Nov. 29, 1938. C. A. BAUER 2,138,058

ICE TRAY

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Fig. 1.

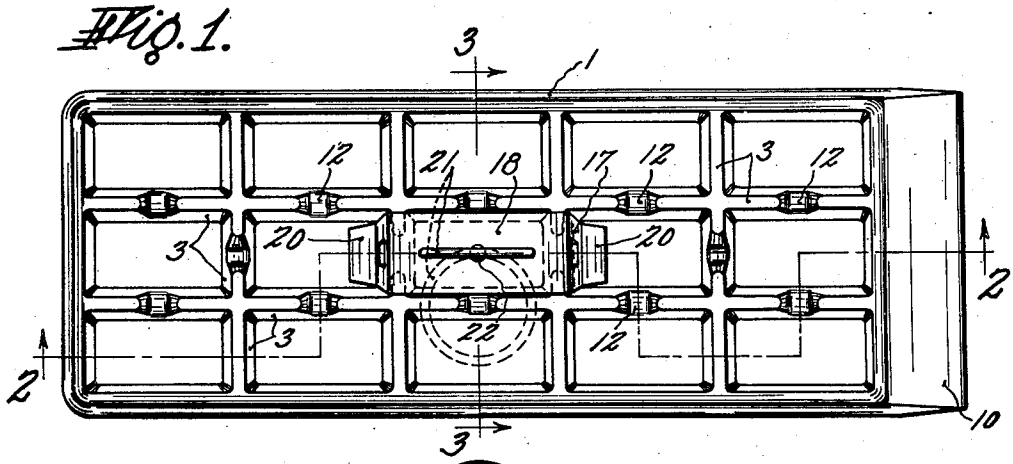


Fig. 2.

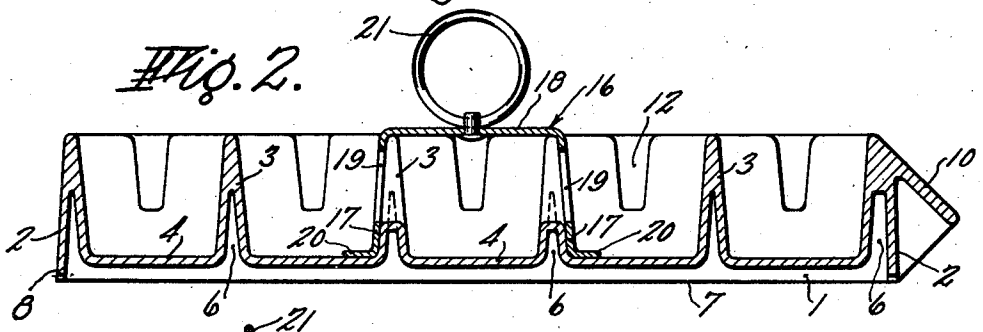


Fig. 3.

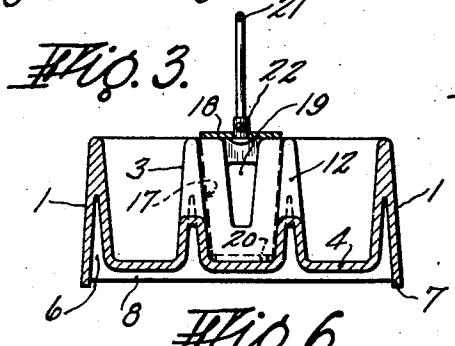


Fig. 4.

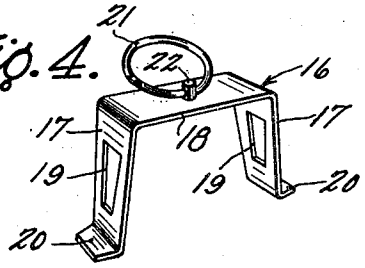


Fig. 6.

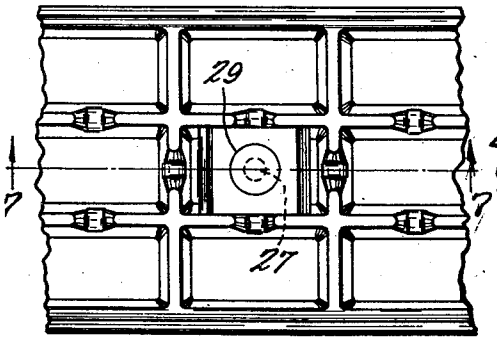
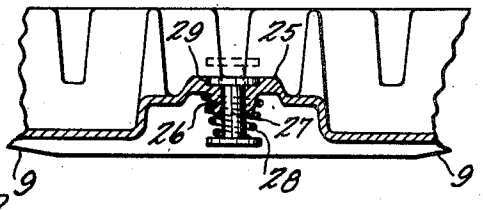


Fig. 7.



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Fig. 5.

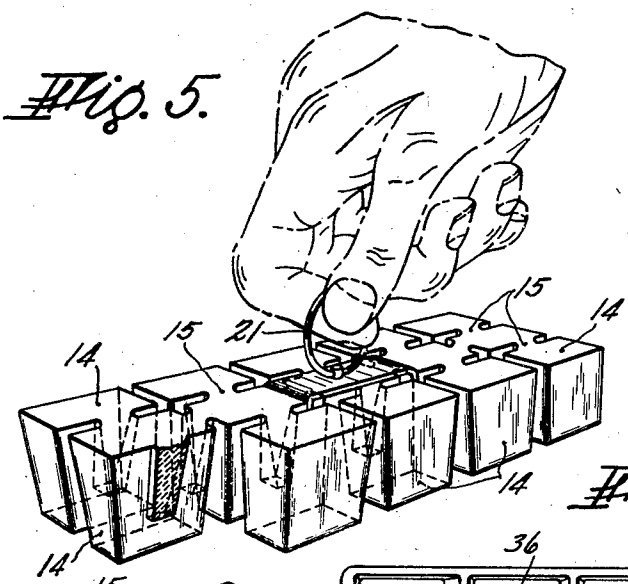


Fig. 8.

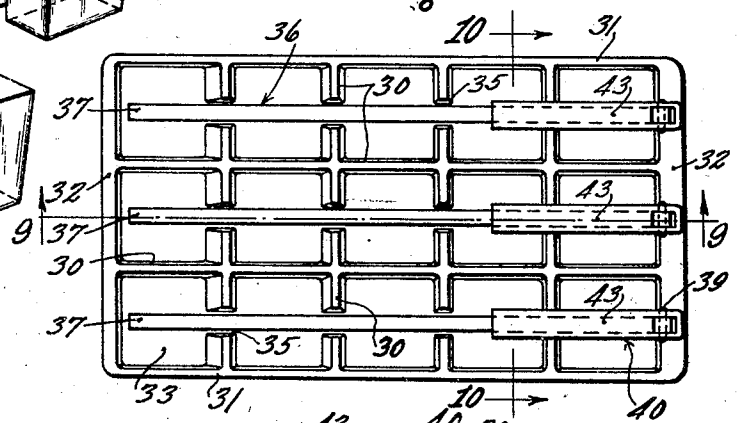


Fig. 9.

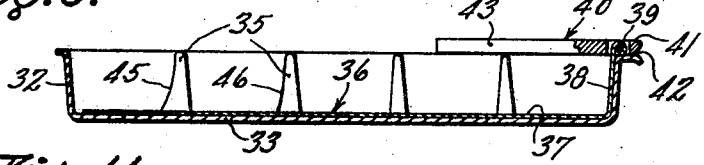


Fig. 11.

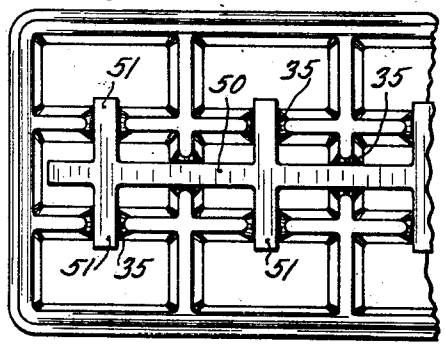
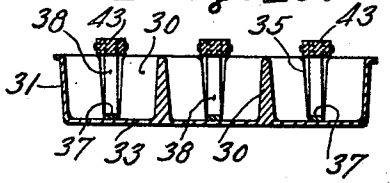


Fig. 10.



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2,138,058

ICE TRAY

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Application May 1, 1935, Serial No. 19,219

5 Claims. (Cl. 62—108.5)

This invention relates to trays or containers for freezing ice in cubes, blocks or similar forms. More particularly it relates to devices of this kind intended for use in freezing relatively small blocks or cubes of ice for use in beverages and for other household purposes.

Among the objects of my invention is to facilitate removal of the frozen cubes from the tray and provide easier handling of the frozen cubes after their removal. My invention also secures greater efficiency in freezing and also minimizes the tendency of the trays to become frozen to the supporting surface in the freezing chamber of the refrigerator.

Other and further objects residing in the construction of the trays, including simplicity of structure and manufacturing economy, will be apparent in the following specification and claims.

In the accompanying drawings,

Fig. 1 is a plan view of a tray constructed according to my invention;

Fig. 2 is a sectional view substantially on line 2—2 of Fig. 1;

Fig. 3 is a sectional view substantially on line 3—3 of Fig. 1;

Fig. 4 is a detail perspective view of the ice lifting member;

Fig. 5 is a perspective view showing one manner of handling the ice blocks;

Fig. 6 is a fragmentary plan view showing a modified form of ice lifting means;

Fig. 7 is a sectional view substantially on line 7—7 of Fig. 6;

Fig. 8 is a plan view of a modification adapted for dry removal of the blocks and the means for effecting such removal;

Fig. 9 is a sectional view substantially on line 9—9 of Fig. 8;

Fig. 10 is a sectional view substantially on line 10—10 of Fig. 8; and

Fig. 11 is a fragmentary plan view showing a modified form of lifting means.

The forms of trays now commonly in use for freezing ice cubes, in most instances comprise an open metal pan of suitable dimensions provided with a separable metal grid or separator which when positioned in the tray divides the latter into compartments of desired size. The compartments are filled with water which freezes as separate blocks. In the simplest form the open pan and loose separator form the complete tray and the only feasible way of removing the frozen cubes is to place the tray in a larger pan of warm water or hold it inverted under a stream of warm water. In either case the first result is to loosen the cubes and separator from the pan as a unit, there being insufficient connection between the separator and the pan so that the heat applied to the latter is transmitted in any substantial degree to the separator. It is now necessary to remove the cubes from the separator and this may be done by letting the separator and cubes stand at room temperature until they drop out or by passing the separator with its enclosed cubes under a stream of warm water. In either case the cubes come out individually and at random and usually at intervals, the outer cubes releasing first. Substantial time is required as well as a disagreeable handling of the cubes, and if only a portion of the cubes are required the excess which have freed themselves are usually wasted as it is difficult to return the cubes to their compartments, due to the unavoidable slight individual irregularities of the compartments, and irregularities in the freezing of the blocks.

Numerous attempts have been made to overcome the above difficulties, one plan suggested being to make the tray, in whole or in part, of flexible rubber so that the cubes may be released by warping the tray without any application of heat. Here again a substantial amount of handling of the cubes is necessary and the rubber tends to give the cubes a disagreeable taste. The relatively poor heat conductivity of the rubber also increases the freezing time. Various mechanical arrangements have been proposed for removing cubes from metal trays by providing means for prying part or all of the separations from the pan but these are cumbersome and expensive to manufacture and have the difficulty, common to all trays with loose separations, that there is poor conductivity between the separator and tray, resulting in impaired freezing efficiency.

All of the above difficulties are overcome by my invention as will be specifically pointed out as the following description of one embodiment of my invention proceeds.

Referring to the drawings, the tray is formed of metal with side members 1, end members 2, separating partitions 3, and bottoms 4 integral with each other. The tray may be cast, die cast, drawn or otherwise manufactured to produce an integral structure. I have found die casting, using an aluminum alloy, is an economical and satisfactory method of manufacture.

As best shown in Fig. 2, the sides, ends and partitions are preferably double walled, provid-

ing spaces 6 opening to the underside of the tray. As also shown in Fig. 2 the outer side and end walls, as indicated at 7 and 8 respectively, extend downwardly below the bottoms 4 of the ice compartments. Preferably the outer end walls 8 do not descend quite to the level of the edges of the sides 7 (see Fig. 3) so that when the tray is placed in the freezing chamber of the refrigerator it rests on the side edges only, and the troublesome tendency of such trays to freeze to the floor of the chamber and resist removal therefrom is minimized. By slightly tapering, or otherwise cutting back the sides, toward the ends as shown at 9 in Fig. 7, the tendency of the tray to freeze to the chamber floor is further reduced. A similar result would be obtained by letting the ends extend below the sides but in the form shown a more advantageous leverage is obtained and this form has further advantages later pointed out. Removal of the tray from the freezing chamber, as well as its insertion therein, is further facilitated by the handle flange 10 formed at one end of the tray.

Certain of the partitions 3 are provided with notches 12 extending downwardly from their upper edges providing communications from each compartment to at least one of the adjacent compartments so that each ice block 14 is connected by a fin 15 to at least one of the adjacent blocks as best shown in Fig. 5. As will be clear from the drawings the sides of the compartments as well as the edges of the notches 12 are flared outwardly from the bottom. The notches 12 may be of any suitable depth. As shown in Figs. 1, 2 and 3, the notches 12 do not extend to the bottom of the compartments but in some cases there is an advantage in making them the full depth of the compartments, as later explained in connection with the modification shown in Figs. 8 to 11.

To facilitate removal of the blocks from the tray and their handling after removal, as will be described shortly, I preferably provide a member generally indicated at 16. This member comprises a flat piece of metal bent into inverted U-shape to provide legs 17 connected by a transverse bridge portion 18. The legs 17 are shaped to substantially conform to the end faces of the ice compartments, see Figs. 1 and 3, and the bridge portion 18 is of a length such that the member 16 straddles one compartment lengthwise to position the legs against the adjacent end face of the adjacent compartments as shown in Fig. 2. The legs 17 are provided with openings 19 coinciding with the notches 12 of the straddled partitions so that the connection of the straddled block to the adjacent blocks is not impaired. The legs 17 may if desired be provided with out-turned feet 20 to extend slightly under the adjacent blocks, but the engagement of the under side of the fins 15 by the portions of the legs below the openings 19 is normally sufficient for the removal of the block assembly. The member 16 is provided with a ring 21 turning in a stud 22, riveted or otherwise secured to the bridge 18. When the tray is placed in the freezing chamber or otherwise stored the ring lies flat in the position shown in dotted lines in Fig. 1, but turns freely into vertical position when used to raise the ice blocks as later described.

One procedure for removing the frozen blocks from the tray is to invert the latter and hold it beneath a stream of warm or hot water, as for example beneath an open faucet, until the spaces 6 are filled and the water covers the bottoms of the compartment due to the rim afforded by the extension of the outer walls of the sides and ends. The water is then poured out by righting the tray. The fact that the outer end walls are of slightly less depth than the sides permits the under side of the tray to be filled with water and the water poured out at the end without substantial wetting of the hands as the tray is most conveniently grasped at the sides. If the water is reasonably warm, by the time the under side of the tray has been filled, the water poured off, and the tray righted the heat has been transmitted through the walls sufficiently to free the ice, and the blocks as a unit may be lifted from the tray as shown in Fig. 5 by means of member 16 and ring 21. The desired number of cubes may easily be broken or twisted off with the fingers or knocked off with a knife handle or the like, as indicated in the latter figure, and the remainder returned to the tray. Since the unused blocks are still fastened together they are easily returned to their original compartments. If desired the removal may be effected by placing the tray in a pan filled to a suitable depth with warm water, and as soon as the blocks are freed they are lifted out as before.

It will thus be seen that by means of the structure described, the ice blocks are removed with a minimum of manipulation and handling, and if reasonable care is used, without any substantial wetting of the hands.

The structure is capable of substantial variation in use and is not in any sense limited to the procedures above described. For example, the member 16 may be omitted, and, after warming, the tray simply inverted on a plate or other surface, the block assembly being permitted to drop out. This procedure may be preferable when all of the ice blocks are to be used immediately and the possibility of this procedure emphasizes the following advantages in my tray construction. Since the tray is of integral construction there is uniform conductivity to all surfaces of the ice and all cubes are released simultaneously, and since the blocks are connected together there is no scattering of the blocks. The slight inclination or draft given the compartment walls and the edges of the notches 12 prevents any tendency of the blocks to lock themselves in the compartments.

The uniform conductivity resulting from the integral structure of the tray not only assures simultaneous release of the blocks but promotes efficient freezing since freezing starts and progresses from all surfaces of the compartments whereas in trays with separable partitions the heat transference between the body of the tray and the loose partitions is poor and the freezing starts and progresses from the outside faces of the outer blocks.

The extent and formation of the recesses 6 may be varied from that shown and the advantages of the connected assembly of the blocks may be secured although the integral sides and partitions are single-walled and their longitudinal conductivity alone is relied on to release the blocks, when combined with a water retaining rim about the bottom of the tray.

In Figs. 6 and 7 is shown an alternative means for raising the ice block assembly from the tray. As there shown the bottom 25 of the center compartment is raised and provided with a downwardly extending boss 26 in which a double-headed pin 27 is mounted for a limited vertical movement. A spring 28 positioned between the

lower head and the bottom of the tray normally maintains the pin in lower position. The bottom 25 is provided with a recess 29 in which the upper head seats flush with the surface of the bottom of the compartment. To avoid entrapping a pocket of air if the block of ice is returned to the compartment the raised bottom 25, or at least a portion of it, should not be below the bottom of the notches 12 at the sides of the compartment and the raised portion should extend from side to side (or end to end) of the compartment as best shown in Fig. 6. As will be obvious after the ice blocks have been released by the application of warm water as previously described, pressure applied to pin 27 to move it into the position shown in dotted lines in Fig. 7 will raise the ice block assembly from the tray into position for removal.

Above I have described my invention with special reference to novel means for applying heat for the loosening of the block assembly but certain features of my invention are equally well adapted to other means of releasing the block assembly from their compartments as will now be discussed with reference to Figs. 8 to 11 inclusive.

In the latter figures the trays are shown of single thickness as water receiving recesses are unnecessary but it will be understood that the tray arrangement and lifting means of these figures could be applied in substance to the tray shown in Figs. 1, 2 and 3 and one or more features of both arrangements combined to supplement each other or to give the user a wider choice in methods of manipulation.

Referring to Figs. 8, 9, 10 and 11 the tray is shown with partitions 30, integral with the sides 31, ends 32 and bottom 33 of the tray. The notches 35, corresponding to notches 12, are carried to the bottom of the compartments and in the form shown in Fig. 8 are arranged to connect the blocks endwise only, to form three independent assemblies or files of ice blocks. The surfaces of the compartments and the edges of the notches are inclined to give a lift. A generally L-shaped flat strip or bar of stiff metal 36 is positioned in the tray with its long member 37 lying along the bottom of the tray in the notches 35 and with its short member 38 extending upwardly at one end of the tray. The upper end of the member 38 is pivoted at 39 to a lever 40. The pivot point 39 is closely adjacent the outer end of the lever 40 dividing the latter into a short arm 41 resting on the edge 42 of the tray and a long arm 43 normally extending inwardly over the tray. Lifting the long arm 43 tilts the strip 36 upwardly, the short arm 41 sliding slightly over the curved edge 42 of the tray. As will be obvious the ratio of the length of arm 43 to 41 and the movement of arm 41 sliding over curve 42 gives a large leverage which tilts the overlying ice block assembly from the tray. To accommodate the tilting of the blocks the end walls of the two compartments at the end remote from the pivot point are curved as indicated at 45 and 46 to prevent binding of the blocks as they are raised. The degree of curvature required is greatest in the end compartment and in practice the curving of the walls need not be carried beyond the second compartment for a tray of normal length and depth and with the other partitions given a normal lift as shown.

While the tray shown in Fig. 8 is formed with three files of compartments each provided with a lifter strip 36, a single lifter may be employed as shown in Fig. 11, in which case the arrangement of the notches 35 is the same as that of the notches 12 in Fig. 1, the notches 35 however extending to the bottom of the compartment. The single lifting strip 50, which is positioned in the center file, is provided with transverse projections 51 lying in the notches connecting the outer file of blocks to the center file. As will be obvious tilting of the lifter 50 tilts the entire block assembly from the tray.

If desired, a member such as 16 in Fig. 4 may be inserted in the trays of Figs. 8 and 11 to facilitate handling of the block assembly after its removal from the tray.

It will be understood that with respect to all of the forms of tray shown, the number of files, and the size and shape of the ice compartments and the trays may be varied from that shown without departing from the scope of my invention.

I claim:

1. A device for freezing a plurality of ice blocks which comprises a rigid tray provided with rigid partitions dividing the tray into a plurality of compartments, all of said partitions forming a permanent and inseparable part of the tray, at least a portion of said partitions being provided with notches to provide communication between each compartment and at least one adjacent compartment, whereby the ice blocks frozen in the compartments are connected together in a unitary assembly by webs of ice formed in the notches, and a rigid member positioned to underlie a portion of said block assembly, said member including a portion extending exteriorly of the tray by which said member can be moved to raise the overlying portion of the ice block assembly with respect to the tray, said notches being of such size that the ice webs formed therein have sufficient strength so that the entire assembly is raised as a unit by the upward movement of said member.

2. A device for freezing a plurality of ice blocks which comprises a rigid tray provided with rigid partitions dividing the tray into a plurality of compartments, all of said partitions forming a permanent and inseparable part of the tray, at least a portion of said partitions being provided with notches to provide communication between each compartment and at least one adjacent compartment, whereby the ice blocks frozen in the compartments are connected together in a unitary assembly by webs of ice formed in the notches, a rigid flat member extending down a wall of at least one compartment and beneath a portion of the ice block therein, and means connected to the upper end of said flat member exteriorly of the tray by which said flat member may be raised to raise the overlying portion of the ice block assembly with respect to the tray, said notches being of such size that the ice webs formed therein have sufficient strength so that the entire assembly is raised as a unit by the upward movement of said member.

3. A device for freezing a plurality of ice blocks which comprises a rigid tray provided with rigid partitions dividing the tray into a plurality of compartments, all of said partitions forming a permanent and inseparable part of the tray, at least a portion of said partitions being provided with notches to provide communication between each compartment and at least one adjacent compartment, whereby the ice blocks frozen in the compartments are connected together in a unitary assembly by webs of ice formed in the notches, and a rigid flat member having one end extending down a wall of one of the compartments and at least partially beneath the ice block therein,

a portion of said member extending exteriorly of the tray and fulcrumed on an edge thereof to permit raising said member, said notches being of such size that the ice webs formed therein have sufficient strength so that the entire assembly is raised as a unit by the upward movement of said member.

4. A device for freezing a plurality of ice blocks which comprises a rigid tray, rigid partitions dividing the tray into a file of compartments, all of said partitions forming a permanent and inseparable part of the tray, said partitions being provided with aligned notches extending to the bottom of the compartments whereby the ice blocks frozen in the compartments are connected together in a unitary assembly by webs of ice formed in the notches, a thin rigid flat member extending lengthwise of the file of compartments at the bottom of the notches, and having a portion extending upwardly against an end wall of the tray and means connected to the upper end of said portion to raise said member with respect to the tray, said notches being of such size that the ice webs formed therein have sufficient strength so that the entire assembly is raised as a unit by the upward movement of said member.

5. A device for freezing a plurality of ice blocks which comprises a tray, partitions dividing the tray into a plurality of compartments, all of said partitions forming a permanent, rigid, and inseparable part of the tray, at least a portion of the partitions being provided with notches to provide communication between each compartment and at least one adjacent compartment, a member bridging one of said compartments and provided with downwardly extending leg portions engaging in the adjacent compartments, said leg portions being formed with openings conforming with the notches in the adjacent partitions, and a lifting handle secured to said member, said notches being of such size that the ice webs formed therein have sufficient strength so that the entire assembly is raised as a unit by the upward movement of said member.

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