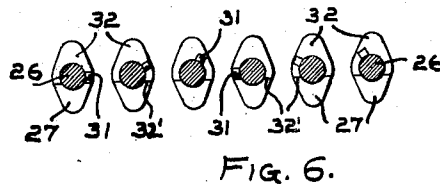
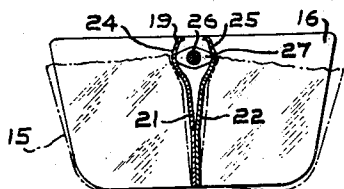
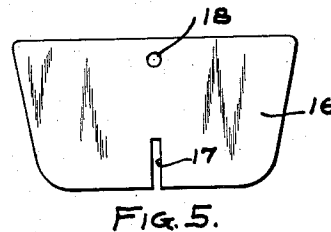
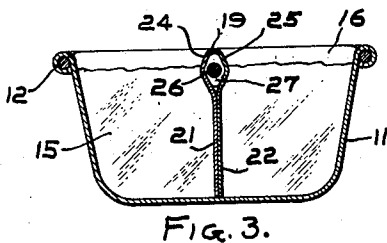
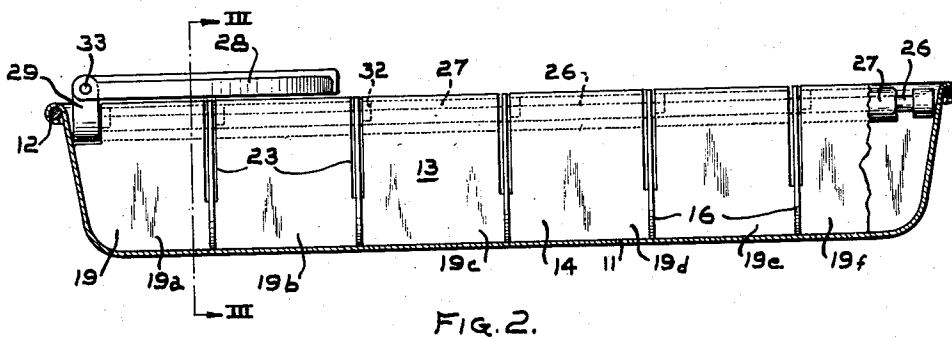
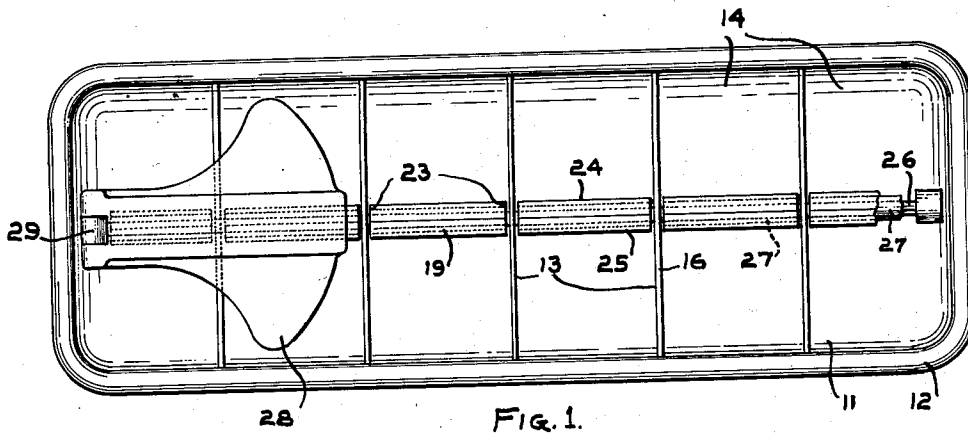


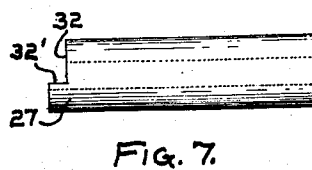
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LIQUID CONGEALING APPARATUS
Filed May 25, 1937

2,278,408



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LIQUID CONGEALING APPARATUS

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12 Claims. (Cl. 62—108.5)

My invention relates to liquid congealing apparatus and particularly to liquid congealing apparatus from which ice particles are to be disengaged by manual effort as distinguished from the use of heat.

It is an object of my invention to provide liquid congealing apparatus adapted to form ice cubes suitable for domestic or table use from which the ice cubes are readily disengageable without excessive manual effort and which is inexpensive in construction.

It is another object of my invention to so construct a grid structure for domestic liquid congealing apparatus that the ice particles formed by the grid structure may be moved progressively, so that either some or all the ice particles may be removed from the grid structure as desired.

It is another object of my invention to provide an improved mechanical structure for effecting successive removal of ice cubes from liquid congealing apparatus of the type adapted particularly for use in domestic refrigeration apparatus.

These and other objects are effected by my invention, as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which:

Fig. 1 is a top plan view of an ice pan and grid structure embodying my invention;

Fig. 2 is a side elevational view of my improved liquid congealing apparatus with portions thereof broken away for the sake of clearness;

Fig. 3 is a sectional view of the liquid congealing apparatus taken on line III—III of Fig. 2 and showing the parts of the tray and grid in their normal position during ice freezing;

Fig. 4 is a sectional view of my improved grid structure showing the parts in the position they assume to break the ice cubes from the grid structure;

Fig. 5 is an elevational view of one of the transverse wall members of the grid structure;

Fig. 6 is a series of six views illustrating the mechanical arrangement of the cams and operating member to effect successive removal of ice cubes from the grid structure; and,

Fig. 7 is a detail view of a cam used in my invention.

Referring specifically to the drawing for a detailed description of my invention, numeral 11 designates an ice tray, preferably formed of relatively rigid stamped metal, such as, for example, aluminum or aluminum alloy and pro-

vided with a turned reinforcing lip 12. A grid structure, generally indicated at 13, is disposed in the ice tray 11 and divides the ice tray into a plurality of cells 14 which form ice cubes 15.

The grid structure 13 is formed of a plurality of rigid transverse wall members 16, preferably also formed of stamped aluminum or aluminum alloy, in the form shown best in Fig. 5. Each transverse wall member 16 is provided with a slot 17 in the bottom thereof and with an aperture 18 near the top thereof. As shown in Figs. 1 to 4, a longitudinal wall member, generally indicated at 19, is formed of two sheets of flexible metal 21 and 22, such as, for example, stainless steel. The sheets 21 and 22 are provided with slots 23 at the tops thereof, as shown in Figs. 1 and 2, which slots 23 receive the transverse wall members 16, the slots 17 of the transverse wall members receiving the bottoms of the sheets 21 and 22 in close fitting relation to hold the sheets 21 and 22 together at their bottoms. The slots 23 in the tops of the sheets 21 and 22 are, however, of sufficient width and depth that the sheets 21 and 22 may readily be spread at their tops. It is to be noted that the transverse wall members 16 extend outwardly on both sides of the longitudinal wall 19 and divide it into a plurality of longitudinal wall portions 19a, b, c, d, e, and f.

The sheets 21 and 22 are provided with arcuate portions 24 and 25 at the tops thereof, which receive an operating member 26 in the form of a round bar which is coextensive with the length of the longitudinal wall 19 and extends through the apertures 18 in the transverse wall members 16. The arcuate portions also enclose a plurality of cams 27, one being provided for each of the longitudinal wall portions 19a to 19f. The cams 27 are closely journaled on the operating member 26. As shown in Figs. 1 and 2, a handle, generally indicated at 28, is rotatably attached to a member 29, which is in turn rigidly attached to the operating member 26. The operating member 26 has a plurality of lugs 31, one for each cam 27, disposed at different angular positions on the operating member 26 and rotatable therewith. The cams 27, as shown in Fig. 6, have depressed portions 32 provided in their faces, so that the lugs 31 will engage the shoulder 32' formed on the cams 27 and turn them in different positions of the operating member 26. The cams shown in Fig. 6 engage the longitudinal wall portions 19a to 19f in the order shown from left to right on the drawing.

Operation

After the ice tray 11 with the grid 13 therein has been filled with water, and the ice blocks 15 formed, the handle member 28 is rotated about a pivotal connection 33 on the member 29 until it engages the lip 12 of the ice tray 11. Further downward movement of the handle 28 with the lip 12 as a fulcrum breaks the bond between the ice cubes and the ice tray 11, so that the grid structure 13, with the ice cubes 15 still adhering thereto, may be disengaged from the ice tray 11.

The handle 28 is then grasped and if rotated clockwise, moves the operating member 26 in a clockwise direction. The lug 31 of the first of the series of figures shown in Fig. 6, at the left end thereof, immediately engages the first cam 27 and rotates it to the position shown in Fig. 4, thus spreading the tops of the flexible sheets 21 and 22 of the first longitudinal wall portion 19a and loosening the two cubes from the portion 19a and the adjacent transverse rigid wall 16. Further movement of the handle 28 in a clockwise direction effects engagement of the lug 31 associated with the cam between the sheets of the longitudinal wall portion 19b and still further rotation of the handle 28 in a clockwise direction effects movement of the cam between the sheets of the longitudinal wall portion 19c, thus loosening the ice cubes from the longitudinal wall portions and from the adjacent rigid transverse walls 16. Obviously, either two, four, or six cubes may be released by varying the rotation of the handle in a clockwise direction.

If more ice cubes are desired, the handle 28 is then turned in a counter-clockwise direction, past the normal position shown in Figs. 1 and 2 until the lugs 31 engage the fourth, then the fifth and lastly the sixth cam shown in Fig. 6, reading from left to right. Thereby either two, four, or six more ice cubes may be progressively removed from the grid by successive separation of the sheets of the longitudinal wall portions 19d, 19e, and 19f. Obviously, the handle 28 may be first rotated counterclockwise, or may be rotated partly clockwise and partly counter-clockwise to remove part or all the cubes as desired.

From the foregoing, it will be apparent that I have provided an improved ice tray and grid structure from which ice cubes may be progressively removed as desired for consumption, and which requires a minimum amount of manual effort, because only two cubes are broken from the grid structure at a time and the force to break this relatively small ice bond is slight. Furthermore, the apparatus is obviously simple in operation and inexpensive in construction.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications, without departing from the spirit thereof, and I desire, therefore, that only such limitations shall be placed thereupon as are imposed by the prior art or as are specifically set forth in the appended claims.

What I claim is:

1. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure including a vertical longitudinal wall formed of two thicknesses of metal and a plurality of spaced vertical transverse walls extending outwardly from both sides of said longitudinal wall and means for sep-

arating the two thicknesses of metal which extend between some of the transverse walls independently of the two thicknesses of metal which extend between other of the transverse walls to release some of the ice cubes from the grid structure while others remain in place.

2. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two sheets of metal and a plurality of rigid spaced transverse walls extending outwardly from both sides of said longitudinal wall member, and means for successively separating the portions of the sheets of metal which extend between respective transverse walls for removing part or all of the ice cubes from the grid structure, said means comprising a plurality of cams engageable with said sheets of metal and a common operating member for rotating the cams, said cams being attached in different positions in relation to said operating member so that they successively move the two sheets of metal which extend between respective transverse walls at different positions of the operating member.

3. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure including a vertically longitudinal wall member formed of two sheets of metal and a plurality of rigid spaced transverse walls extending outwardly from both sides of said longitudinal wall, said two sheets of metal of the longitudinal wall being slotted at the top thereof to receive said transverse walls, and means for successively separating the two sheets of metal between respective slots in the longitudinal wall for removing ice cubes successively from between adjacent transverse walls.

4. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two sheets of metal and a plurality of rigid spaced transverse walls extending outwardly from both sides of said longitudinal wall member, and means for successively separating the portions of the sheets of metal which extend between respective transverse walls for removing part or all of the ice cubes from the grid structure, said means comprising a plurality of cams engageable with said sheets of metal, a common operating member for rotating the cams, said cams being attached in different positions in relation to said operating member so that the points of the cams engage the two sheets of metal which extend between respective transverse walls at different positions of the operating member, and a handle attached to said operating member for actuating the same.

5. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two sheets of metal and a plurality of rigid spaced transverse walls extending outwardly from both sides of said longitudinal wall member, and means for successively separating the portions of the sheets of metal which extend between respective transverse walls for removing part or all of the ice cubes from the grid structure, said means comprising a plurality of cams each em-

bodily a high point, said cams being engageable with said sheets of metal, and a common operating member for rotating the cams, said cams being rotatable in different positions in relation to said operating member so that the high points of the cams engage the two sheets of metal which extend between respective transverse walls at different positions of the operating member, said common operating member for said cams including a handle member, said handle member being attached to the grid member in a position to engage the pan member so as to break the ice bond between the ice cubes and the pan member when the handle member is actuated.

6. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two flexible sheets of metal attached together at the bottom thereof, and a plurality of rigid spaced transverse wall members extending outwardly from both sides of said longitudinal wall member and means for successively flexing the portions of the two sheets of metal which extend between respective transverse walls for removing part or all of the ice cubes from the grid structure.

7. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two sheets of flexible metal, a plurality of rigid spaced transverse wall members extending outwardly from both sides of said longitudinal wall member, said sheets of metal of the longitudinal wall member being slotted at the top to receive said transverse wall members, said transverse wall members being slotted at the bottom to receive said longitudinal wall member and to assist in holding the flexible sheets of the longitudinal wall member together at the bottom thereof, and means for successively flexing the portions of the two sheets of metal which extend between respective transverse walls for removing part or all of the ice cubes from the grid structure.

8. In liquid congealing apparatus, the combination of a pan member, a grid structure for dividing the pan member into a plurality of ice cube forming cells, said grid structure embodying a longitudinal central wall member formed of two sheets of flexible metal, a plurality of rigid spaced transverse wall members extending outwardly from both sides of said longitudinal wall member, said sheet of metal of the longitudinal wall member being slotted at the top to receive said transverse wall members, said transverse wall members being slotted at the bottom to receive said longitudinal wall member and to assist in holding the flexible sheets of the longitudinal wall member together at the bottom thereof, means for successively flexing the portions of the two sheets of metal which extend

between respective transverse walls for removing part or all of the ice cubes from the grid structure, said means comprising a cam engaging each portion of the two sheets of metal extending between respective transverse walls adjacent the top of said two sheets of metal, and a common operating member for the cams, said cams being rotatable by the common operating member in different relative positions so that they separate the flexible sheets at different positions of the operating member.

9. A grid assembly adapted to be positioned in an ice cube tray and comprising a longitudinal partition and lateral grid members secured thereto, said longitudinal partition comprising portions of resilient material forming pairs of legs, a pair of said legs being positioned between each two lateral grid members, the legs of each pair being movable one relative to the other, a rotatable shaft extending along said grid and having cams positioned one between the legs of each pair, said cams being so arranged as, on rotation of said shaft, to successively move the legs to cause successive releasing of ice cubes from the grid from one end of the latter to the other.

10. An ice tray having a grid assembly removably positioned therein, means on said grid assembly for removing said grid assembly from the tray and the ice from said grid assembly, said means including a rotatable shaft and a lever pivoted thereto, said shaft and lever being so constructed and arranged that movement of the lever through one arc will loosen the grid assembly and attached cubes from the tray and movement of the lever through another arc at an angle to the first-named arc will release the cubes from the grid assembly, said cube releasing mechanism being so arranged as to release cubes from each succeeding pair of compartments in succession.

11. 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 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 said element through one arc will remove the grid assembly and attached cubes from said tray and movement of said element through an arc at an angle to the first-named arc will release the cubes from said grid assembly, said cube releasing means being constructed to remove cubes from each successive pair of compartments in succession.

12. A grid assembly comprising a longitudinal grid member and lateral grid members suitably secured together and means for decreasing the effective distance between the longitudinal grid member and the outer ends of the lateral grid members progressively along the length of the longitudinal grid member.

JOHN H. ASHBAUGH.