Feb. 14, 1950 J. H. ROETHEL 2,497,743

ICE TRAY

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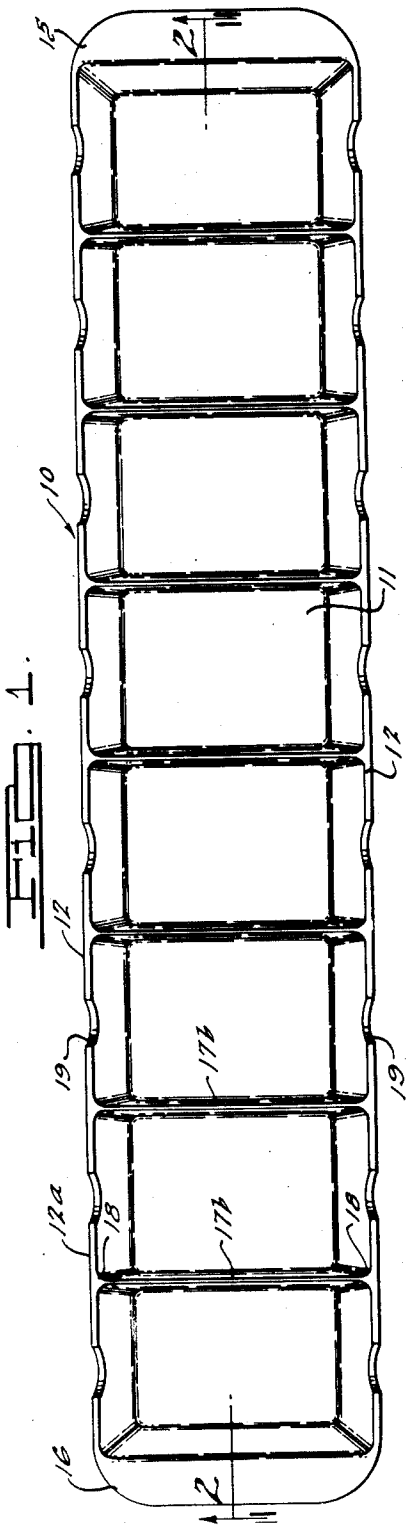


Fig. 1.

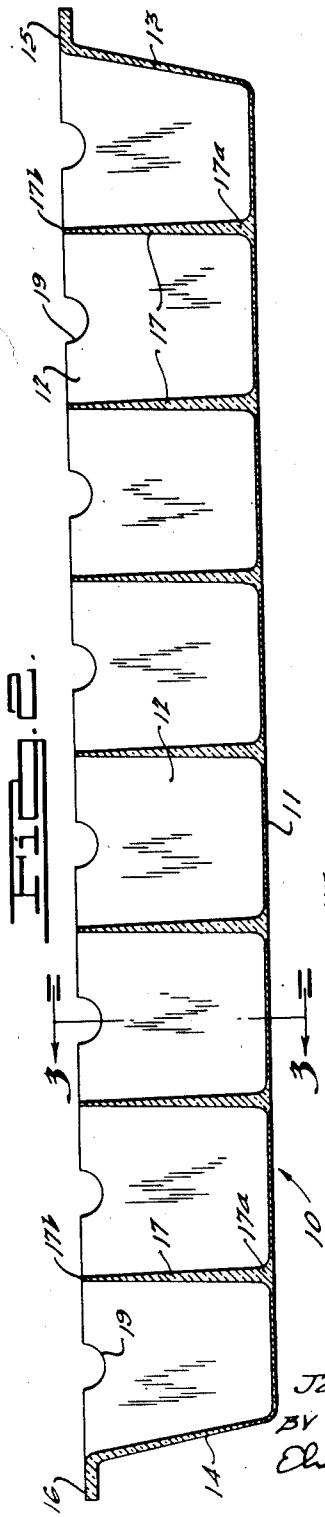


Fig. 2.

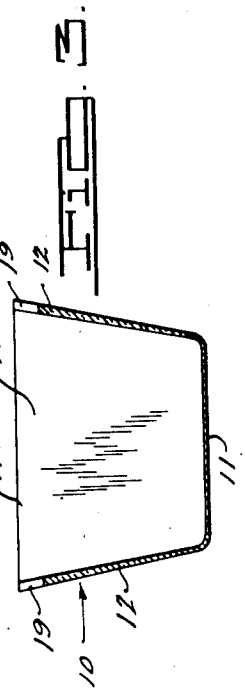


Fig. 3.

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ICE TRAY

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3 Claims. (Cl. 62—108.5)

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This invention relates to liquid freezing trays and particularly to a tray of the general type having a pan-like receptacle within which ice cubes or blocks of frozen substances are molded through the medium of grid or division members connecting the side walls of the tray.

An object of the invention is to provide an ice tray or the like which may be molded as a unit from plastic material, such as polyethylene plastic or the like, to provide transverse grid or divider members joined to the bottom and side walls of the tray, and in which the bottom of the tray may be made relatively thin and capable of providing maximum freezing contact with the evaporator shelf, the improved construction being such as to permit flexing or twisting of the receptacle so as to easily loosen or eject the ice blocks.

A further object of the invention is to form the pan or receptacle of the tray and its transverse grid or divider members in one piece from plastic material, preferably polyethylene or equivalent material, the grid members of the tray being tapered so as to increase in thickness toward the bottom of the tray and the side walls of the tray decreasing in thickness toward the bottom of the tray, thus enabling a thin bottom to be used while facilitating removal of the ice cubes when the tray is flexed or torsionally twisted, the improved construction having the further advantage of assisting in maintaining the tray in proper shape.

Still another object of the invention is to provide the upper edges of the side walls of the tray receptacle with notches or depressed portions which not only serve as overflow openings to control the height of the water level in the tray when filled but also increase the flexibility of the tray to facilitate bending or flexing thereof when removing the ice cubes.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

Fig. 1 is a plan view of an ice tray embodying the present invention.

Fig. 2 is a sectional elevation taken substantially through lines 2—2 of Fig. 1 looking in the direction of the arrows.

Fig. 3 is a section taken substantially through lines 3—3 of Fig. 2 looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

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In the drawings there is illustrated, by way of example, an ice tray comprising a pan-like receptacle adapted to contain water and constructed with a series of transverse grid or dividing members integrally connecting the side walls of the tray or receptacle together and by means of which a number of ice cubes or blocks may be produced when the tray is supported within the ice freezing compartment of a refrigerator.

The pan-like receptacle 10 is generally rectangular in shape and in the present instance is relatively narrow to produce a single row of ice cubes or blocks corresponding in widths to the width of the receptacle. The pan or receptacle 10 is molded in one piece from polyethylene or equivalent plastic material to provide a flat bottom 11 terminating in parallel upright side walls 12 and rear and front upright walls 13 and 14 respectively which are integral with the bottom and extend continuously around the four sides of the tray. The bottom 11 of the receptacle is relatively thin and after merging into the side and end walls 12, 13 and 14 the latter preferably increase in thickness in the direction of the upper edges thereof. These side and end walls are sloped or inclined in an upward direction so as to facilitate the removal of the ice cubes from the tray. The end walls 13 and 14 terminate at their upper edges in outwardly extending flange portions 15 and 16 respectively which are preferably of increased thickness and serve the purpose of handles or hand grips which not only may be grasped to remove the tray from the refrigerator compartment but also may be grasped to facilitate flexing or twisting of the tray in removing or ejecting the cubes therefrom.

The pan shaped receptacle 10 is molded to provide a number of transverse grid or divider members 17 which are integral with the bottom 11 as well as the side walls 12. In the present instance the tray is formed with seven grid or divider members 17 which together with the end walls divide the receptacle into spaces for the production of eight ice cubes or blocks. It will be understood that the tray may be formed with a smaller or larger number of divider strips for

the purpose of producing the desired number of ice cubes. I prefer to utilize an injection molding process for producing in one piece the receptacle 10 and transverse grid or divider members 17. It will be noted that each of the divider members or strips 17 is generally wedge shaped in cross section. The lower edges 17a of the divider strips are joined to the bottom 11 by curved fillets which in effect produce transverse stiffening ribs effective to reinforce the receptacle and enable the bottom 11 to be made quite thin so as to reduce the rate of freezing. Each of the divider strips or members 17 diminishes in thickness toward the upper edge 17b thereof so as to have tapering side walls. By this construction the side walls of each ice cube space formed by two of the divider strips 17 flare or taper upwardly thereby facilitating the ejection of the frozen ice cubes therefrom. It will be apparent, therefore, that by flaring the walls 12 as well as the walls 17 of each freezing space the ice cube may be forced outwardly through the top opening of this space very easily. As illustrated in Fig. 1, the ends of the divider strips 17 are joined to the side walls 12 by curved fillets 18 which in effect form ribs which are continuations of the corresponding rib-like portions along the lower edges of the members 17 and which in like manner reinforce the tray and assist in maintaining the shape thereof after continued use.

In the present embodiment of the invention the upper edges 12a of the side walls of the tray receptacle are formed with notches or depressed portions 19, a pair of these notches being provided centrally of the side wall portions of each freezing space. The notches 19 are of suitable depth and preferably arcuate in configuration, and these notches serve the two purposes of controlling the height of the water level in the tray when filled and of increasing somewhat the flexibility of the side walls of the tray so as to facilitate bending of the tray when it is desired to remove the ice cubes therefrom in this manner. By providing the overflow openings or notches 19 the water level in the tray after filling may be maintained at a level corresponding substantially to the bottoms of the notches, and hence when the water freezes and expands upwardly the frozen ice cubes or blocks will not project upwardly beyond the upper edges of the divider members 17 nor will the ice blocks be joined across the tops of these divider strips so as to interfere with the quick ejection of the ice cubes from the tray.

As previously stated, the receptacle 10 including the divider or grid members 17 is formed in a single injection molding operation from polyethylene plastic or equivalent material. Polyethylene is particularly adapted for use in the fabrication of the present ice tray for the reason that this material has a wax-like surface which is non-wettable by water and, hence, inhibits the adherence of the ice thereto. Polyethylene is not only tough, flexible and substantially unbreakable, even under conditions of hard usage, but will also yield under tension in order to compensate for the expansion of ice upon freezing. After formation of the ice cubes in the tray the cubes may be readily loosened from the bottom and side walls of the freezing spaces upon grasping the flange portions 15 and 16 or the ends of the pan and torsionally twisting, flexing or bending the same. The cubes may also be removed individually from the freezing spaces by

placing the fingers upon the upper edges of the freezing space and the thumbs against the bottom of the space and then applying pressure with the thumbs against the bottom of the freezing space so as to force the ice cube out of the pan. This method of ejecting the cubes individually from the pan is facilitated by reason of the thin flexible character of the bottom wall 11 of the pan and the taper given to all four sides of the freezing space.

I prefer to form the bottom 11 of the pan or receptacle 10 with a wall thickness as low as approximately .030 of an inch. Wall thicknesses ranging from approximately .030 to .040 of an inch are satisfactory for the bottom of the pan, it being understood that the wall thickness of the upright sides and end of the pan increase progressively and uniformly so as to have substantially greater thickness at the upper edges thereof. The wall thicknesses of the upper edges of the side and end walls of the pan may range from approximately .050 to .093 of an inch. This construction together with the rib-like fillets formed along the bottom and side edges of the divider strips 17 afford sufficient form-sustaining rigidity to the tray regardless of the unusual thinness given to the bottom thereof. The divider members 17 may taper to a thickness at the upper edges thereof corresponding substantially to the thickness of the bottom 11. Although the thickness of the bottom 11 of the tray receptacle preferably falls within approximately the foregoing range, it will be understood that a wall thickness from approximately .020 to .065 of an inch will give good results.

I claim:

1. A liquid freezing tray comprising a generally rectangular pan-shaped member formed with a bottom and surrounding upright outer side walls, a plurality of transverse divider strips integrally joined along their bottom and end edges to the bottom and to an opposed pair of said side walls, each strip diminishing in thickness from the lower edge to the upper edge thereof, the upper edges of said opposed outer side walls being formed with a plurality of notches.

2. A liquid freezing device comprising a pan-shaped tray and grid members dividing the tray into a plurality of liquid freezing spaces, the upper edge of an outer side of said tray being formed with depressed portions for controlling the level of liquid in said spaces independently of one another when the tray is filled.

3. A liquid freezing device comprising a pan-shaped tray having a bottom and surrounding upright side walls, and grid means dividing the tray into a plurality of separate liquid freezing compartments, the upper edges of a pair of opposed outer side walls having notches for controlling the level of liquid in said compartments each independently of the others when the tray is filled.

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