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ICE TRAY HARVESTING APPARATUS

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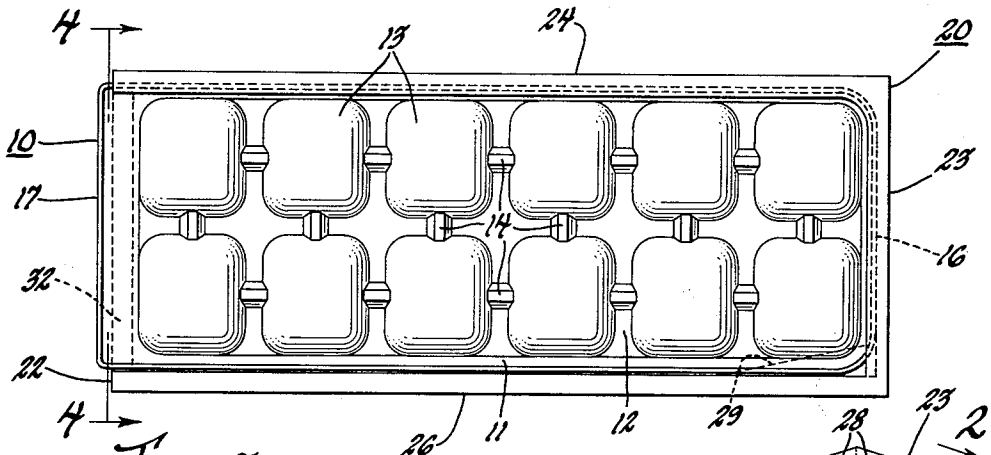



Fig. 3

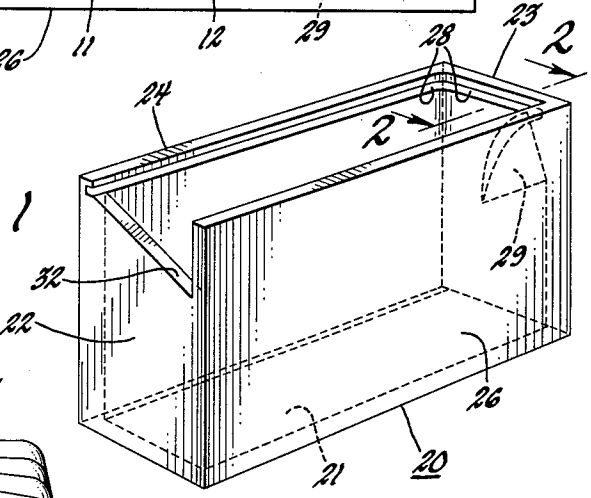



Fig. 1

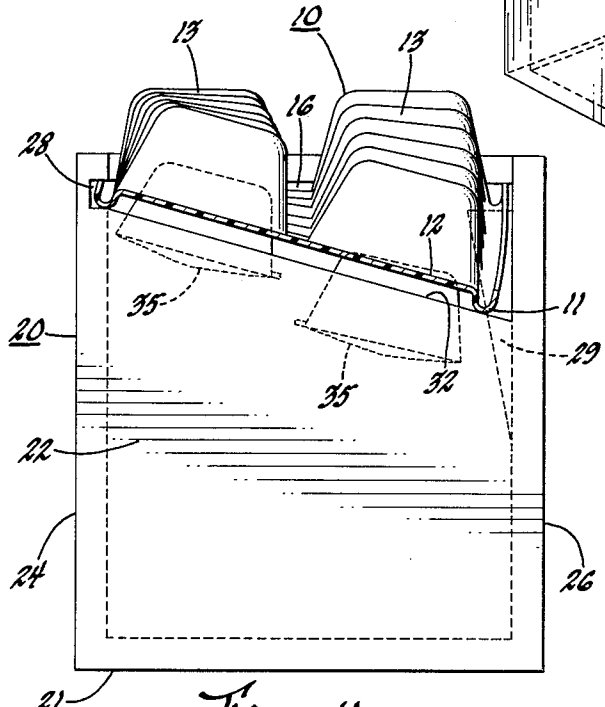



Fig. 4

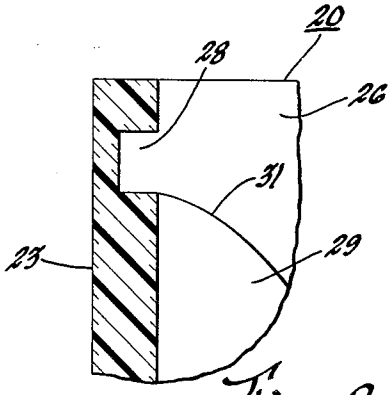



Fig. 2

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# ICE TRAY HARVESTING APPARATUS

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This invention relates to refrigeration and particularly to an ice harvesting apparatus or combination for use within and without houshold refrigerator cabinets to effect ejection of ice blocks from a water freezing tray into an ice storage receptacle of the combination.

It has recently been proposed to invertedly support three corners of a flexible ice tray on the open top portion of an ice storage bucket or receptacle and to manually depress the free or unsupported fourth corner of the tray to flex same and longitudinally twist the tray for ejecting ice blocks out of compartments thereof into the receptacle. As an example of such proposal the R. C. Voigtmann Patent No. 3,053,059 issued September 11, 1962 is referred to for a better understanding of the invention herein described. Flexible ice trays, irrespective of the material of which they are formed, particularly those molded of high density linear polyethylene are known to possess fragile characteristics and other characteristics inherently providing same with a safe normal range of resiliency or flexibility which automatically returns them to their original state or shape after being flexed and twisted. An ice tray of this type if distorted beyond its normal range of resiliency will then be abnormally or permanently warped causing an end thereof to be out of alignment with its opposite end. It has been the practice to realign ends of such a tray, in order that it may be filled with water to a uniform level therein and also so that it will rest in a flat condition on a freezing support, by flexing and twisting same a greater distance in an opposite direction to the initial abnormal warpage imparted thereto. However, several such acts of excessive reverse flexing and twisting of a flexible tray diminishes or destroys its resilience and frequently causes walls thereof to crack or to be ruptured thus rendering the tray incapable of retaining water. A user of a refrigerator equipped with trays of this type is thereby required to periodically purchase new trays to replace those in which their resilience has been destroyed or those damaged. I contemplate an improvement in the art of a tray and ice storage receptacle combination which is used to eject ice blocks from the tray supported on the receptacle thereinto by flexing and twisting the tray, which improvement not only overcomes damaging the tray but also prolongs its operational life to thereby render a combination of this nature substantially infallible and practical.

An object of my invention is to provide an ice tray member and portable ice storage receptacle member type ice harvesting apparatus or combination wherein the tray member is placed in an inverted position upon the receptacle member and twisted to eject ice blocks from the tray into the receptacle with means on one of the members engageable by the other member for preventing flexing of the tray beyond that necessary to remove ice blocks therefrom so that the tray will not be abnormally and/or permanently distorted.

In carrying out the foregoing object it is another and more specific object of my invention to provide a stop means associated with a flexible resilient ice tray and ice storage receptacle type ice harvesting combination for limiting flexure and twisting of the tray during ejection of ice blocks therefrom into the receptacle to a point within a normal inherent range of resiliency of the tray whereby same retains sufficient resilence after being flexed and twisted to automatically return its flexed portions back into their nonflexed state without use of additional biasing or returning means.



Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a perspective view of an ice block storage receptacle member of the present ice harvesting apparatus or combination;

FIGURE 2 is an enlarged fragmentary vertical sectional view taken on the line 2—2 of FIGURE 1 showing a guide on the receptacle member;

FIGURE 3 is a top plan view of a flexible ice tray member invertedly supported in a single flat plane upon the receptacle member of the present combination; and

FIGURE 4 is a vertical sectional view through a portion of the tray member illustrating its cooperation with the receptacle member when flexed and twisted in ejecting ice blocks from the tray into the receptacle and is taken on the line 4—4 of FIGURE 3 showing stop means on the receptacle front wall for limiting flexure of the tray.

Referring to the drawings, I show a four-cornered elongated freezing device or ice tray member **10** preferably, although not necessarily, formed of a high density linear polyethylene which is provided with an integral top somewhat rigidified bounding reinforcing rim **11** of arcuate shape in cross section and the tray is illustrated in FIGURES 3 and 4 as being invertedly supported wholly in a single horizontal plane on the upper portion of a substantially rectangular ice block storage bucket or receptacle member to be hereinafter described. Ice tray member **10** is water repellant, flexible and resilient and therefore especially suited for use in my ice harvesting combination. The bounding rim **11** on tray member **10** will maintain the general rectilinear configuration of the tray upon flexing and twisting same as will be presently described. Rim **11** rises above a flat wall portion **12** of the tray member **10** and is resistive to sagging and yet can be longitudinally flexed or twisted. Tray member **10** has a plurality of walls formed integral with its flat wall portion **12** and depending therefrom to define the bottom and upstanding sides of rows of individual or spaced-apart ice molds, pockets or compartments **13**. The bottom of compartments **13** may be curvilinear at least in one direction thereacross and sides of these compartments diverge upwardly from their bottom to assist in ejecting ice blocks out of the compartments. Channels **14** are formed in the flat wall portion **12** of tray **10** and extend between each of the pockets or compartments **13** to provide weirs interconnecting them and which serve to disperse incoming water to the tray uniformly to the compartments upon filling the tray or freezing device. It should be noted that in the freezing device or tray **10** here disclosed walls, pockets or compartments **13** are located rather close to rim **11** at the rear end **16** thereof and that the compartments are spaced a substantial distance from rim **11** at the front end **17** of the tray. This serves, in addition to permitting ejection of ice blocks out of front compartments **13** without interference by a front wall of a receptacle upon which the tray is to be invertedly supported, to provide tray **10** with a front handle-like portion for facilitating handling, inverting and positioning of the tray into association with a receptacle. A freezing device or tray as herein briefly described is conventional and well known to those skilled in the art and tray member **10** forms a component of my ice harvesting apparatus or combination which is a portable unit placeable into and removable from a chamber of a refrigerator cabinet and also usable either within or outside the refrigerator cabinet.

The other component of the present ice harvesting apparatus or combination comprises or includes a rectangular ice block storage bucket or receptacle member generally represented by the reference numeral 20. Receptacle member 20 is preferably a molded plastic open top box-like structure having a base 21, upstanding front and back end walls 22 and 23 and two opposite long side walls 24 and 26. The one side wall 24 and back wall 23 of receptacle member 20 are provided with a groove 28 which extends continuously across these two walls only and forms support means carried by and having all portions thereof immovable relative to one another and to the portable unit or receptacle component of my apparatus or combination. In other words, the support means is stationary on member 20 and extends in a single horizontal plane along the one side 24 and the adjoining end wall 23 thereof. An upwardly inclined or angular boss 29 is integrally formed on the rear inner surface of the one long side wall 26 of receptacle 20 with its upper portion terminated at the lower ledge part of groove 28 in the back wall 23. The upper portion of boss 29 is curved as at 31 (see FIGURE 2) to provide a guide for a purpose to be hereinafter described. It is to be noted that the top of front end wall 22 of receptacle member 20 (see FIGURES 1 and 4) terminates on the side 24 of the receptacle at the lower ledge of the tray support means or groove 28 and is downwardly inclined as at 32 toward the opposite long side 26 of the receptacle. The portion 32 of front wall 22 of receptacle member 20 provides or forms a stop means on the member separate from the support means thereon and spaced out of or below the single horizontal plane thereof. Insofar as my invention is concerned a stop means could be formed on a part of tray member 10 for engagement with receptacle member 20 but the present location of stop means 32 is preferred. It is also to be noted that the tray member 10 is intentionally constructed to be slightly longer than ice storage receptacle member 20 (see FIGURE 3) and that its width is substantially equal to or preferably slightly less than the distance from the inner surface of side wall 26 of the receptacle to the upright side wall portion of groove 28 in receptacle wall 24 (see FIGURES 3 and 4) for reasons to hereinafter become apparent.

Assume that a supply of ice blocks is needed to chill salads or drinks in glasses, a freezing device or elongated tray member 10 with ice blocks frozen in compartments 13 thereof is removed from a chamber of a refrigerator cabinet, inverted and its rim 11 on one side of the tray placed in alignment with the tray supporting means or groove 28 on or in receptacle wall 24 at the front 22 of storage receptacle member 20 with rim 11 on the other side of the tray located inwardly of the receptacle side wall 26. Tray 10 being so associated with the receptacle member 20 is then shifted toward the back wall 23 of this member and the curved or rounded upper portion of boss 29 guides the rear tray corner opposite groove 28 in receptacle wall 24 into the portion of groove 28 in receptacle back wall 23 while the tray rim 11 is fitted in and supported on other portions of the groove or support means on receptacle 20 as shown in FIGURE 3 of the drawings. In this fashion a side and an end of tray 10 or three corners of the four-cornered tray are supported in a single horizontal plane in an inverted position on the support means on ice storage receptacle 20 with its front end overlapping the stop means 32 on front wall 22 thereof and with its one front or fourth corner adjacent wall 26 of the receptacle or portable unit relieved of support thereby. This relieved or free unsupported fourth corner of tray 10 is now flexible out of the single horizontal plane of support of other corners of the tray such as by a manual force applied in the vicinity thereof or adjacent thereto. For example, a downward force applied to the unsupported fourth corner of tray 10 flexes portions of the tray downwardly into receptacle 20 along its wall 26 toward the stop means 32 on front wall 22 thereof and longitudinally twists the tray as shown in FIGURE 4 of the drawings. This amount of flexing and twisting of tray 10 is predetermined and is ample to shift walls of compartments 13 relative to one another for resiliently and momentarily distorting the compartments and loosening ice blocks from walls thereof whereby the ice blocks, indicated by the dotted lines at 35 in FIGURE 4, are ejected downwardly therefrom into the ice storage receptacle member 20. Removal of ice blocks from tray 10 of the present ice harvesting apparatus into a receptacle 20 may be carried out within a chamber of the refrigerator cabinet and/or outside the cabinet at a point remote therefrom. Stop means 32 being in the path of flexure of the one free or unsupported fourth corner of tray 10 is directly engaged thereby to prevent abnormal distortion of the tray beyond the stop. Since the flexing movement of portions of tray 10 from the plane of support to stop means 32 is predetermined, to be stopped by the stop means at a point within a safe normal range of resiliency of the resilient tray, impartation thereto of an abnormal and/or permanent distortion is avoided. Tray 10 therefore inherently retains sufficient resilience to biasingly or automatically return its fourth corner and other of its flexed and twisted portions back into the plane of its three corners or the plane of its horizontally supported portions while positioned on ice storage receptacle 20 when the flexing force is released from the tray. By so limiting and preventing abnormal distortion of tray 10 no excessive distortion thereof can occur and the necessity of reversely flexing same and causing damage thereto is eliminated. Therefore tray member 10 retains or maintains a normal operational resilience over a long period of time to thereby assure automatic return of flexed portions thereof to their original unflexed state without the aid or in the absence of additional returning means therefor.



It should, in view of the foregoing, be apparent that I have made an improvement invention which by limiting flexure of a flexible resilient ice tray to within a normal range of resiliency thereof the tray is prevented from being abnormally and/or permanently warped or distorted and therefore no occasion arises to remove abnormal distortions therefrom which might damage same. By my invention operational usage of the tray in conjunction with a portable ice storage receptacle for ejecting ice blocks from the tray into the receptacle is prolonged to thereby render an ice block harvesting apparatus of the type disclosed practical. My invention eliminates an existing fallacy in known ice block harvesting combinations of the character described and by such elimination a user thereof is not burdened with the expense of frequently purchasing replacement trays. The ice block ejecting and harvesting apparatus or combination herein disclosed is of simplified construction, highly effective and of low manufacturing cost.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. An ice harvesting combination for use within and outside a refrigerator cabinet comprising:

(*a*) a rectangular receptacle having support means carried thereby and immovable relative thereto forming a portable ice storage unit for placement into and removal from a refrigerator cabinet,

(*b*) a flexible four-cornered tray provided with walls forming a row of compartments therein and adapted to be received by said support means on the portable unit,

(*c*) said support means being located within said receptacle and including portions located at each of three corners of said rectangular receptacle all spaced from the fourth corner thereof for supporting and holding three corners of the four-cornered tray in an inverted horizontal plane thereon,

(*d*) said receptacle having a downwardly inclined upper

edge portion that is overlapped by a fourth corner of said tray so that said tray can be flexed downwardly at the fourth corner thereof out of said horizontal plane inwardly of said receptacle by a force applied adjacent said fourth tray corner for twisting said tray and distorting said compartments thereof with respect to one another to eject material supported therein into the interior of said receptacle,

(*e*) said inclined upper edge having portions thereof located below the plane of said support means for direct engagement by the fourth corner of said tray during flexing thereof, and

(*f*) said inclined upper edge upon being engaged by said tray limiting twisting thereof to a point within its normal range of resiliency for preventing permanent distortion of the tray whereby said tray retains sufficient resilience to return its flexed twisted portions back into said horizontal plane on the unit automatically in response to releasing said force,

(*g*) said support means including means for securing said three corners of said tray in said horizontal plane during twisting thereof produced by downward flexure of said fourth tray corner.

2. An ice harvesting combination for use within and/or outside a refrigerator cabinet comprising:

(*a*) a five-walled open top box-like structure having support means thereon adjacent the open top thereof immovable relative thereto forming a portable ice storage receptacle,

(*b*) a flexible resilient four-cornered tray including a plurality of walls for forming compartments therein and adapted to be received by said support means on the portable receptacle,

(*c*) said support means including portions at one upstanding side wall and at the upstanding adjoining back wall of said box-like receptacle spaced from one corner of an upstanding front wall thereof for supporting a side and a rear end of said tray in an inverted position on the receptacle and holding said supported side and rear end of the tray stationary



thereon in a single plane with a front end of said tray in overlapping relationship to said upstanding front wall of said receptacle,

(*d*) the top edge of said front wall of the box-like receptacle structure being inclined downwardly from said support means at said one side wall thereof to its other side wall for relieving that overlapping front corner of the tray disposed above said one corner of the front wall of said receptacle and the side of the tray opposite its supported side from support thereby,

(*e*) said inclined top edge of the upstanding front wall of said receptacle structure providing a stop means thereon at said one front corner of the receptacle,

(*f*) said relieved front end and opposite side of said tray being movable beyond said single plane while said supported side and rear end thereof are held on said support means by a downward force applied directly to the inverted tray in the vicinity of its said unsupported front corner to twist portions of said tray and shift opposed walls of each of said compartments therein with respect to one another for loosening ice blocks therefrom and ejecting them out of the compartments into said box-like receptacle structure, and

(*g*) said unsupported front corner of said twisted tray engaging said stop means for limiting twisting of the tray to within its normal range of resiliency and for preventing abnormal distortion thereof whereby when the force is released from said tray it possesses sufficient resilience to return twisted portions thereof back into said single plane on the portable receptacle.

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