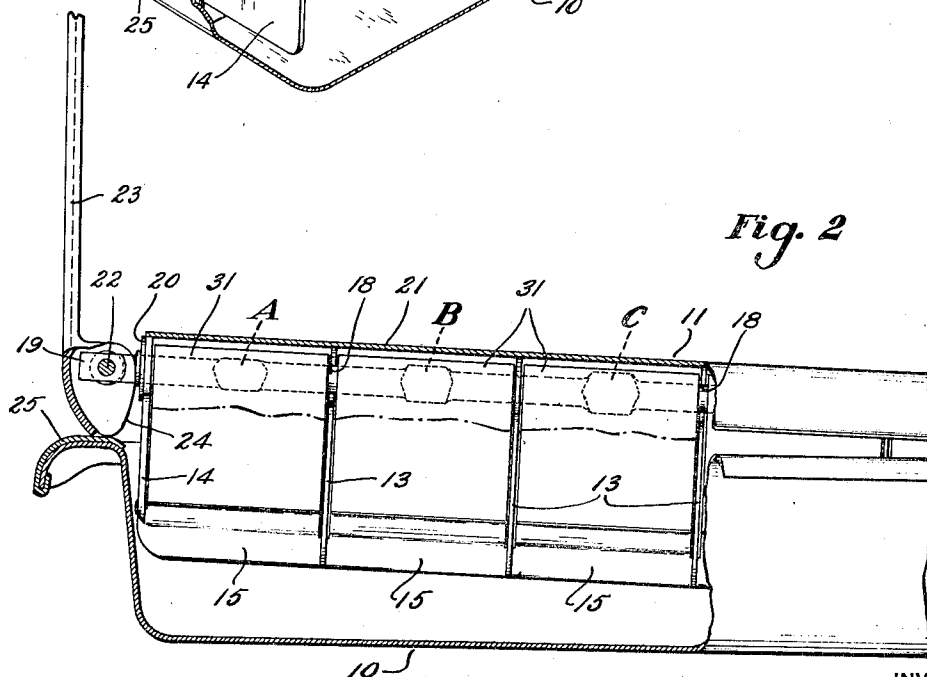
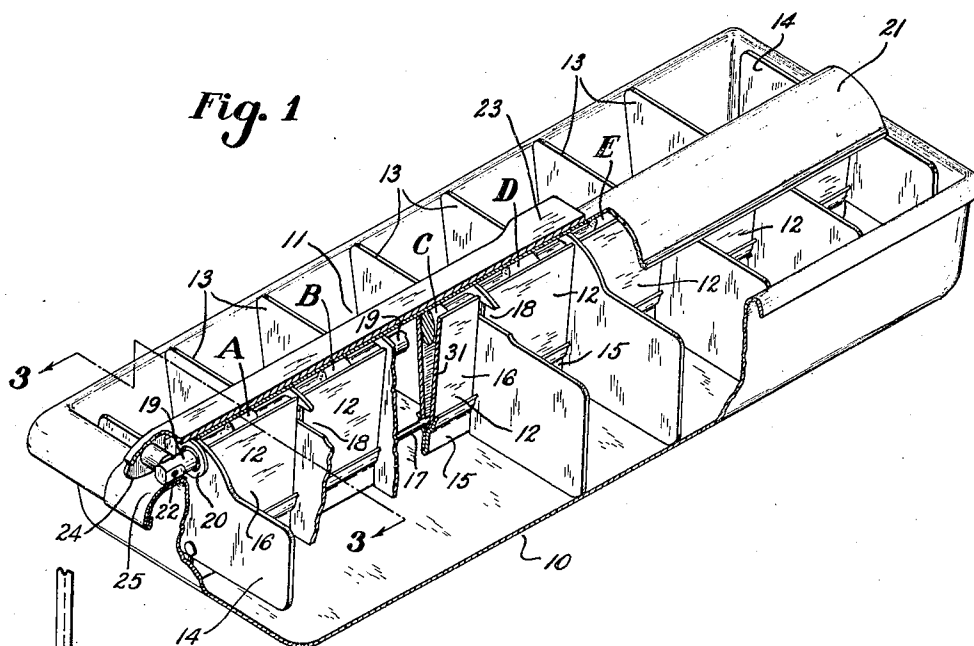
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2,320,534

REFRIGERATION

Filed Oct. 21, 1938

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

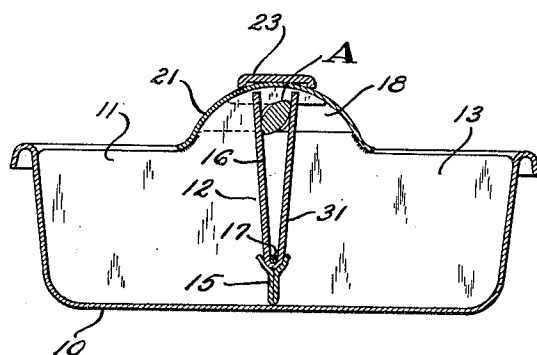


Fig. 3

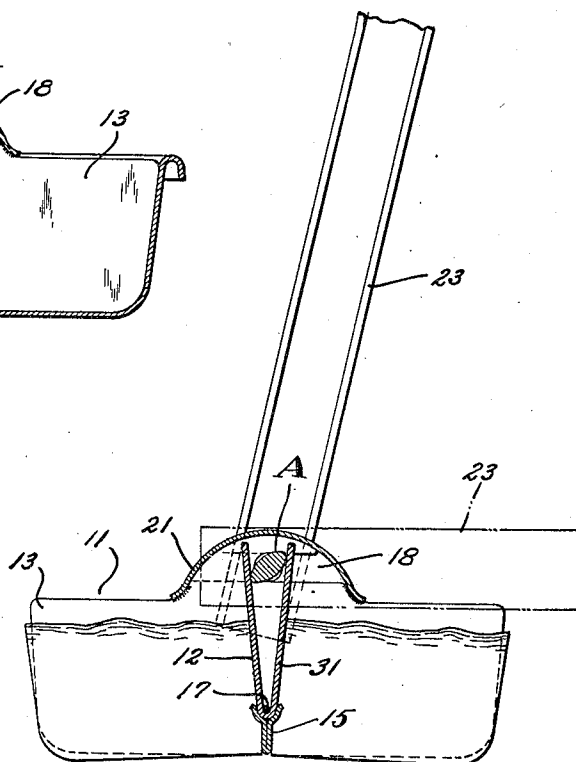


Fig. 4

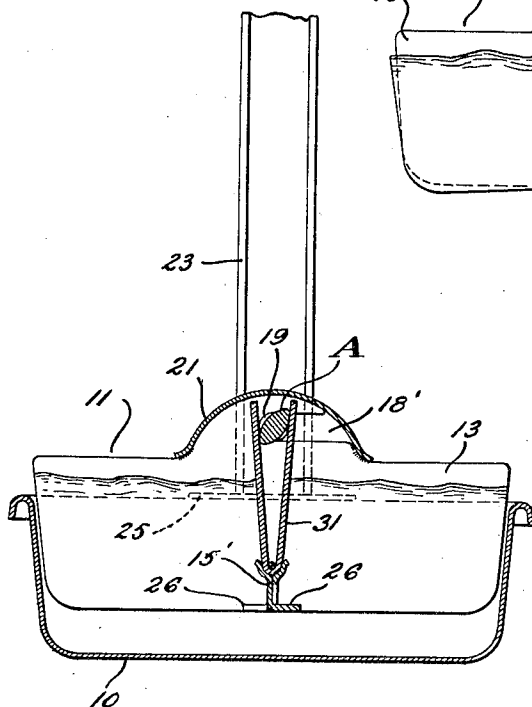


Fig. 5

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3 Sheets-Sheet 3

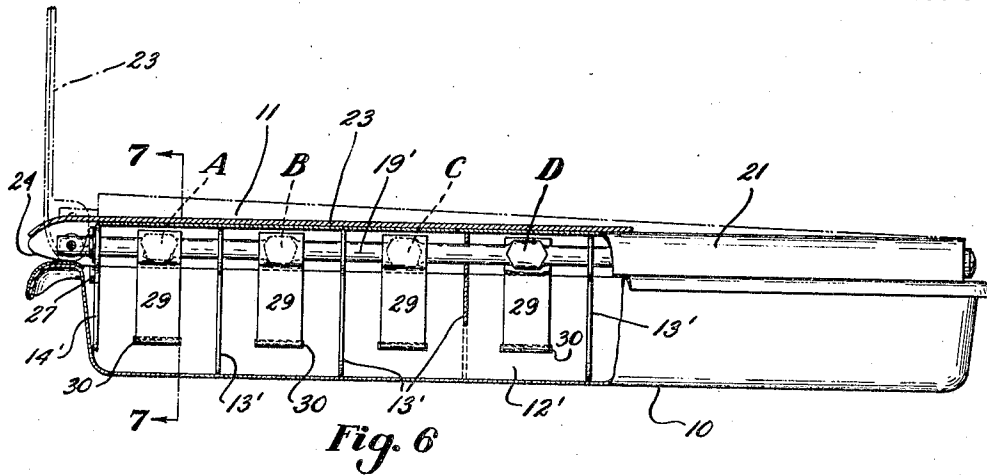


Fig. 6

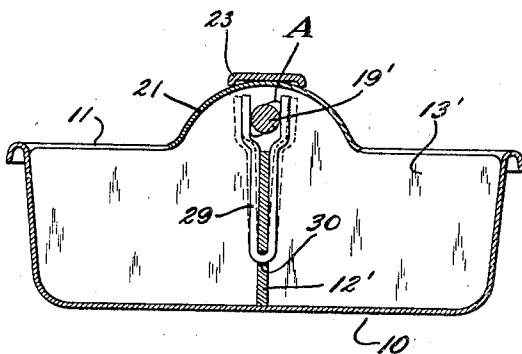


Fig. 7

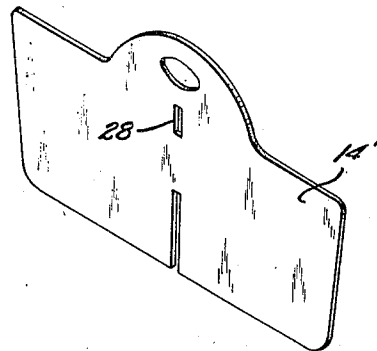


Fig. 8

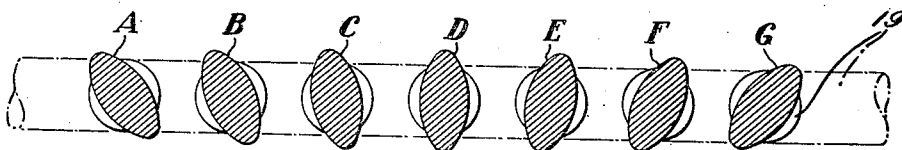


Fig. 9

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2,320,534

REFRIGERATION

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Application October 21, 1938, Serial No. 236,267

15 Claims. (Cl. 62—108.5)

This invention relates to refrigeration, and more particularly, to a grid assembly adapted to be removably positioned in a standard freezing tray of a domestic refrigerator.

It is the usual custom to remove ice cubes from a freezing tray of a refrigerator by first running hot water over the tray to remove the grid assembly and attached cubes from the tray, and thereafter running additional hot water over the grid assembly to remove the individual cubes therefrom.

This method has the disadvantage that ice is wasted since the cubes are considerably reduced in size by melting them loose and in addition, water is dripped over the place where the cubes are being removed so as to necessitate wiping up after each removal. The surface of the cubes is also wet and slippery, and consequently the cubes are hard to handle.

It has also been proposed to remove cubes from the freezing tray of a refrigerator by mechanical leverage mechanisms, but such devices have not been entirely satisfactory because of the excessive force necessary to be applied in removing the cubes, the complexity of the mechanism in operation, the high cost of manufacture and their tendency to get out of order so as to necessitate their frequent repair and replacement.

It is accordingly an object of this invention to provide a grid assembly for the freezing tray of a refrigerator in which the disadvantages of these prior methods are eliminated.

It is another object of this invention to provide a grid assembly for the freezing tray of a domestic refrigerator in which ice cubes may be removed singly and in succession and in which the grid assembly and attached cubes are first removed from the tray and then the individual cubes are removed from the grid assembly one at a time.

It is another object of this invention to provide a grid assembly for the freezing tray of a refrigerator in which it is not necessary to remove all the cubes and in which only a small force is necessary to remove the cubes.

More particularly, it is an object of this invention to provide a grid assembly having a rotatable shaft with cams arranged in staggered relation to eject cubes from the grid assembly in succession and a lever pivoted to said shaft for rotating it with means on the lever to engage the edge of the tray to release it and the attached cubes from the tray, which is so arranged that movement in the one arc will remove the grid assembly and attached cubes from the tray and

movement in an arc at an angle to the first mentioned arc will remove the cubes from the grid assembly.

It is another object of this invention to provide a grid assembly for the freezing tray of a refrigerator which is simple in operation, easy and economical to manufacture which will not get out of order.

Other objects and advantages of the invention will become apparent as the description proceeds when taken in connection with the accompanying drawings, in which:

Figure 1 is a perspective view of one embodiment of the invention partly broken away to show the details of construction;

Figure 2 is an elevation of a portion of the device of Figure 1 depicting the grid assembly and attached cubes being removed from the tray;

Figure 3 is a cross sectional view on line 2—3 of Figure 1;

Figure 4 is a cross sectional view similar to Figure 3 depicting the cams in operation;

Figure 5 is a cross sectional view of another modification of the invention;

Figure 6 is a side elevation of another embodiment of the invention;

Figure 7 is a cross sectional view of the device of Figure 6;

Figure 8 is a detail view of a portion of the device of Figure 6; and

Figure 9 shows the cam shaft with the shape of the various cams in cross section.

Referring to Figures 1 to 4, inclusive, the numeral 10 represents an ice tray of usual form. Removably positioned in the tray 10 is a grid assembly generally indicated at 11 which comprises a longitudinally extending grid member 12, intermediate lateral grid members 13 and end lateral grid members 14 which cooperate with the walls of the tray to form a plurality of cube compartments. The longitudinal grid member 12 comprises a lower portion 15 and an upper portion 16. The lower portion 15 extends the entire length of the tray and is received in slots in the intermediate lateral grid members 13. The upper portion 16 of the longitudinal grid member 12 is made of spring metal and comprises a plurality of sections 31 of U-shape as shown in Figure 3, positioned between adjacent lateral grid members 13 and the end lateral grid members 14. The end lateral grid members 14, the various sections 31 of the upper portion 16 of the longitudinal grid member 12, and the intermediate lateral grid members 13 are held in assembled relation by a wire rod 17 positioned in the bottom

of the U-shaped sections. The rod 17 extends the full length of the tray and is riveted over at the ends into contact with the end lateral grid members 14.

The intermediate lateral grid members 13 are provided with slots 18. The slot 18 of each succeeding lateral grid member extends in opposite directions. Rotatably mounted in the slots 18 is a shaft 19 having cam portions A, B, C, D, E, F and G. The cams lie between the legs of the U-shaped sections 31 and are arranged in staggered relation as shown in Figure 9. Collars 20 are positioned on the shaft beyond the end lateral grid members 14 to prevent end play of the shaft and the shaft is covered by cover member 21. Pivoted to one end of the shaft 19 by means of pivot pin 22 is a lever 23 having a cam portion 24 adapted to bear on bearing plate 25 secured to the handle of the tray.

In assembling the device, the shaft is positioned in the slots 18 of the intermediate lateral grid members 13 with the slots of each succeeding grid member extending in opposite directions. The end lateral grid members 14 are then positioned on the shaft 19 and the collars 20 welded or otherwise secured to the shaft. The cover member 21 is then spot welded to the various lateral grid members. The individual U-shaped sections 31 of the longitudinal grid member 12 are then positioned between the adjacent lateral grid members, and the lower portion 15 of the longitudinal grid member 12 positioned in slots in the lateral grid members. The wire rod 17 may then be inserted through the bottom portions of the U-shaped sections 31 and through openings in the lateral grid members. The rod 17 is then riveted over at the ends to hold the assembly in assembled relationship. The lever 23 may then be secured to the end of the shaft 19 by means of a pivot pin 22.

In operation the grid assembly 11 is positioned in the tray 10, the tray filled with water, and placed on the evaporator shelf of a refrigerator until the water has frozen. The tray is then removed from the evaporator shelf in any suitable manner, the lever 23 grasped in one hand and raised in a vertical arc. This will cause the cam 24 to engage the bearing plate 25 whereby the grid assembly and attached cubes will be raised from the tray as shown in Figure 2.

The end lateral grid members 14 are provided so that the cubes in the end pockets will have a greater area bonded to the grid assembly than to the side walls and bottom of the tray, thus assuring that all the cubes will be raised from the tray along with the grid assembly. The lever is then rotated through an arc at right angles to the first arc, as shown in Figure 4 so as to rotate the shaft 19 on its axis. As shown in Figure 4 the first cam is in operation and since the U-shaped section 31 is wider at the top than at the bottom, the lower portion of the cam will contact the lefthand leg of section 31 so as to move it outwardly before the righthand leg. The initial rotation of shaft will thus first release the lefthand cube and continued movement will release the righthand cube.

Since the cams are arranged in staggered relation, cam B will come into operation after cam A has released its two cubes and continued rotation of the shaft will release each cube from the grid assembly singly and in succession. The legs of the individual sections 31 being movable relative to the lateral grid members, will force the

cubes outwardly relative to the lateral grid members and break the bond therebetween.

Pivoting the lever 23 so as to overlie the shaft 19 and cover member 21 results in a construction in which the tray takes up very little space in the evaporator shelf, and in which great leverage is obtained for releasing the grid assembly and attached cubes from the tray and the individual cubes from the grid assembly. Since only one cube is released at a time, only a small force need be applied.

The embodiment of Figure 5 is the same as that just described with the exception that feet 26 are struck outwardly from the lower portion 15' of the longitudinal grid member and extend into each cube compartment. This will assure that the individual cubes will be lifted from the tray along with the grid assembly.

The modification of Figures 6, 7 and 8 operates on the same principle as those previously described with the exception that the longitudinal grid member 12' is made in a single piece and has slots which interfit with similar slots in the lateral grid members 13'. The end lateral grid members 14' are secured to the longitudinal grid member 12' by means of a lug 27 extending through apertures 28 in the members 14' and riveted over. U-shaped members 29 of spring metal have their bight portions positioned in openings 30 in a longitudinal grid member 12' with their legs extending upwardly on each side of the cams on the shaft 19'.

The operation of the device is substantially the same as that described in connection with Figures 1 to 4, inclusive, with the exception that when the cams are rotated, the legs of the members 29 are forced outwardly to break the bond between the cube and the grid assembly.

From the foregoing it can be seen that this invention provides a grid assembly adapted to be positioned in a standard ice tray which is simple in operation, economical to manufacture, which will not get out of order. Only a small amount of manual force need be applied in removing the grid assembly and attached cubes from the tray, and in later removing the individual cubes from the grid assembly and the cubes may be released from the grid assembly singly and in succession.

While I have shown but a few embodiments of my invention, it is to be understood that these embodiments are to be taken as illustrative only and not in a limiting sense. I do not wish to be limited to the specific structure shown, but to include all equivalent variations thereof except as limited by the scope of the claims.

I claim:

1. A grid assembly adapted to be positioned in an ice tray, said grid assembly comprising rigid longitudinal and lateral grid members suitably secured together in such manner as to divide an ice tray into a plurality of compartments when placed therein, U-shaped members of flexible material secured to said longitudinal grid member between each pair of lateral grid members and means for flexing said flexible U-shaped members.

2. A grid assembly adapted to be positioned in an ice cube tray, said grid assembly comprising rigid longitudinal and lateral grid members suitably secured together in such manner as to divide an ice tray into a plurality of compartments when placed therein, U-shaped members of flexible material secured to said longitudinal grid member between each pair of lateral grid mem-

bers and a rotatable shaft positioned between the legs of said U-shaped members, said shaft having cams adapted to engage the legs of said U-shaped members.

3. A grid assembly adapted to be positioned in an ice cube tray, said grid assembly comprising rigid longitudinal and lateral grid members suitably secured together in such manner as to divide an ice cube tray into a plurality of compartments when placed therein, a U-shaped member of flexible material secured to said longitudinal grid member between each pair of lateral grid members and a rotatable shaft positioned between the legs of said U-shaped members, said shaft having cams adapted to engage the legs of said U-shaped members, said cams being arranged in staggered relationship.

4. An ice cube tray having a grid assembly removably positioned therein to form a plurality of cube compartments, in combination with means including a movable element mounted for movement on axes at right angles to each other for releasing said grid assembly and attached cubes from said tray and the attached cubes from said grid assembly, said means being so constructed and arranged that movement of the element through one arc will remove the grid assembly and attached cubes from said tray and movement of said element through another arc at an angle to the first named arc will release the cubes from the grid assembly, said cube releasing means being constructed to remove cubes from said compartment singly and in succession and means on the bottom of said grid assembly and extending into said cube compartments to support ice cubes as said assembly is removed from said tray.

5. A grid assembly adapted to be positioned in an ice tray comprising longitudinal and lateral grid members, said longitudinal grid member comprising a bottom portion interfitted with said lateral grid members and an upper portion secured to said bottom portion, said upper portion comprising U-shaped sections lying between adjacent lateral grid members, a rotatable shaft mounted on said lateral grid members and having cams thereon lying between the legs of said U-shaped section and means lying over said shaft for securing said grid assembly in assembled relationship.

6. A grid assembly adapted for positioning in an ice tray for forming a plurality of compartments, said grid assembly comprising, a longitudinal dividing wall having a plurality of elongated openings spaced along the length thereof near its bottom edge, a plurality of laterally extending dividing walls interfitted with said longitudinal dividing wall centrally between said openings, a flexible U-shaped member having its bight portion positioned in each of said openings with the legs thereof extending upwardly on opposite sides of said longitudinal dividing wall, and means extending between the legs of said U-shaped members for moving the legs thereof outwardly from said longitudinal dividing wall to eject ice from said compartments.

7. A grid assembly adapted for positioning in an ice tray for forming a plurality of compartments, said grid assembly comprising, a longitudinal dividing wall having a plurality of elongated openings spaced along the length thereof near its bottom edge, a plurality of laterally extending dividing walls interfitted with said longitudinal dividing wall centrally between said openings, a flexible U-shaped member having its bight

portion positioned in each of said openings with the legs thereof extending upwardly on opposite sides of said longitudinal dividing wall to a point above the same and means extending between the legs of said U-shaped members above said longitudinal dividing wall for moving the legs thereof outwardly from said longitudinal dividing wall to eject ice from said compartments.

8. A grid assembly adapted for positioning in an ice tray for forming a plurality of compartments, said grid assembly comprising, a longitudinal dividing wall having a plurality of elongated openings spaced along the length thereof near its bottom edge, a plurality of laterally extending dividing walls interfitted with said longitudinal dividing wall centrally between said openings, a flexible U-shaped member having its bight portion positioned in each of said openings with the legs thereof extending upwardly on opposite sides of said longitudinal dividing wall, a rotatable shaft mounted on said laterally extending dividing walls and extending between the legs of said U-shaped members and means on said shaft for moving the legs of said U-shaped members outwardly of said longitudinal dividing wall to eject ice from said compartments.

9. A grid assembly adapted for positioning in an ice tray for forming a plurality of compartments, said grid assembly comprising a longitudinal dividing wall having a plurality of elongated openings spaced along the length thereof near its bottom edge, a plurality of laterally extending dividing walls interfitted with said longitudinal dividing wall centrally between said openings, a flexible U-shaped member having its bight portion positioned in each of said openings with the legs thereof extending upwardly on opposite sides of said longitudinal dividing wall, a shaft rotatably mounted on said laterally extending dividing walls and extending between the legs of said U-shaped members and means on said shaft for moving the legs of said U-shaped member outwardly of said longitudinally dividing wall to eject ice in said compartments, said means comprising cams spirally arranged along the length of said shaft.

10. A grid assembly for an ice tray, said assembly comprising a longitudinally extending wall having a plurality of upwardly opening slots in spaced relationship along the length thereof, a lateral dividing wall having a downwardly opening slot interfitted with each of said upwardly opening slots, said longitudinally extending wall having portions movable outwardly along the laterally extending walls, means mounted for movement on said laterally extending walls for moving said portions outwardly along said laterally extending walls and a cover for said means above said longitudinally extending wall and secured to said laterally extending walls for holding said means and walls in assembled relationship.

11. A grid assembly having a longitudinally extending member and a plurality of laterally extending members for dividing an ice tray into a plurality of compartments, said longitudinally extending member having a plurality of upwardly opening slots spaced along the length thereof, said laterally extending members each comprising a plate having a downwardly opening slot interfitted with each of said upwardly opening slots, said longitudinally extending member having flexible U-shaped members extending upwardly thereof between said laterally extending members, means mounted for movement on said laterally extending members and lying between

the legs of said U-shaped members for moving the legs thereof outwardly to eject ice in said compartments outwardly along the length of said laterally extending members and a cover for said means lying above said longitudinally extending member and being secured to said laterally extending members to hold said means and members in assembled relationship.

12. A grid assembly having a longitudinally extending member and a plurality of laterally extending members for dividing an ice tray into a plurality of compartments, said longitudinally extending member having a plurality of upwardly opening slots spaced along the length thereof, said laterally extending members each comprising a plate having a downwardly opening slot inter-fitted with each of said upwardly opening slots, said longitudinally extending member having flexible U-shaped members extending upwardly thereof between said laterally extending members, means mounted for movement on said laterally extending members and lying between the legs of said U-shaped members for moving the legs thereof outwardly to eject ice in said compartments outwardly along the length of said laterally extending members, a cover for said means lying above said longitudinally extending member and being secured to said laterally extending members to hold said means and members in assembled relationship and means on the lower edge of said grid assembly and extending into said compartments for raising ice with said grid assembly as it is raised from an ice tray.

13. A grid assembly for an ice tray, said assembly comprising a longitudinal dividing wall having a plurality of upwardly opening slots in spaced relationship along the length thereof, a lateral dividing wall having a downwardly opening slot interfitted with each of said upwardly opening slots in said longitudinal dividing wall, said longitudinal dividing wall having portions movable outwardly along said lateral dividing walls, a shaft mounted for rotation in open slots in the upper edge of said lateral dividing wall for moving said portions outwardly along said lateral dividing walls and a cover for said shaft above said longitudinal dividing wall and secured to said lateral dividing walls for holding said shaft and walls in assembled relationship.

14. A grid assembly having a longitudinally extending member and a plurality of laterally extending members for dividing an ice tray into a plurality of compartments, said longitudinally extending member having an upwardly opening recess extending the length thereof and a plurality of upwardly opening slots spaced along the length thereof, said laterally extending members each comprising a plate having a downwardly opening slot interfitted with each of the upwardly opening slots in said longitudinally extending member, a flexible U-shaped member having its bight portion positioned in said upwardly opening recess between each pair of laterally extending members and a rod-like member extending between the legs of said U-shaped members at the bight thereof and through openings in said laterally extending member for holding said U-shaped members and dividing members in assembled relationship.

15. A grid assembly having a longitudinally extending member and a plurality of laterally extending members for dividing an ice tray into a plurality of compartments, said longitudinally extending member having an upwardly opening recess extending the length thereof and a plurality of upwardly opening slots spaced along the length thereof, said laterally extending members each comprising a plate having a downwardly opening slot interfitted with each of the upwardly opening slots in said longitudinally extending member, a flexible U-shaped member having its bight portion positioned in said upwardly opening recess between each pair of laterally extending members, a rod-like member extending between the legs of said U-shaped member at the bight thereof and through openings in said laterally extending members for holding said U-shaped members and dividing members in assembled relationship and means mounted for movement on said laterally extending members and extending between the legs of said U-shaped members near the upper end thereof for moving the legs outwardly along the length of said laterally extending members.

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