July 28, 1942. S. W. E. ANDERSSON 2,291,437

ICE TRAY GRID

Filed April 19, 1940

FIG. 1.

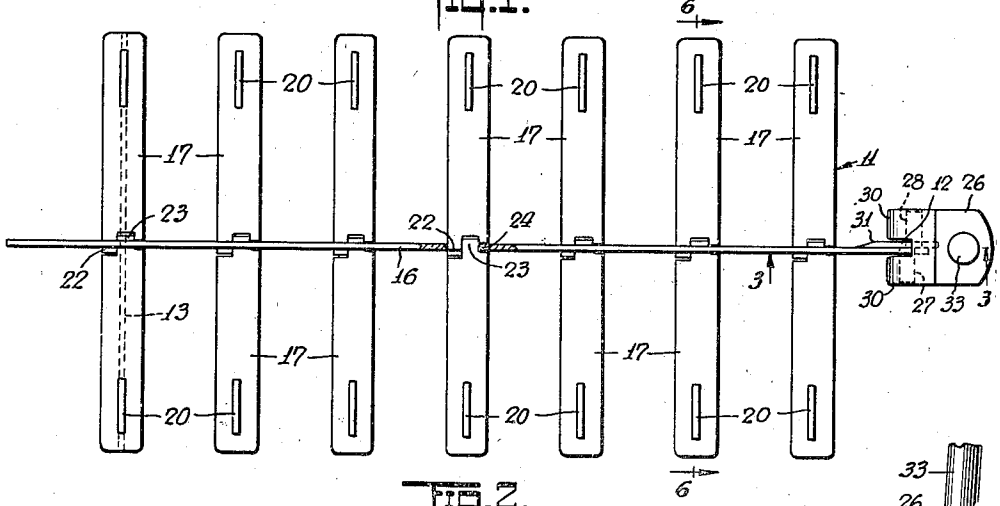



FIG. 2.

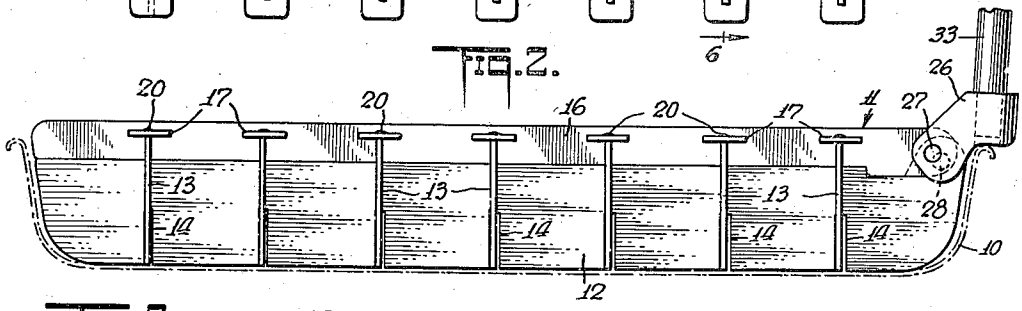



FIG. 3.

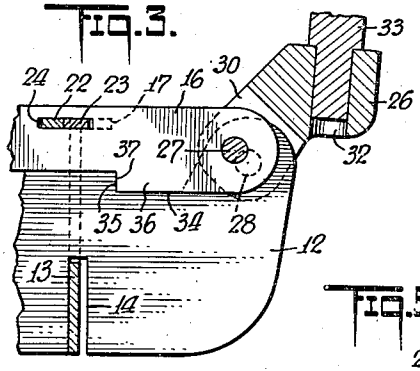



FIG. 6.

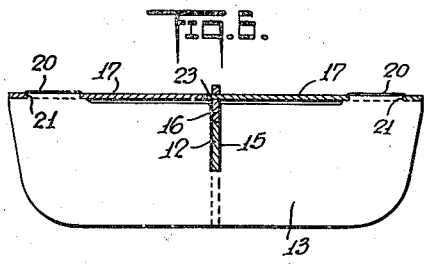



FIG. 5.

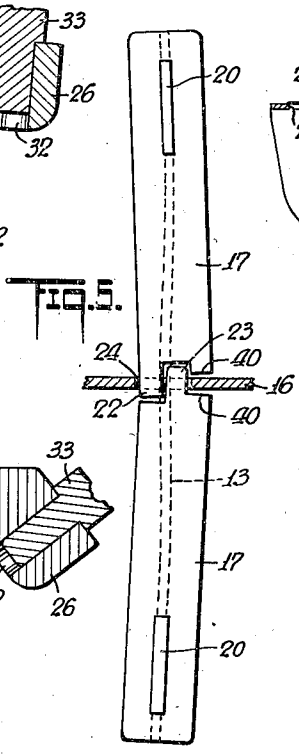



FIG. 4.

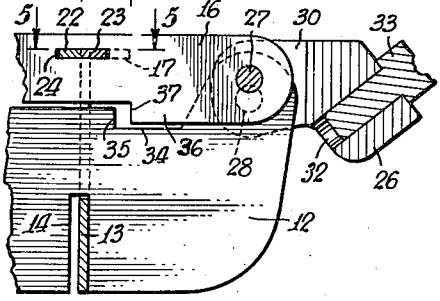



FIG. 7.




INVENTOR
Sven W. E. Andersson
BY
D. E. Heath
his ATTORNEY

Patented July 28, 1942 2,291,437

# UNITED STATES PATENT OFFICE

2,291,437

## ICE TRAY GRID

Sven W. E. Andersson, Evansville, Ind., assignor to Servel, Inc., New York, N. Y., a corporation of Delaware

Application April 19, 1940, Serial No. 330,455

5 Claims. (Cl. 62—108.5)

The present invention relates to improvements in mechanical ice tray grids for forming ice cubes.

One object of the present invention is to provide a new and improved mechanical ice tray grid, having parts constructed for easy interlocking assembly into a strong dependable unit without resort to welding.

Another object is to provide a new and improved mechanical ice tray grid, which is constructed to permit easy effective cleaning thereof, and which thereby lends itself easily to sanitary maintenance.

Another object is to provide a new and improved mechanical ice tray grid, designed to avoid double or laminated wall constructions.

Another object is to provide a new and improved mechanical ice tray grid, so constructed as to lend itself to easy manufacture from simple non-corrosive stampings affording substantial dependable strength.

Another object is to provide a new and improved mechanical ice tray grid, which can be simply and effectively operated with a minimum amount of manual effort to release the ice cubes from the grid walls.

Another object is to provide a new and improved ice tray grid having ice releasing mechanical means, which can be easily operated while the grid is retained in its tray, and which lends itself to easy releasing operation with little or no fingering of the ice cubes.

Another object is to provide a new and improved mechanical ice tray grid, which can be operated to release the ice cubes from the grid walls without splintering or otherwise damaging said cubes.

Among other objects is to provide a mechanical ice tray grid, which is simple in construction but nevertheless attractive in appearance, which is made up of a minimum number of parts, which is of extremely practical and rugged construction and not likely to get out of order, and which is well suited to meet the requirements of economical manufacture.

Various other objects of the invention will be apparent from the following particular description, and from an inspection of the accompanying drawing, in which:

Fig. 1 is a top plan view of a mechanical grid device, embodying the present invention, and shown with its mechanical ice releasing means in the position it assumes when not in use,

Fig. 2 is a side elevation of the grid device of Fig. 1, shown in conjunction with a pan indicated in dot and dash lines,

Fig. 3 is a detail section taken on line 3—3 of Fig. 1, but on a larger scale,

Fig. 4 is a section similar to Fig. 3, but showing the grid device in ice releasing position,

Fig. 5 is a detail section taken on line 5—5 of Fig. 4,

Fig. 6 is a detail section taken on line 6—6 of Fig. 1, and

Fig. 7 is a top plan view of one of the cross partitions flexed into ice releasing position, the flexure of said partition being shown somewhat exaggerated.

In the specific form of the invention shown, a shallow ice cube tray or pan 10 of the usual type for storage in the freezing compartment of a refrigerator has removably fitted therein a mechanical grid device 11, embodying the features of the present invention. This grid device 11 comprises a main or center plate partition 12 intersected by a plurality of cross plate partitions 13, and defining with said latter partitions and the walls of the tray 10 a series of adjoining cells or molds in which the ice cubes are formed.

The center partition 12 is interlocked with the cross partitions 13 by means of halving joints. For that purpose, the center partition 12 is provided with a series of horizontally spaced vertical slots or notches 14, extending upwardly from its lower edge, and each of the cross partitions 13 is provided with a vertical slot or notch 15 extending centrally of its width and downwardly from its upper edge. The center partition 12 and the cross partitions 13 are interlocked in intersecting overlap with the slots 14 and 15 in reverse relationship to receive the solid sections of said cross partitions and of said center partition respectively.

The cross partitions 13 have their lower edges substantially flush with the lower edge of the center partition 12, and have a height substantialy greater than that of said center partition, so that the upper slotted sections of said cross partitions extend above the upper edge of said center partition.

The ice releasing mechanism comprises a flat center slide rod 16, guided in the upper portions of the slots 15 of the cross partitions 13, and seated on the upper edge of the center partition 12. For transmitting the slide movement of this rod 16 to the cross partitions 13, a series of lever links 17, desirably in the form of flat strips are connected between said rod and said cross partitions. These links 17 are arranged in pairs, with

the links of each pair supported in longitudinal alignment on the upper edge of a corresponding cross partition 13 and on opposite sides of the center partition 12.

The outer end of each link 17 is rigidly secured to the outer corresponding end of its respective cross partition 13, desirably by means of an ear 20, projecting upwardly from the upper edge of said cross partition, and passing through a slot 21 in said link. This ear 20 is staked or riveted over the link 17, so that said link and the corresponding outer end of its associated cross partition 13 are firmly secured together against relative play or movement.

The inner ends of aligned links 17 are loosely interlocked, and loosely articulated to the slide rod 16 desirably by adjoining tongue formations 22 and 23 on said links, respectively, extending into a slot 24 in said slide rod, and loosely intermated similarly to a tongue and groove connection.

As far as certain aspects of the invention are concerned, the means for shifting the slide rod 16 for ice releasing operations may be effected by any suitable means. In accordance with the specific form shown, this rod shifting means desirably includes an eccentric yoke 26, straddling the slide rod 16 and the center partition 12 near one end thereof, and having a pair of spaced pivotal connections with said slide rod and said center partition respectively. These pivotal connections may be formed by pins 27 and 28, press-fitted or otherwise secured to respective arms 30 of the yoke 26, and projecting in bearing holes in the slide rod and the center partition respectively.

In order to permit the pivot axes of the yoke 26 to be placed close together for substantial leverage, one of the center members, as for instance the partition 12, is shown slightly offset at 31 from the plane of the main body of said partition. This arrangement permits the two pivot axes to be closely set, irrespective of the diameter of the pivot pins.

In order to rotate the yoke 26 for rectilinear movement of the slide rod 16 along the center partition 12, said yoke has a socket 32 for the loose reception of one end of a lever 33.

To limit the return movement of the slide rod into the position shown in Figs. 2 and 3, one of the center members, as for instance the center partition 12, is desirably provided near the yoke 26 with a recess 34, presenting a shoulder 35, while the corresponding end of the slide rod 16 has a downward projection 36, extending in said recess and presenting a shoulder 37. The shoulder 35 acting as a limiting stop prevents further return movement of the slide rod 16 towards the left when the shoulder 37 on said rod reaches said stop.

When it is desired to break the ice bond the lever 33 is inserted into the socket 32 of the yoke 26 and rotated clockwise from the position shown in Figs. 2 and 3. This lever operation causes corresponding rotation of the yoke 26 about the pivot connection 28, and corresponding rectilinear movement of the slide rod 16 to the right. This ice releasing movement of the rod 16 may be approximately ⅛ of an inch, as has been provided in one practical embodiment of the invention, and will cause corresponding simultaneous movement of all the inner interlocking ends of the links 17 to the right from the position shown in Figs. 1, 2 and 3 to the position shown in Figs. 4 and 5. The resultant tilting of the links 17, as shown in Fig. 5, will exert a bending force on the ears 20 of the cross partitions 13, tending to tilt the lower row of ears shown in Fig. 1 clockwise and the upper row counterclockwise, and to thereby bow said cross partitions towards the right. At the same time, the center partition 12 will exert a reaction force towards the left on the centers of the cross partitions 13. The combination of bending forces on the cross partitions 13 just described will cause each of said partitions to become sinuously flexed, as shown in Fig. 5, and as shown in somewhat exaggerated form in Fig. 7. In Fig. 7 the portions of the cross partitions on opposite sides of the center partition 12 are shown bulged or bowed towards the right and the center sections of said partitions are shown bulged or bowed towards the left, the ends of the partitions forming substantially the nodal points of the flexure. This undulated bending of each cross partition 13 causes the surface on both sides thereof to deflect and peel away from the adjacent surfaces of the four ice cubes frozen and adhering thereto, thereby breaking the ice bond between said cross partitions and said ice cubes. This peeling action is effected smoothly and easily without splintering or otherwise damaging the ice cubes. This permits removal of a few ice cubes from the grid and replacement of the others in the tray.

The operation of the ice releasing mechanism as described is preferably effected while the grid device is in the tray 10. The tray or the yoke 26 may be so constructed that the tray rim below said yoke does not contact the yoke upon ice releasing rotation thereof. If desired, the pan 10 may be constructed to permit the yoke 26 to ride easily over and in contact with the rim during the ice releasing rotation of said yoke. The pan 10 so constructed may cause the grid device to be tilted bodily during ice releasing operations. This tilting of the grid device is not disadvantageous since it will break the ice bond between the ice cubes and the tray.

The slots 14 in the center partition 12 are desirably of progressively increasing width from the left to the right, as shown in Fig. 2, so that the distances between the cross partitions 13 are increased after the grid device has been operated, thereby permitting the released cubes to fall more easily from said device. This progressive increase in the width of the slots 14, however, is not necessary as far as certain aspects of the invention are concerned. In any case, these slots should be of such width that the center section of each cross partition 13 will move, if at all, along the center partition 12 a distance which is less than that travelled by the slide rod 16 during ice releasing operation. This assures immobility of the center sections of the cross partitions 13 to the right at least during the terminal portion of the operating stroke of the slide rod 16, and hence assures the application of reaction pressure to the left of said center sections during said operating stroke.

The cross partitions 13 are formed of springy material, so that when the lever 33 is released from operating position shown in Fig. 4, the inherent resiliency of these cross partitions will cause the partitions to return to their original straight condition, as shown in Figs. 1, 2 and 6. The recoil of these cross partitions 13 will restore the slide rod 16 and the links 17 to the position shown in Figs. 1, 2 and 6.

To assure against converging of longitudinal aligned cross partitions 13 towards the left from

the position shown in Fig. 1, the inner ends of these cross partitions are desirably stepped to form abutment edges 40. These edges are adapted to engage the corresponding faces of the slide rod 16, so that said faces serve as limiting stops to prevent this tilting action. This limiting feature maintains the cross partitions 13 squarely in relation to the center members 12 and 16, when the ice releasing mechanism is not being used, and thereby prevents accidental curving of these partitions in reverse relationship from that shown in Figs. 5 and 7.

The various partitions 12 and 13, the links 17 and the slide rods 16 consist of flat stampings desirably made of aluminum alloy of high tensile strength, so as to combine the feature of low cost with good appearance and freedom from corrosion.

Because of the manner in which the partitions 12 and 13 are assembled and interlocked without resort to spot welding, none of these partitions need to be made from double wall or laminated construction.

As many changes could be made in the above construction, and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A grid for use in an ice tray, comprising a longitudinal partition, a series of single-walled cross partitions forming a grid assembly with said longitudinal partition, a slide rod along the upper edge of said longitudinal partition, and means responsive to the slide movement of said slide rod along the upper edge of said longitudinal partition to sinuously flex said single-walled cross partitions.

2. The combination with a freezing tray, of a grid assembly including a longitudinal partition, transverse partitions extending to either side of the longitudinal partition, the transverse partitions being single-walled and cooperating with the longitudinal partition to provide freezing cells in the tray, and force multiplying mechanism operatively engaging the single-walled transverse partitions for imparting ice dislodging movement thereto relative to the longitudinal partition, the force multiplying mechanism being so constructed and arranged that, when the transverse partitions are viewed from above and ice dislodging movement is imparted thereto, the single-walled transverse partitions are sinuously curved with the portions at opposite sides of the longitudinal partition being similarly bowed in the same direction and joined by reverse bends formed by the center regions of the transverse partitions.

3. A grid for use in an ice tray including a longitudinal partition, a series of cross partitions forming a grid assembly with the longitudinal partition, the cross partitions being single-walled and having tabs at opposite sides of the longitudinal partition, a movable member extending along the top edge of the longitudinal partition, and structure operative with movement of the movable member along the top edge of the longitudinal partition to produce warping or flexing of the single-walled cross partitions, said structure including elements operatively associated with the movable member and connected to the tabs in such a manner that a twisting or wrenching movement is imparted thereto to produce the aforementioned warping or flexing of the single-walled cross partitions.

4. A grid for an ice tray including a longitudinal partition, a series of transverse partitions forming a grid assembly with the longitudinal partition, the transverse partitions being single-walled and having tabs at opposite sides of the longitudinal partition, a movable member extending along the top edge of the longitudinal partition, and structure operative with movement of the movable member along the top edge of the longitudinal partition to produce warping or flexing of the single-walled transverse partitions, said structure including elements operatively associated with the movable member and connected to said tabs to impart a twisting or wrenching movement thereto to produce the aforementioned warping or flexing, and said structure being so formed and arranged that the elements are held in operative association with the movable member solely by the connection of the elements to said tabs.

5. The combination with a freezing tray, of a grid assembly including a longitudinal partition, and transverse partitions extending to either side of the longitudinal partition, the longitudinal partition and the transverse partitions having slots for the purpose of interlocking the partitions in the slots to provide freezing cells in the tray, the transverse partitions being single-walled and having tabs at the top edges at opposite sides of the longitudinal partition, a movable member having openings therein and extending along the top edge of the longitudinal partition, and structure operative with movement of the movable member along the top edge of the longitudinal partition to produce warping or flexing of the single-walled transverse partitions, said structure including links having their inner ends formed to be received by the openings in the movable member for operative association therewith, the links at their outer ends being connected to the tabs in such a manner that a twisting or wrenching movement is imparted thereto to produce the aforementioned warping or flexing, and said structure being so formed and arranged that the longitudinal and transverse partitions and movable member and links are held in assembled relation by the connection of the links to the tabs.

SVEN W. E. ANDERSSON.