May 24, 1938. E. H. LUTZ 2,118,211

LIQUID CONGEALING APPARATUS

Filed Feb. 27, 1937

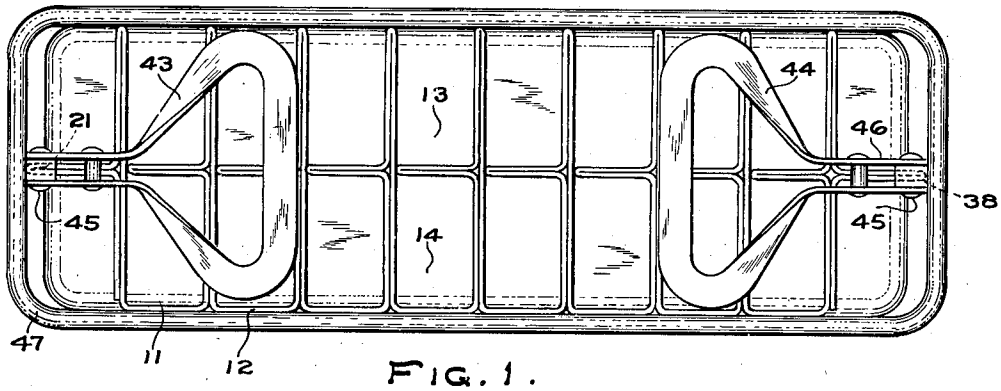


FIG. 1.

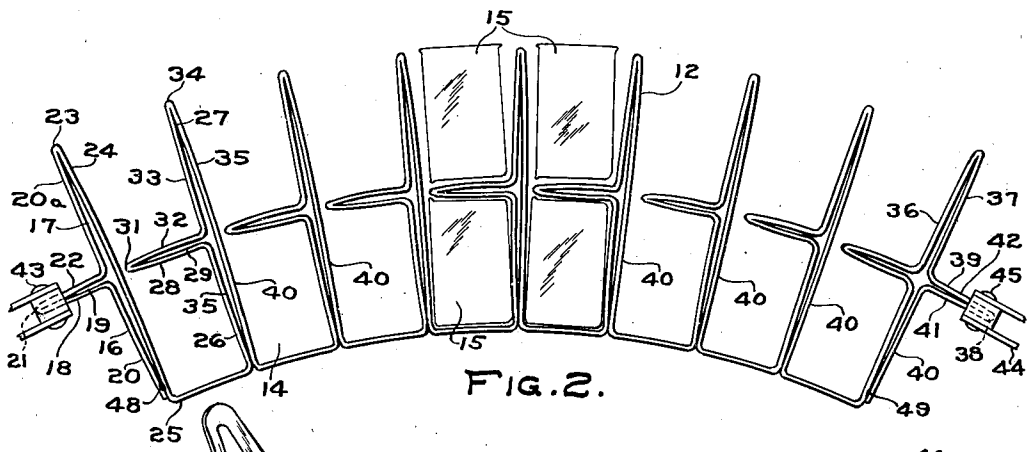


FIG. 2.

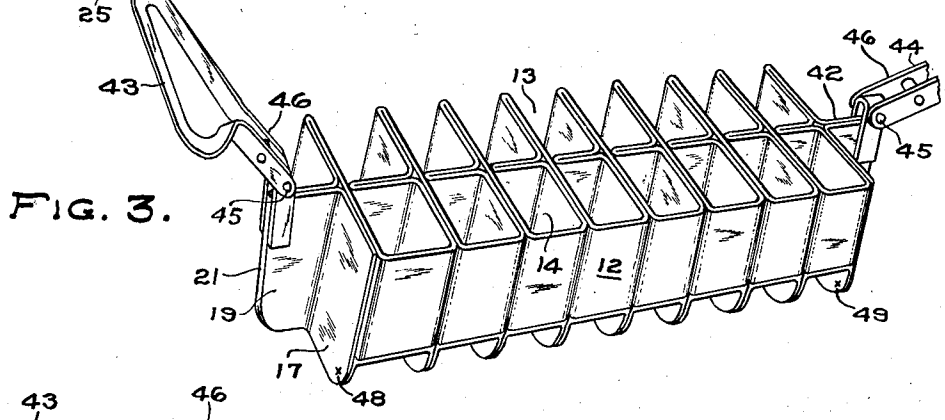


FIG. 3.

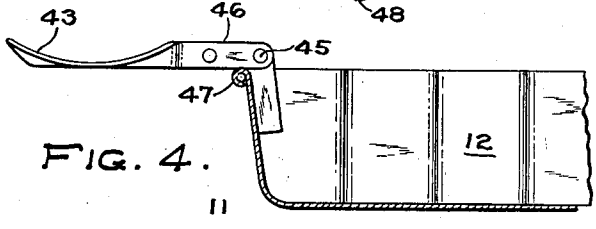


FIG. 4.

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LIQUID CONGEALING APPARATUS

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11 Claims. (Cl. 62—108.5)

My invention relates to liquid congealing apparatus, and particularly to liquid congealing apparatus of the type wherein a flexible metallic grid member is employed to divide an ice tray into cells for the formation of ice of a suitable size and shape for domestic and table use.

It is an object of my invention to provide an improved metallic grid member which may be flexed to loosen ice therefrom and in which the flexing force applied to the grid member is particularly effective to break the bond between the ice and the grid member.

It is another object of my invention to provide improved liquid congealing apparatus wherein a flexible grid member is forcibly moved relative to the ice tray, and is thereafter flexed to remove ice from said grid member.

It is still another object of my invention to provide a flexible grid member which is relatively stiff in an upward direction when lifting force is applied thereto because of certain structural characteristics of the grid itself.

It is a further object of my invention to provide a flexible metallic grid member which forms a double row of ice cubes in an ice tray and which only need be flexed in one direction transverse to the horizontal plane of the grid to break the ice bond between the ice cubes and the grid member.

It is also an object of my invention to provide an improved flexible metallic grid structure which is relatively inexpensive and easy to manufacture.

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 liquid congealing apparatus of the type in general use in domestic refrigeration, and illustrates a preferred embodiment of my invention;

Fig. 2 is a top plan view of the improved flexible grid structure shown in Fig. 1, illustrated in its flexed position after removal from the ice tray;

Fig. 3 is a perspective view of the flexible grid structure, shown in its normal position; and

Fig. 4 is a side elevational view of one end of the ice tray and grid, with the ice tray broken away to illustrate the leverage means for lifting the grid structure from the tray.

Referring specifically to the drawing for a detailed description of my invention numeral 11 designates an ice tray which is preferably formed of sheet aluminum and which is substantially rigid. A flexible grid structure generally shown at 12 divides the ice tray 11 into two rows of cells 13 and 14 for the formation of ice cubes, shown at 15 in Fig. 2.

The grid structure 12 is preferably formed of a flexible, non-corrosive metal, such as, for example, stainless steel, in the following manner. Preferably, although not necessarily, a single sheet of stainless steel is utilized, and starting at the left hand end of the grid shown in Figs. 1 to 3, the sheet first forms a portion 20 of one side 16 of a first double transverse wall 17. At the middle of the transverse wall 17, the sheet is bent outwardly at right angles to form one side 18 of an end longitudinal wall member 19, and is then folded at 21 and bent back to form a second side 22 of the end longitudinal wall 19. The side 22 extends to said first transverse wall 17 and is then bent at right angles to form a second portion 20a of the side 16 of the first transverse wall 17. The sheet is then bent back upon itself, being folded at 23 to form a second side 24 of the transverse wall 17. The sheet is then again bent at right angles to form a wall 25 which extends the length of a cell 14, in the same plane as and adjacent to a side wall 25 of the ice tray 11. The sheet is again bent at right angles to form a portion 26 of one side 30 of a second transverse wall 27 and extends to substantially the middle of the transverse wall 27 where it is bent at right angles and extends to the first transverse wall 17 and forms one side 28 of a longitudinal wall member 29. The sheet is then folded at 31 and extends to the second transverse wall 27, forming a second side 32 of the longitudinal wall member 29. The sheet is again bent at right angles to form a second portion 33 of the side 30 of the transverse wall 27 and is then folded at 34 and bent back upon itself to form a second side 35 of the transverse wall 27.

It will be seen, therefore, that the wall 25 of single thickness of metal, the transverse wall 27 of double thickness of metal, and the longitudinal wall member 29 of double thickness of metal form an inverted F-shaped member, indicated at 40. The forming of the foregoing F-shaped members 40 are thereafter continued until the desired length of the flexible grid is obtained. At the right hand end of the grid member 12, the last transverse wall 36, instead of having its right hand sheet 37 extend completely across the transverse wall, has the sheet 37 bent at right angles substantially at the middle of the transverse wall and doubled at 38 to form sides 39 and 41 of an end longitudinal wall member 42. The sheet 37 is then bent at right angles and extends to the edge of the transverse wall 36.

Handles 43 and 44 are preferably attached to the end longitudinal members 19 and 42, respectively, by pivot pins 45, so that the handles 43 and 44 may be disposed in the position shown in Fig. 1 when not in use, and may be rotated to the position shown in Fig. 4 when it is desired to lift the grid member 12 from the ice tray 11 to forcibly break the ice bond between the ice cubes 15 and the ice tray 11, and remove the grid therefrom. Flat portions 46 of the handles 43 and 44 engage a turned reinforced lip 47 of the ice tray 11, so that downward force applied by the user to the ends of the handles 43 and 44 lift the grid structure 12, the lip 47 acting as a fulcrum and the handles 43 and 44 and the flat portions 46 acting as levers.

It is sometimes necessary to provide means for preventing upward flexing of the grid member 12 when lifting force is applied to the ends thereof, so that the grid will be lifted substantially an equal amount along its entire length and the ice bond between the cubes 15 and the ice tray 11 will be broken for the entire longitudinal extent of the ice tray. Several constructions have been heretofore utilized for stiffening the grid, such as providing a rigid longitudinal member, or welding or otherwise fastening the double sheets of each transverse wall together adjacent the bottom thereof. In addition to other obvious disadvantages of such constructions, they are expensive and complicate the manufacture of flexible metallic grids. In my grid member, the only welding utilized is at the points 48 and 49, to prevent the end transverse sheets 16 and 37 from bending out of shape when force is applied to the handles 43 and 44. The grid member 12 is relatively stiff in a vertical direction, however, because the folded portions 31 of each F-shaped section 40 freely abuts its contiguous transverse wall for the entire height of the grid structure and, therefore, prevents vertical rotation of the longitudinal grid wall members at these points.

After the grid member 12 is removed from the ice tray 11, the handles 43 and 44 are grasped and force applied thereto in a plane coinciding with the horizontal plane of the grid so that the grid is opened up as shown in Fig. 2. Torsional force may also be applied through the handles 43 and 44. All the walls of the grid are, therefore, moved relative to each other and are spread to break the ice bond between the ice cubes 15 and the grid member 12, and all the force applied is useful to spread the walls, since none of the ice cubes 15 are compressed by flexing the grid. It will be obvious that, in flexible grid structures where some of the cubes are compressed by movement of the walls in a given direction, the work required to compress the cubes is useless because such force does not assist in breaking the bond between the ice cubes and the grid. A double row of ice cubes may, therefore, be removed by flexing the grid in one direction, with the aforesaid twisting motion applied if desirable, by my invention.

From the foregoing, it will be apparent that I have provided an improved, relatively inexpensive grid member which is inherently stiff in a vertical direction and in which a double row of ice cubes may be removed by flexing the grid with a minimum of effort required.

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. A removable grid for dividing an ice tray into a plurality of cells for forming ice cubes comprising a single strip of flexible metal bent to form a plurality of vertical transverse walls of double thicknesses of metal, a plurality of vertical longitudinal walls formed of a single thickness of metal connecting adjacent thicknesses of the transverse walls, and a plurality of vertical longitudinal wall members extending between said transverse walls and each comprising two thicknesses of metal bent from said transverse walls and folded adjacent a contiguous transverse wall.

2. A removable grid for dividing an ice tray into a plurality of cells for forming ice cubes comprising a single strip of flexible metal bent to form a plurality of vertical transverse walls of double thicknesses of metal, a plurality of vertical longitudinal walls formed of a single thickness of metal connecting adjacent thicknesses of the transverse walls, and a plurality of vertical longitudinal wall members extending between said transverse walls and each comprising two thicknesses of metal bent from said transverse walls and folded adjacent a contiguous transverse wall, said folded portion of the longitudinal walls of double thicknesses freely abutting the transverse wall to which it is contiguous.

3. A removable grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising walls of flexible sheet metal formed to provide a plurality of vertical transverse partitions of two thicknesses of sheet metal, and a plurality of vertical longitudinally extending partitions extending between said transverse partitions and each comprising two thicknesses of sheet metal extending from one of said transverse partitions and connected adjacent to a contiguous transverse partition, said longitudinal walls freely abutting the latter transverse partition.

4. A removable grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising walls of flexible sheet metal formed to provide a plurality of transverse partitions of two thicknesses of sheet metal, a plurality of vertical longitudinal partitions formed of a single thickness of metal connecting adjacent thicknesses of metal of the transverse partitions at one edge of all of said transverse partitions, and another group of vertical longitudinal partitions extending between said transverse partitions and each comprising two thicknesses of metal extending from said transverse partitions intermediate of their vertical edges and connected to each other adjacent to a contiguous transverse partition.

5. A removable grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising vertical partition walls of flexible sheet metal formed into F-shaped members, the top of each F-shaped member being formed of a single thickness of metal and the remainder of the F-shaped member being formed of double thicknesses of metal.

6. A removable grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising vertical partition walls of flexible sheet metal formed into F-shaped members, the top of each F-shaped member being formed of a single thickness of metal and the remainder

of the F-shaped member being formed of double thicknesses of metal, the outer end of the top of each F-shaped member being connected to the contiguous thickness of metal of the upright portion of the next F-shaped member.

7. A removable grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising vertical partition walls of flexible sheet metal formed into F-shaped members, the top of each F-shaped member being formed of a single thickness of metal and the remainder of the F-shaped member being formed of double thicknesses of metal, the outer end of the top of each F-shaped member being connected to the contiguous thickness of metal of the upright portion of the next F-shaped member, the F-shaped members being otherwise free to move relative to each other.

8. A grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising a plurality of walls extending transversely of the ice tray, a central longitudinal wall structure comprising a plurality of members extending between contiguous transverse walls and each connected to one transverse wall only, and a plurality of flexible members connecting the edges of said transverse walls on one side thereof only, whereby the grid forms a double row of ice cubes which are loosened by flexing the grid in one direction in the horizontal plane thereof.

9. A grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising a plurality of walls extending transversely of the ice tray, a central longitudinal wall structure comprising a plurality of members extending between contiguous transverse walls and each connected to one transverse wall only, a plurality of flexible members connecting the edges of said transverse walls on one side thereof only, whereby the grid forms a double row of ice cubes which are loosened by flexing the grid in the horizontal plane thereof, and means provided on the grid for imparting flexing movement to the grid structure.

10. A grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising a plurality of walls extending transversely of the ice tray, a central longitudinal wall structure comprising a plurality of members extending between contiguous transverse walls and each connected to one transverse wall only, a plurality of flexible members connecting the edges of said transverse walls on one side thereof only, whereby the grid forms a double row of ice cubes which are loosened by flexing the grid in one direction in the horizontal plane thereof, and means provided on the grid for imparting flexing movement thereto comprising handle members attached to the longitudinal ends of the grid.

11. A grid structure for dividing an ice tray into a plurality of cells for forming ice cubes comprising a plurality of vertical walls extending transversely of the ice tray, a central vertical longitudinal wall structure comprising a plurality of members extending between contiguous transverse walls, each of said members being attached to only one of said transverse walls and freely abutting the other contiguous transverse wall for its entire extent, whereby the grid structure is stiffened when force is applied at the ends thereof in a vertical direction, a plurality of members connecting said transverse walls together, and means provided on the grid for removing it from said ice tray by applying vertical lifting force to the ends of said grid and said means being effective for thereafter imparting flexing movement to the grid.

EDWARD H. LUTZ.