

Feb. 13, 1940.

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2,190,502

ICE TRAY

Filed May 7, 1938

3 Sheets-Sheet 1

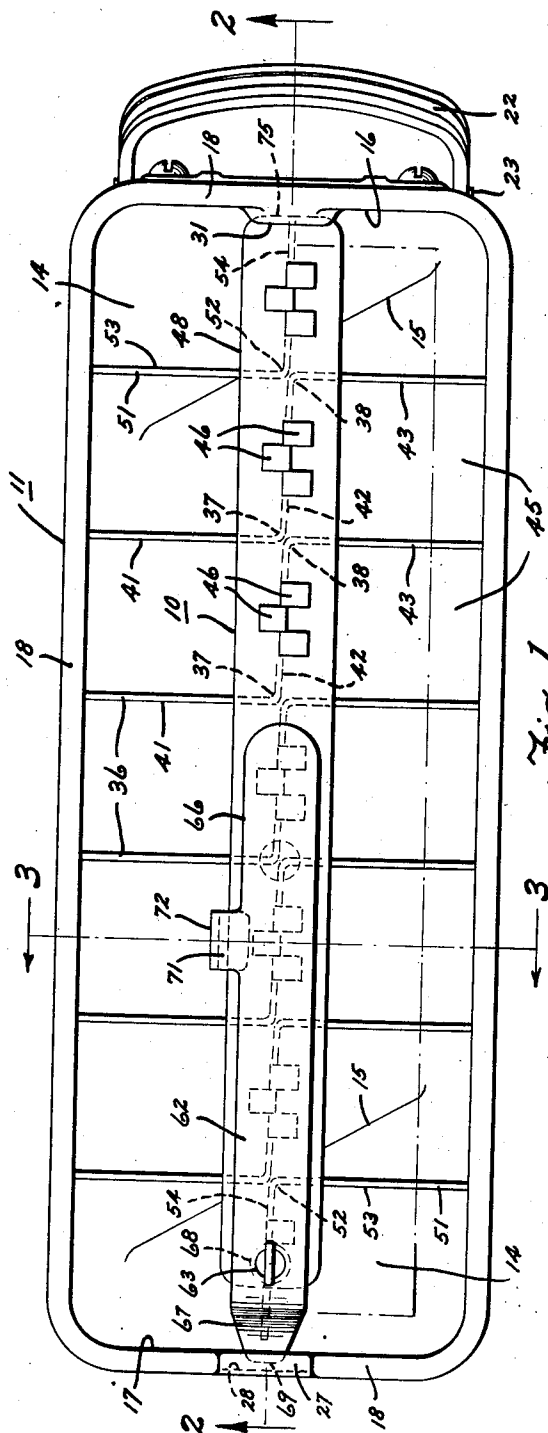


Fig. 1

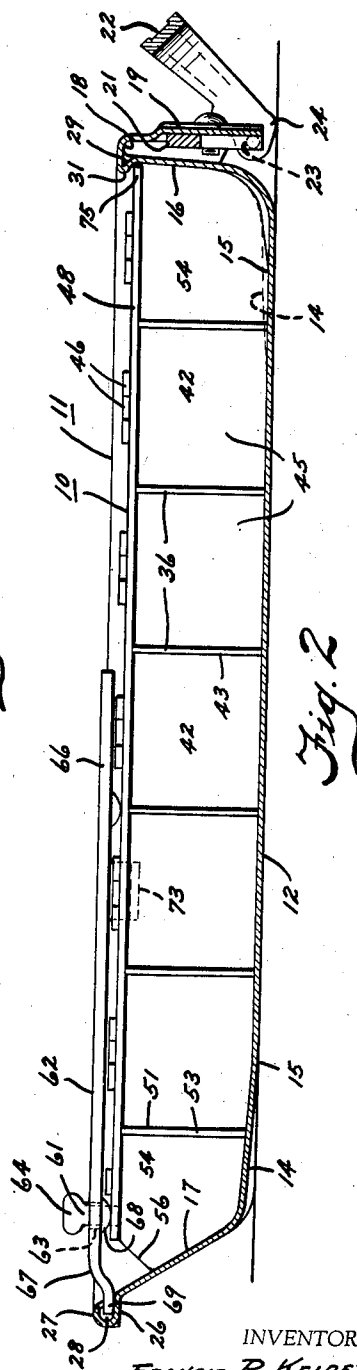


Fig. 2

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3 Sheets-Sheet 2

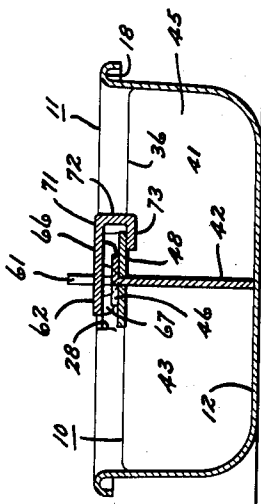


Fig. 3

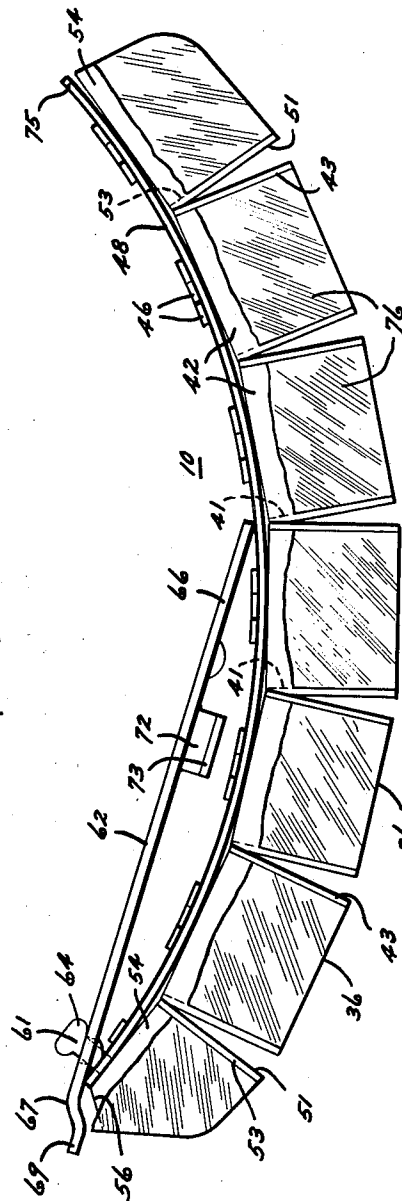


Fig. 6

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3 Sheets-Sheet 3

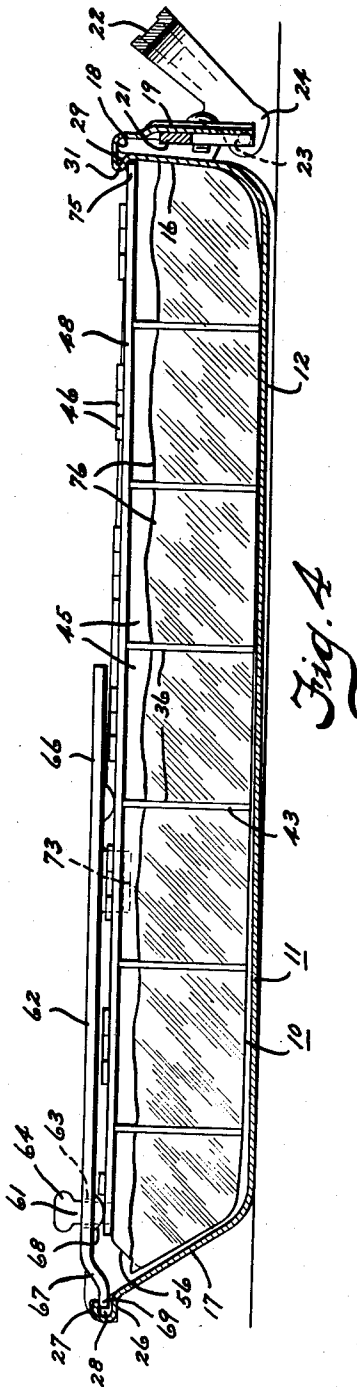


Fig. 4

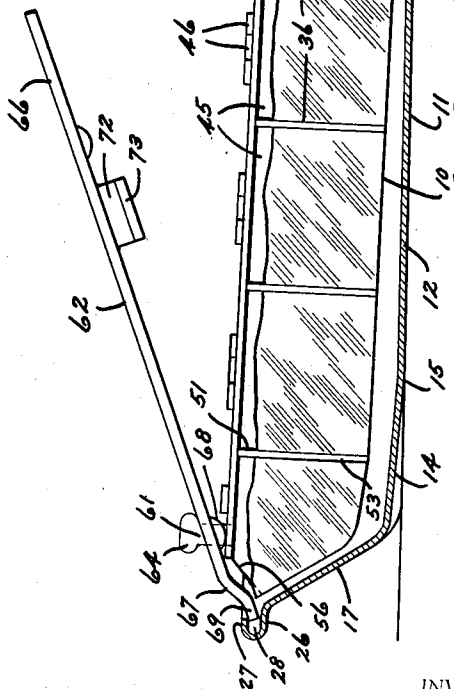


Fig. 5

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UNITED STATES PATENT OFFICE

2,190,502

ICE TRAY

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Application May 7, 1938, Serial No. 206,613

3 Claims. (Cl. 62—108.5)

This invention relates to grids or molds and is particularly adapted for use in trays of liquid freezing devices employed in household refrigerators.

5 An object of my invention is to provide an improved grid structure for disposition in an ice tray to divide the tray into a plurality of ice block molds or compartments and a novel method of removing the grid from the tray and ice blocks
10 from the grid structure without the application of artificial heat.

Another object of my invention is to provide an improved grid structure for disposition in an ice tray which is removable therefrom as a unit
15 to remove ice blocks from the tray and which includes a backbone member that can be readily flexed after the grid has been removed from the tray to facilitate the liberation of ice blocks from the grid structure.

20 Another object of my invention is to provide an improved grid structure for an ice tray which comprises a plurality of rigid partitions secured to a flexible backbone member for dividing the interior of the tray into a plurality of ice block
25 compartments and wherein the backbone member may be flexed after removal of the grid from the tray to bow the grid structure and cause movement of the rigid partitions relative to one another for breaking ice blocks from certain walls
30 thereof and for enlarging the ice block compartments.

A further object of my invention is to provide an improved grid structure for an ice tray according to the preceding object and wherein the partition carrying backbone member is normally out
35 of contact with ice blocks formed in the structure and wherein the rigid partitions are of such form or configuration as to cooperate with one another to provide a longitudinal wall and a plurality of walls extending laterally therefrom for
40 dividing the interior of the tray into rows of ice block compartments.

A still further object of my invention is to provide a grid structure of the type described in the
45 foregoing objects with means for removably locking the grid in a tray to prevent bowing of the grid backbone member while the grid structure is positioned in the tray to thereby maintain the grid in a normal ice freezing position within the
50 tray.

Still further and more specific objects and advantages reside in the simplicity of operation of my improved grid structure and in novel combinations and arrangements of parts thereof to
55 provide a durable structure of low manufacturing

costs as will more fully appear in the course of the following description.

In the drawings:

Fig. 1 is a top plan view of an improved freezing device having a grid structure constructed according to my invention disposed in the tray thereof;

Fig. 2 is a longitudinal vertical sectional view of the tray of the improved freezing device taken on the line 2—2 of Fig. 1 and showing the grid
10 thereof in elevation;

Fig. 3 is a transverse vertical sectional view of the freezing device taken on the line 3—3 of Fig. 1;

Fig. 4 is a view similar to Fig. 2 showing ice
15 within the tray of the freezing device and disclosing the tray in a twisted position;

Fig. 5 is a view similar to Fig. 2 showing the grid structure and ice blocks bonded thereto elevated relative to the tray of the freezing device; 20 and

Fig. 6 is a view of the grid removed from the tray and bowed to move certain of its walls relative to other walls thereof to break ice blocks loose from some of the grid walls. 25

The improved freezing device of the present invention comprises a metallic grid structure 10 removably disposed in a metal tray 11. The tray 11 is of the so-called "Presto" flexible metal type and has a portion of its bottom wall 12 near each
30 end thereof raised, as at 14, so as to be disposed at an angle relative to the flat portion thereof. These raised or angled bottom wall portions 14 of tray 11 each provide a shoulder or fulcrum line 15 which extends transversely across the tray
35 bottom at an angle to the extension of the tray end walls 16 and 17. The side walls and end walls 16 and 17 of tray 11 diverge outwardly toward the top of the tray. It will be noted that the back wall 17 is diverged outwardly toward the top
40 of the tray a greater distance than other walls thereof for the purpose of facilitating removal of the grid 10 from the tray as will become apparent hereinafter. The upright walls of tray 11 have their upper portion rolled or bent over as at 18
45 to provide a rim which extends substantially entirely around the tray to increase its structural strength while retaining its flexibility to permit twisting thereof. A portion of the metal of tray 11 is extended downwardly from the rim 18, as at
50 19, (see Fig. 2) at the front of the tray and provides a mounting for a heavy metal piece 21 which has a handle 22 pivotally secured thereto as at 23. The handle 22 is provided with a cam surface or surfaces 24 for a purpose to be here-

inafter described. A portion of the upper part of tray back wall 17 is formed outwardly as at 26 and then inwardly as at 27 to provide a pocket or cavity 28. A portion of the upper part of tray front wall 16 is formed inwardly of the tray as at 29 to provide a ledge or protrusion 31. The purpose of the pocket 28 and the protrusion 31 will become apparent in the description of the grid structure and operation of the device.

10 The metallic grid structure 10 removably disposed within tray 11 is of a unitary construction and includes or comprises a plurality of vertically disposed metal sections or partitions 36. These partitions 36 are bent as at 37 and 38 (see Fig. 1) to form them into a zigzag configuration to provide wall portions 41, 42 and 43. Partitions 36 are arranged closely adjacent one another with the wall portion 42 thereof in substantial alignment with one another to provide the grid 10 with a sectional longitudinal wall. The wall portions 41 and 43 of partitions 36 are disposed in spaced apart relation along the length of the grid and extend laterally from the longitudinal grid wall to provide a row of ice block compartments 45 on each side thereof. Partitions 36 each have ears 46 formed integral therewith and extending from the top edge of wall part 42 thereof which ears extend through spaced apart slots provided in a flat relatively long flexible horizontally disposed supporting or backbone member 48 extending longitudinally of the tray 11. The ears 46 are bent over against and may be welded or otherwise suitably secured to the member 48 to permanently attach the partitions 36 to this backbone member. At each end of the unitary grid structure 10 there is a vertically disposed partition 51 (see Fig. 1) bent as at 52 to form same into a substantially L-shape in planular configuration and to provide wall portions 53 and 54. These L-shaped partitions 51 are permanently attached to the flexible grid backbone 48 in the same manner that partitions 36 are attached thereto. The wall parts 54 of partitions 51 form the end portions of the longitudinal grid wall, and the part 54 of the one partition 51 at the back of tray 11 is cut away as at 56 (see Fig. 2) to permit movement of a lever carried by the grid 10. The wall portion 54 of L-shaped partition 51, located at the back of tray 11 and having the cut away part 56, is provided with an integral upwardly extending stud portion 61 (see Fig. 2).

A lever 62 carried by the grid 10 is provided with an opening 63 therein (see Fig. 1) which is fitted over the stud portion 61 of partition 51, and thereafter the top of the stud portion 61 is beaded over or flattened out to provide a head 64 thereon. The head 64 secures lever 62 to the grid structure 10 and permits tilting and horizontal movement of the lever about the stud 61 relative to the grid. Lever 62 has a handle end 66 and a short end 67 and is provided with a depending bearing surface 68 struck therefrom at the opening 63. The edge portion of short end 67 of lever 62 is bent down to provide a finger 69 which fits into the pocket 28 formed by the bent portions 26 and 27 of the top edge of tray 11. The handle end 66 of lever 62 has an integral outwardly directed portion 71 bent down as at 72 and thence in at 73 (see Fig. 3). The inwardly directed portion 73 of the lever 62 is hooked under backbone member 48, and the lever is adapted to be turned horizontally about stud portion 61 in a direction transverse of the grid structure to remove portion 73 thereof from

member 48 so as to permit elevation and tilting of the lever. The end 75 of the flexible backbone member 48 opposite the lever end of grid 10 is located under the ledge or protrusion 31 formed by the inwardly bent part 29 of tray 11. Thus, it will be seen that the metallic grid structure 10 is of a unitary construction and that it is removably locked in the resilient metal tray 11 to hold the grid partitions 36 or ice block forming walls in a vertical position. The bottom edges 10 of the end partitions 51 of grid 10 are cut to conform to the angled wall portions 14 of the bottom wall 12 of tray 11. It is to be understood that the walls 41, 42 and 43 of partitions 36 and walls 53 and 54 of partitions 51 may be treated or coated with a waxy or the like substance to facilitate release of ice blocks therefrom.

Assume that water has been frozen in the freezing device disclosed in the form of ice blocks 76 in compartments 45, by the cooling effect produced by an evaporator of a refrigerating system, and the device is to be removed from its support in or on the evaporator to permit harvesting of the ice blocks 76. Handle 22 is grasped by the hand and pulled forward thereby rotating about its pivotal mountings 23 to cause the cam surface 24 to apply force between the freezing device and its support. This force elevates the freezing device relative to its support and breaks the ice bond therebetween to permit the device to be readily removed from the evaporator. The freezing device is, after removal thereof from the evaporator, placed on a flat surface such as a table top or ledge and force is applied in a downward direction simultaneously upon opposite ends of the tray 11. Since the tray is constructed of relatively thin metal, it is somewhat flexible and the force applied to its ends as described is transmitted to the fulcrum lines or shoulders 15 through the angled tray bottom wall portions 14. The construction of the tray 11 is such that the downward force applied to its ends causes twisting thereof as illustrated in Fig. 4 of the drawings to break the mass of ice, which adheres to the grid 10, loose from its walls. The tray 11, of course, is sufficiently resilient to again assume its normal flat position as shown in Fig. 2 after being flexed or twisted. After the mass of ice has been loosened from walls of tray 11, by twisting of the tray as shown in Fig. 4, the lever 62 is moved horizontally about its pivotal connection or stud portion 61 transversely of the freezing device to remove the hook part 73 of the lever from beneath the backbone member 48 of grid 10. Handle end 66 of lever 62 may then be elevated relative to the grid structure 10 as shown in Fig. 5 of the drawings to cause the finger 69 on the short end 67 thereof to pry against tray 11 and elevate the grid 10 and ice blocks 76 adhering thereto relative from the tray. The elevation of handle end 66 of lever 62 decreases the length of the grid structure 10 by decreasing the distance between the end 75 of backbone member 48 and the end of finger 69 on lever 62. The length of the grid structure being decreased as described permits disengagement of the end 75 of member 48 from the ledge or boss 31 at the front of tray 11 and permits the finger 69 on the short end 67 of lever 62 to be released from the pocket 28 formed in the back wall 17 of tray 11. The grid structure 10 and ice blocks 76 adhering thereto may now be readily removed from the tray 11 to permit or facilitate removal of ice blocks from the grid. In Fig. 6 of the drawings I have disclosed the

unitary grid structure 10 together with ice blocks 76 adhering thereto removed from the tray 11 and bowed to cause movement of certain of the ice block compartment walls relative to other walls thereof. The backbone member 48 is, as before stated, flexible and the grid structure 10 is grasped at each end thereof by the hands of the operator and force applied to the backbone 48 inwardly of its ends, by the operator's thumbs, 10 flexes the backbone and bows the structure into the position shown in Fig. 6. The bowing operation of the grid structure 10 moves the partitions 36 relative to one another and also breaks a part of the partitions or some of the ice block compartment walls loose from the ice blocks 76. 15 For example, it will be noted that the walls 43 of partitions 36 on one side of the grid 10 are moved or spread away from an adjacent ice block 76 and that walls 41 of partitions 36 on the 20 opposite side of grid 10 are also moved or spread away from an adjacent ice block. This spreading action somewhat resembles the spreading of a fan and enlarges the ice block compartments 45. The bowing of grid 10 by bending the flexible backbone member 48 thereof not only moves certain walls of partitions 36 away from other walls and away from the ice blocks as shown in Fig. 6 of the drawings but also loosens or decreases to a certain degree the bond of ice to these other walls to thereby facilitate the act of releasing the ice blocks 76 from the grid. Since the ice blocks 76 are contacting two walls only of their respective compartments and since they have been partially loosened from these two 35 walls by flexure of the grid structure, their release is greatly facilitated and is not a difficult task. Therefore, the ice blocks 76 can be readily removed from the enlarged ice block compartments 45 of grid 10 by pushing same with the thumb or by striking them a blow with any suitable instrument. After the desired number or all ice blocks have been removed from the grid 10, the grid may be permitted to return to its normal substantially flat position for replacement in the tray 11. The grid may, therefore, be again placed in tray 11 with its one end abutting tray wall 16 and end 75 of member 48 located over the ledge or boss 31 formed on the tray. The finger end 69 of lever 62 is again fitted 50 in the tray pocket 28 and lever 62 is then moved horizontally into a position parallel with the backbone member 48 so as to locate the hook portion 73 of the lever thereunder for locking the grid structure 10 within the tray. The bowing of the grid 10 may, after a period of time, cause its backbone member 48 to be sprung into an abnormal curved position, but the arrangement disclosed for locking the grid within the tray overcomes this deformation of the backbone member and assures that the grid will lie flat with its partitions vertically disposed when locked in normal ice freezing position within the tray.

From the foregoing, it will be seen that I have 65 provided an improved freezing device and a novel method of harvesting ice blocks therefrom, since no artificial heat is required to remove the ice from the tray and ice blocks from the grid. The grid of the freezing device is of improved structure and, by forming same of a flexible backbone with substantially non-flexible partitions or ice compartment forming walls secured thereto, it is of a unitary construction and yet readily flexible to break ice therefrom. My improved grid is of 75 low cost, strong and durable and also effective

to remove ice blocks therefrom without shattering the blocks. By constructing the grid entirely of metal, I thereby retain the fast freezing characteristics of metal tray and grid combinations. In the present device the lever employed 5 to separate the grid and ice blocks adhering thereto from the tray also serves as a handle for the grid structure and facilitates manipulation thereof.

While the form of embodiment of the invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows: 15

1. In combination, a tray having a unitary grid structure removably disposed therein, said grid structure comprising a relatively narrow elongated resilient metal backbone member having a plurality of separate rigid metal partitions 20 secured thereto and depending therefrom to the bottom of said tray for dividing the interior thereof into rows of ice block compartments, each of said partitions having a part thereof extending lengthwise of said backbone member and 25 another part thereof extending laterally from each side of said first named part, said laterally extending parts of said partitions being spaced apart along the length of said grid structure and extending outwardly a substantial distance from 30 said backbone member to provide said ice block compartments with open tops, a lever pivotally mounted upon said grid structure and having a part thereof on one side of its pivotal mounting engaging a portion of said backbone member 35 and having another part thereof on the other side of its pivotal mounting engaging a portion of said tray for locking said resilient backbone member in a horizontal position relative to the tray during freezing of a substance in said compartments, said lever being movable in one direction of motion to release said first named part thereof from said backbone member and being 40 movable in another direction of motion for causing its second named part to apply force to the tray for elevating the unitary grid structure together with ice blocks adhering thereto relative to said tray, and said backbone member being flexible to permit bowing of said unitary grid structure, after same has been removed from 45 the tray, whereby said laterally extending parts of said partitions will be moved away from one another to enlarge said ice block compartments and facilitate the removal of ice blocks therefrom.

2. In combination, a tray having a unitary grid structure removably disposed therein, said grid structure comprising a relatively narrow resilient metal backbone member having a plurality of vertically disposed rigid metal partitions depending therefrom and dividing the interior of said tray into rows of ice block compartments, each of said partitions being of a zigzag form and arranged to provide said grid structure with a longitudinal wall and a plurality of walls extending laterally therefrom 65 in spaced apart relation along the length thereof, said laterally extending walls of said zigzag partitions extending a substantial distance outwardly from said resilient backbone member to provide said ice block compartments with open 70 tops, a lever pivotally mounted upon an end of said grid structure and having a part thereof on one side of its pivotal mounting engaging a portion of said backbone member remote from the end of said grid structure and having an-

other part thereof on the other side of its pivotal mounting engaging an end wall of said tray for locking said resilient backbone member in a horizontal position within said tray during freezing of a substance in said compartments, said lever being movable in one direction of motion to release said first named part thereof from said backbone member and being movable in another direction of motion for causing its second named part to apply force to the tray for elevating the unitary grid structure together with ice blocks adhering thereto relative to said tray, and said backbone member being flexible to permit bowing of said unitary grid structure, after same has been removed from the tray, whereby said laterally extending walls of said rigid partitions will be moved away from one another to enlarge said ice block compartments and facilitate the removal of ice blocks therefrom.

3. In combination, a tray having a unitary grid structure removably disposed therein, said grid structure comprising a resilient metal backbone member extending longitudinally of the tray and having a plurality of separate metal partitions secured thereto and depending therefrom to the bottom of said tray, said partitions each having a portion extending in a direction transverse of

the extension of said backbone member along the length of said grid structure to divide the interior of said tray into a plurality of ice block compartments, said portions of said partitions projecting outwardly a substantial distance beyond said backbone member to provide said ice block compartments with open tops, a lever carried by said grid structure and having a part thereof engaging a portion of said tray for locking the grid therein and for holding said resilient backbone member in a parallel position relative to the bottom of the tray and for also maintaining said partitions in a normal ice block forming position, said lever being movable to unlock the grid from the tray and to cause said part thereof to apply force to the tray for elevating the unitary grid structure together with ice blocks adhering thereto relative to said tray, and said backbone member being flexible to permit bowing of said unitary grid structure, after same has been removed from the tray, whereby said partitions will be moved relative to one another out of their normal ice block forming position to enlarge said ice block compartments and facilitate the removal of ice blocks therefrom.

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