Feb. 18, 1947. D. H. REEVES 2,416,119

EXTENSIBLE ICE TRAY GRID

Filed Aug. 5, 1937 3 Sheets-Sheet 1

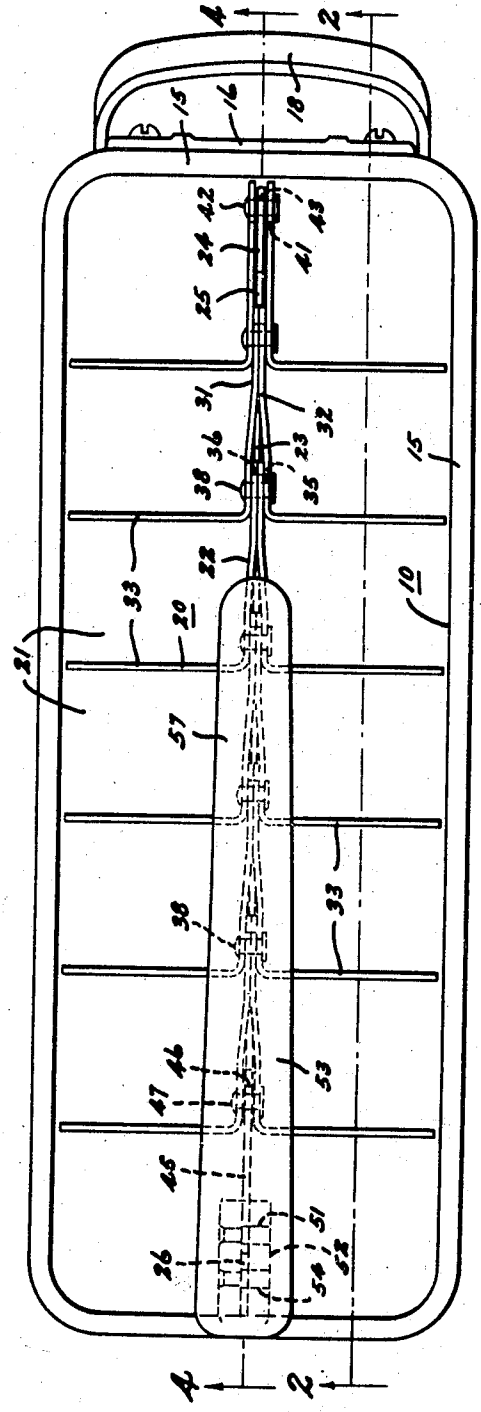


Fig. 1

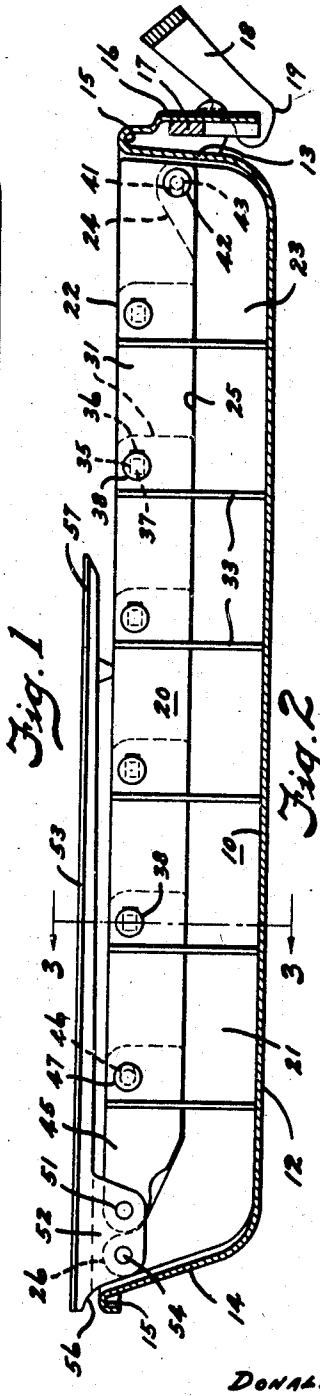


Fig. 2

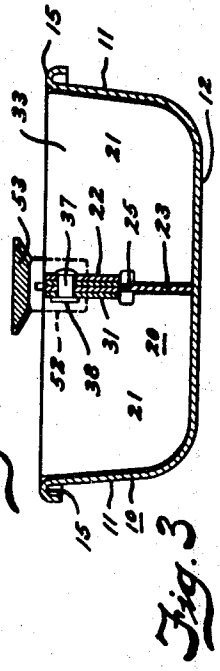


Fig. 3

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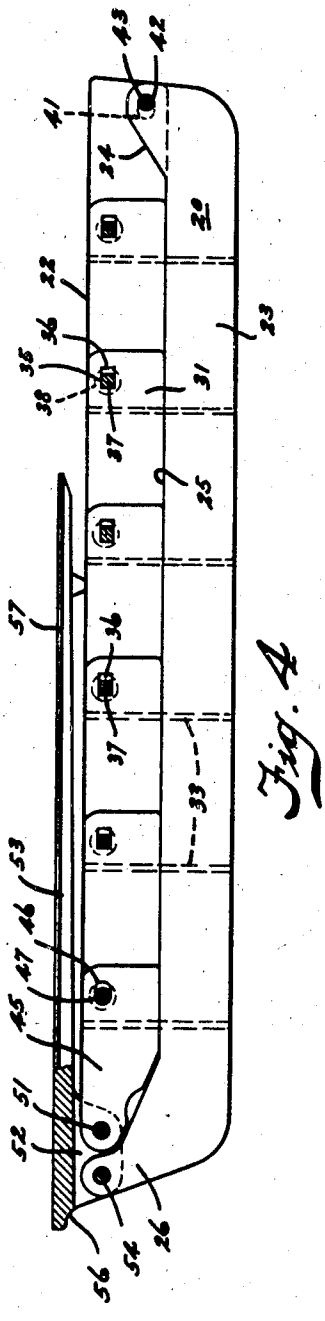


Fig. 4

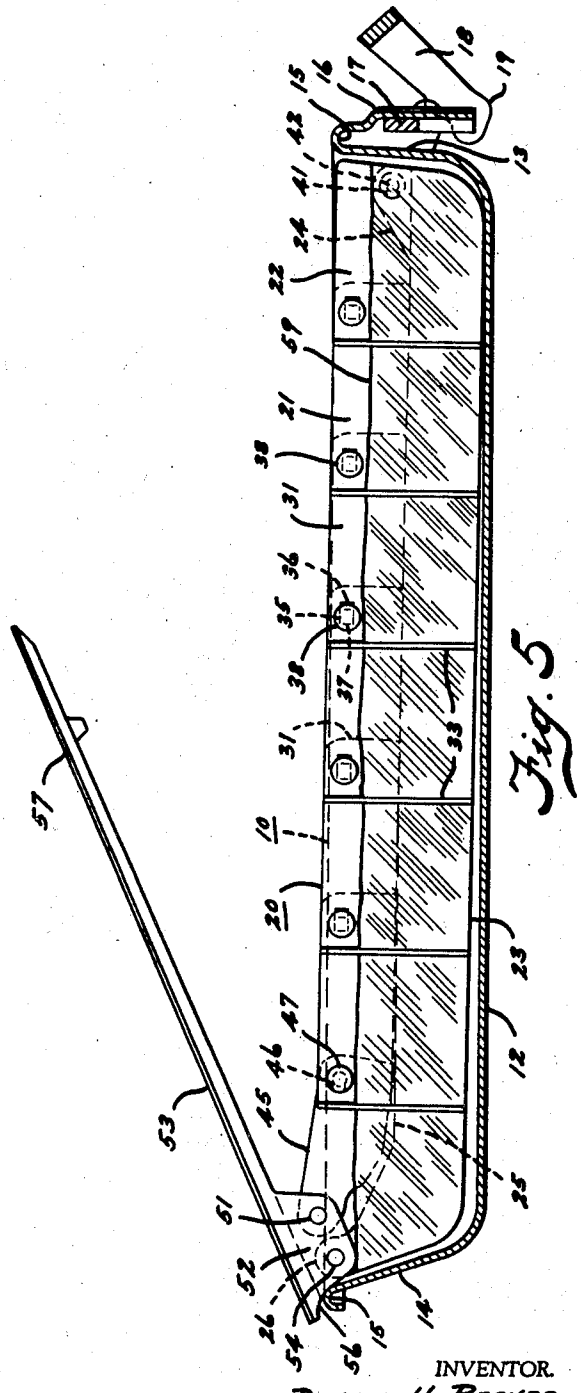


Fig. 5

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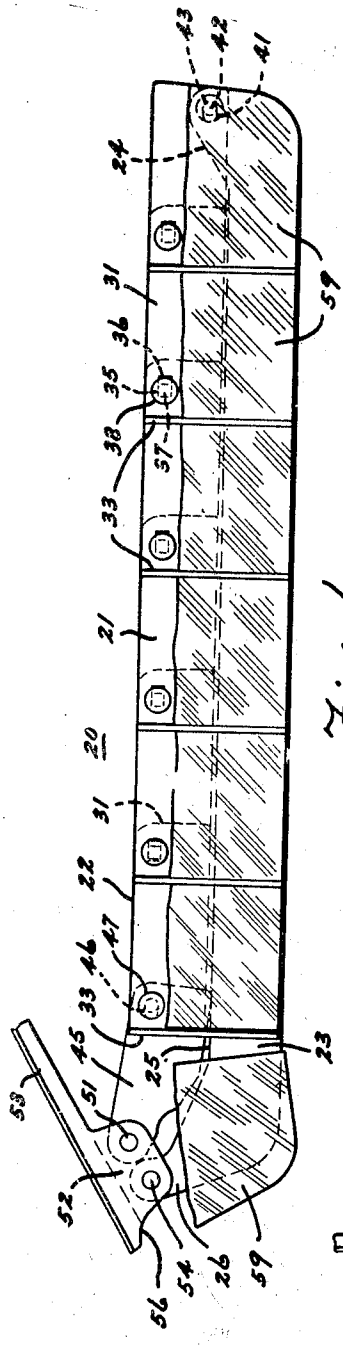


Fig. 6

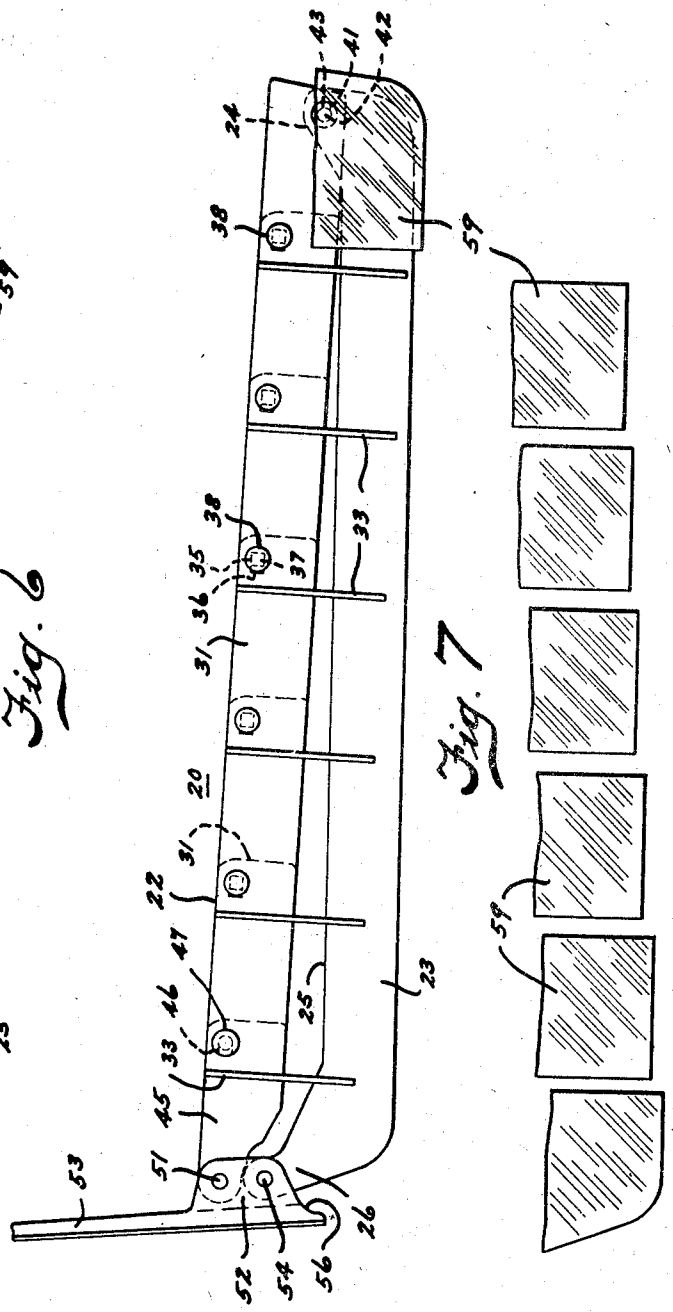


Fig. 7

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UNITED STATES PATENT OFFICE

2,416,119

EXTENSIBLE ICE TRAY GRID

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Application August 5, 1937, Serial No. 157,575

15 Claims. (Cl. 62—108.5)

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This invention relates to freezing devices for liquids and particularly to ice trays employed in household refrigerating apparatus.

One of the objects of my invention is to provide an improved grid construction adapted to be removably disposed in an ice tray for dividing the interior of the tray into a plurality of ice block compartments and a novel method of removing ice blocks from the tray and grid without application of artificial heat thereto.

Another object of my invention is to provide a metallic grid structure for an ice tray which structure has certain walls thereof movable relative to other walls for breaking the bond between ice blocks in the grid and the grid walls to thereby release the blocks therefrom.

A further object of my invention is to provide a metallic grid structure having superimposed sections forming a two-part longitudinal dividing wall one part of which is extensible lengthwise of the other part thereof for moving transverse dividing members carried thereby to enlarge the ice block compartments formed by the structure and release ice therefrom.

In carrying out the foregoing objects it is a still further and more specific object of my invention to provide a unitary metallic grid structure having a longitudinal dividing wall formed of superimposed parts and one part of which is formed by rigid sections including integral transverse walls movably secured together and movable progressively relative to one another to permit lengthwise extension of the one part of the longitudinal dividing wall relative to the other part thereof for releasing ice blocks from the structure.

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 form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a top plan view of an ice tray having a grid positioned therein and constructed in accordance with my invention;

Fig. 2 is a side view of the freezing device shown in Fig. 1 and is taken on the line 2—2 thereof;

Fig. 3 is a vertical transverse sectional view of the freezing device taken on the line 2—2 of Fig. 2;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1 showing in detail the connections between parts of the grid construction;

Fig. 5 is a view similar to Fig. 2 showing the grid together with ice blocks frozen therein and adhering thereto elevated relative to the tray;

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Fig. 6 is a view disclosing the grid and ice blocks adhering thereto removed from the tray and showing certain walls of the grid structure moved relative to other walls thereof for releasing ice blocks therefrom; and

Fig. 7 is a view similar to Fig. 6 showing the position of the walls of the grid structure after having been moved to release all ice blocks therefrom.

Referring to the drawings, for the purpose of illustrating the invention, I have shown in Figs. 1, 2 and 3 a metal ice tray 10 having side walls 11 (see Fig. 3), a bottom wall 12 and opposed end walls 13 and 14. The tray side walls 11 and the front end wall 13 thereof converge outwardly toward the top of the tray. The tray back wall 14 is converged outwardly toward the top of the tray a greater distance than other upright walls thereof for a purpose which will become apparent hereinafter. The walls 11, 13 and 14 of tray 10 have their upper edge rolled over to form a rim 15 which extends continuously around the top of the tray. A portion of the metal tray 10 is extended downwardly from rim 15, as at 16, at the front end thereof and provides a mounting for a heavy metal piece 17 which has a handle 18 pivotally secured thereto. The handle 18 facilitates placing of tray 10 in or on a cooling element of a refrigerating system and a cam surface 19 formed thereon functions, upon actuating handle 18, to break an ice bond between the tray and its support to permit removal of the tray and its frozen contents from the cooling element. The handle 18 is normally disposed in the position shown in Fig. 2 of the drawings with the cam surface 19 thereof resting upon a refrigerated shelf or support for the tray. Upon clasping the handle 18 with the hand and pulling forward on same, it rotates about its pivotal mounting and causes the cam surface 19 thereof to impart force to the tray support to thereby break the ice bond between the tray and its support and elevate the tray relative thereto. Thereafter, the tray 10 may readily be removed from the cooling element or evaporator.

A unitary metallic grid structure, generally represented by the reference character 20, is removably disposed within tray 10 and divides the interior thereof into a plurality of rows of open-top molds, cells or compartments 21. The grid structure 20 includes a vertically disposed longitudinal partition or wall comprising two members or parts 22 and 23 positioned one above the other. The lower wall part 23 of the longitudinal partition of grid 20 is in the form of a single rigid strip of

metal having an ear portion 24 formed upwardly of its top edge surface 25 at the end thereof disposed adjacent the front wall 13 of tray 10. This rigid metal part 23 of the longitudinal grid wall or partition also has a raised ear portion 26 formed upwardly from the top edge surface 25 thereof at its opposite end. The upper member or part 22 of the vertically disposed two-part longitudinal partition of grid 20 is formed of a plurality of rigid sections arranged to be moved lengthwise relative to one another for a purpose to be hereinafter described.

Each rigid section of the sectional top wall part 22 of the longitudinal grid partition comprises two oppositely disposed substantially L-shaped sheet metal members. The sides or body portions 31 of the oppositely disposed L-shaped members are positioned substantially parallel to one another and are bent outwardly as at 32 (see Fig. 1) to provide a space therebetween for the reception of the ends of adjacent sections. The wings or legs 33 of the oppositely disposed L-shaped metal members of the rigid sections are of greater vertical dimension than the sides or body portions 31 thereof and extend to the bottom of the tray or to the bottom edge of the rigid lower wall part 23 of the longitudinal grid partition or wall. These wing portions or legs 33 therefore extend downwardly from the sectional top member or part 22 of the longitudinal grid partition and outwardly therefrom in spaced apart relation along the partition to provide walls or partitions dividing the interior of tray 10 into a plurality of rows of ice block compartments 21. The body portion or side 31 of each L-shaped metal member of the rigid sections of the sectional upper wall member or part 22 of grid 20 is provided with squared holes 35 adjacent the point of extension of the integral leg or wing portion 33 therefrom. These body portions or sides 31 of each L-shaped member are also provided with a rectangular shaped hole 36 near their ends. The holes 35 in one section register with the rectangular holes 36 in another section and receive a squared shaft portion 37 of rivets 38 (see Figs. 3 and 4). The rivets 38, due to their squared shaft portion fitting into the squared holes 35, lock the body portions or sides 31 of oppositely disposed L-shaped members together with the ends of adjacent L-shaped members movably secured therebetween to form the plurality of rigid sections of the sectional wall. The rectangular holes or slots 36 in the L-shaped members of the rigid sections permit the squared shaft portion 37 of rivets 38 to move lengthwise therein and consequently the rigid sections are movable lengthwise of one another. The construction just described applies to all the sections of the wall part 22 intermediate the end sections thereof. The sides or body portions 31 of the L-shaped members of the one end section adjacent the front wall 13 of tray 10 is provided with elongated holes 41 which receive the rounded shaft portion of a rivet 42 fitted into a round hole 43 provided in the upstanding ear portion 24 of the lower part 23 of the two-part longitudinal partition or wall. This structure at the one end of the longitudinal partition or wall secures the parts of the partition together and also provides a pivot point for movement of the sectional wall about the rigid wall of the two-part longitudinal partition or wall. This structure at the one end of the longitudinal partition or wall also permits lengthwise movement of the end section relative to the rigid section 23 of the partition or wall. A single metal piece 45 is clamped between the L-shaped members at the opposite end of the sectional wall part of the longitudinal grid partition and is provided with an elongated hole 46 which receives a rounded shaft portion of a rivet 47 fitted in a round hole provided in the sides of the end section forming members. Thus the metal piece 45 can be pivoted relative to the end section at the rear of tray 10 for a purpose to be presently described. The other end of metal piece 45 is provided with a hole which receives a rivet 51 secured to the legs 52 formed on a lever 53 and which legs straddle the metal piece 45. Another portion of the legs 52 of lever 53 straddles the upstanding ear portion 26 of the lower part 23 of the longitudinal grid partition or wall and has a rivet 54, which passes through a hole provided in the ear 26, secured thereto. It will be seen therefore that the two ends of the two wall parts 22 and 23 of the longitudinal grid partition or wall are connected together to provide a unitary grid structure. It should also be noted that the two ends of the sectional member or part 22 of the longitudinal grid wall are movable relative to the two ends 24 and 26 of the rigid part 23 thereof to permit movement of the grid in a manner and for the purpose to be hereinafter described. Prior to describing the operation of the device disclosed it is to be noted that lever 53 includes a camming or bearing surface 56 adjacent its pivotal mounting 54 which surface is adapted to engage the rim 15 of tray 10 when the handle end 57 of lever 53 is manipulated.

Assume that water has been frozen in tray 10 in the form of ice blocks 59 in compartments 21, by the cooling effect produced by a cooling element of a refrigerating system, and the tray handle 18 has been manipulated to remove the tray from the element and it is now desirable to remove ice blocks 59 from the tray and from the unitary grid structure 20. The handle end 57 of lever 53 is therefore elevated to move the lever 53 about its pivotal mounting or pin 54 and to cause the cam surface 56 formed on the lever to engage the rim 15 of tray 10 and exert a force against the tray. This force applied to tray 10 causes the unitary grid structure 20, together with the ice blocks 59 adhering thereto, to be elevated relative to the tray to break the bond between the ice and the tray walls. This initial movement of lever 53 is illustrated in Fig. 5 of the drawings and it will be noted by reference to this figure that the metal piece 45 at the lever end of the grid structure 20 has been elevated about its pivotal mounting rivet 47 due to raising or rotating pin 51 relative to the lever pivot point 54. The ice blocks can be released from the grid while the grid is in the elevated position relative to the tray or the grid and ice blocks 59 adhering thereto may be removed from tray 10 prior to releasing ice blocks from the grid. Further movement of lever 53 about its pivot 54 continues to elevate the metal piece 45 and the bottom edge of piece 45, resting upon the top edge 25 of the lower wall part 23 of the two-part longitudinal grid partition or wall, acts as a cam against part 23 to start elevation of the lever end of the sectional member or part 22 of the longitudinal grid partition relative to the lower wall part 23 thereof. This position of further movement of lever 53 is illustrated in Fig. 6 of the drawings and it will be noted that the end of elongated slot 46 in the metal piece 45 has engaged the rivet 47 and has

caused the end partition 33 of grid 20 to move toward the lever end of the structure. Thus the movement of metal piece 45 upwardly relative to the longitudinal grid wall part 23 and outwardly from the remainder of the structure 20, to slide the end partitions 33, has caused the ice blocks 59 at the lever end of the grid to be released therefrom and in Fig. 6 these ice blocks are shown falling from the structure 20. It should be noted that the sliding movement of the lever end partitions 33 just described, while elevating the remaining partitions 33 slightly, does not slide these remaining partitions lengthwise of the structure 20 and that still further movement of lever 53 is necessary to cause sliding thereof. Therefore still further movement of lever 53 in the same direction of motion about its pivot 54 will, due to the elongated or rectangular shaped holes 36 in the rigid sections of the sectional member or part 22 of the longitudinal grid wall, cause the remaining partitions to be slid lengthwise relative to one another progressively from the lever end of the structure 20 to its opposite end. Obviously therefore the sectional member or part 22 of the two-wall-part longitudinal grid partition is extended lengthwise of the rigid wall part 23 thereof. It is to be observed that the member or part 22 of the unitary grid structure 20 is elevated relative to the longitudinal wall or wall part 23 and that the lateral grid walls or partitions 33 secured to member 22 are moved upwardly therewith and also moved relative to one another lengthwise or longitudinally of the wall 22. This progressive extension of the one part of the longitudinal grid partition or wall relative to the other part thereof also progressively moves all the partitions 33 of the structure toward the lever end thereof to enlarge the ice block compartments 21 and to cause ice blocks 59 to be released from the structure in succession as will be seen by referring to Fig. 7 of the drawings.

It will be understood that the lever 53 has a single direction of motion for performing the two functions of elevating the unitary grid structure 20 together with ice blocks adhering thereto relative to the tray 10 and of moving certain walls or partitions of the grid structure relative to other walls or partitions thereof to enlarge the ice block compartments and to release ice blocks from the grid. It is also to be understood that, while the shaft portions of rivets 42 and 47 are round to permit pivoting of metal piece 45 about rivet 47 and the side portions 31 of the front end section of the grid about rivet 42, other rivets 38 are squared as at 37 and fit in the squared holes 35 and rectangular holes 36 for preventing turning or pivoting of the rigid sections of the sectional wall part 22 of the longitudinal grid partition or wall. Thus the connections between the sections which permit lengthwise movement thereof relative to one another only serve as means for holding all the rigid sections, except the section formed by the metal piece 45, in the same plane with one another at all times to prevent buckling of the sectional wall part 22 of the longitudinal grid wall. By preventing buckling of the rigid sections the operation of returning the sectional member or wall part 22 of the longitudinal partition to its normal superimposed position upon the rigid wall part 23 thereof is greatly facilitated. While I have shown the upper part of the longitudinal grid partition or wall as being extensible lengthwise of the lower part thereof it is to be understood that the structure may be constructed so that the lower grid wall part is extensible lengthwise of the upper part thereof without departing from the spirit of my invention.

From the foregoing it will be seen that I have provided an improved ice tray grid structure which is of low cost, strong and durable, capable of being operated to extend one wall part of a two-part longitudinal partition and to enlarge the ice block compartments with a minimum of force to cause release of the ice blocks from the grid. The improved grid structure is constructed in such a novel manner that ice blocks are removed therefrom without unduly shattering the blocks while at the same time the entire structure is made of metal to thereby retain the fast freezing characteristics of metal tray and grid combinations. By constructing the grid structure so that the ice block compartments are progressively enlarged a minimum of force releases all ice blocks to thus overcome objections to prior devices wherein utmost effort is required to release the blocks. The improved structure is also of such construction that any desired number of ice blocks can be harvested from the grid and the grid together with the unreleased ice blocks can be replaced in or on the cooling element until such time as they are to be harvested.

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:

1. In combination, a tray having a unitary grid structure removably disposed therein, said grid structure comprising a two-part longitudinal wall, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections disposed above the other part thereof, said sections including body portions and partitions depending therefrom and extending outwardly at the sides of said longitudinal wall to divide the interior of said tray into a plurality of rows of ice block compartments, said sections of said one part of said two-part longitudinal wall being movable relative to one another, and means acting between the two parts of said longitudinal grid wall and operable to extend said sectional part thereof lengthwise of the other part thereof for enlarging said compartments and releasing ice blocks therefrom.

2. In combination, a tray having a unitary grid structure removably disposed therein, said grid structure comprising a two-part longitudinal wall, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections disposed above the other part thereof, said sections including body portions and partitions depending therefrom and extending outwardly at the sides of said longitudinal wall to divide the interior of said tray into a plurality of rows of ice block compartments, said sections of said one part of said two-part longitudinal wall being movable relative to one another, a lever connecting the sectional part of said two-part longitudinal grid wall to the other part thereof, said lever being operable to engage said tray and elevate said grid structure together with ice blocks adhering thereto relative to the tray, and said lever also being operable to extend said sectional part of said longitudinal grid wall lengthwise of the other part thereof after the grid structure and ice blocks have been elevated relative to the tray for enlarging said compartments and releasing ice blocks therefrom.

3. A grid for disposition in an ice tray compris-

ing, a longitudinal wall formed of two parts disposed one above the other and connected at their ends to provide a unitary structure, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections secured together in movable relation to one another, and the connection of the ends of said two parts of said longitudinal wall at one end of the grid structure including a lever movable to act between said two parts of said longitudinal wall for extending said sectional part thereof lengthwise of the other part thereof.

4. A grid for disposition in an ice tray comprising, a longitudinal wall formed of two parts disposed one above the other and connected at their ends to provide a unitary structure, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections secured together in movable relation to one another, means for sliding said sections relative to one another progressively from one portion to another portion of the grid structure to extend said sectional part of said longitudinal grid wall lengthwise of the other part thereof, and means preventing movement between said rigid sections other than said sliding movement thereof to thereby prevent buckling of said sectional part of said longitudinal grid wall.

5. A grid for disposition in an ice tray comprising, a longitudinal wall formed of two parts disposed one above the other and connected together to provide a unitary structure, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections movably secured together, and means for moving said rigid sections relative to one another to extend said sectional one part of said longitudinal wall lengthwise of the other part thereof.

6. A grid for disposition in an ice tray comprising, a longitudinal wall formed of two parts disposed one above the other and connected together to provide a unitary structure, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections movably secured together, and means for moving said rigid sections relative to one another progressively from one part to another part of the grid structure to extend said sectional one part of said longitudinal wall lengthwise of the other part thereof.

7. A grid for disposition in an ice tray comprising, a longitudinal wall formed of two parts disposed one above the other and connected together to provide a unitary structure, one part of said two-part longitudinal grid wall being formed of a plurality of rigid sections movably secured together, said sections each including partitions extending outwardly from said longitudinal wall on opposite sides thereof and in spaced apart relation along said wall, and means for moving said rigid sections relative to one another to extend said sectional one part of said longitudinal wall lengthwise of the other part thereof and to move said partitions away from one another to increase the space therebetween.

8. A grid for disposition in an ice tray comprising, a longitudinal partition formed of two parts disposed one above the other and connected together to provide a unitary structure, one part of said two-part longitudinal partition being formed by an extensible wall, and means for moving said wall to extend same lengthwise of the other part of said two-part longitudinal partition.

9. A grid for disposition in an ice tray comprising, a longitudinal partition formed of two parts disposed one above the other and connected together to provide a unitary structure, one part of said two-part longitudinal partition being formed by an extensible wall, said extensible wall having a plurality of wing portions extending laterally therefrom in spaced apart relation along the length thereof to provide a row of ice block compartments at the side of said longitudinal partition, means for extending said wall lengthwise of the other part of said two-part longitudinal partition, and said wing portions being constructed and arranged to be moved relative to one another by the extension of said wall for enlarging said ice block compartments to cause ice blocks to be liberated therefrom.

10. A grid for disposition in an ice tray comprising, a substantially non-flexible longitudinal metal wall and a plurality of substantially non-flexible metal partitions extending laterally from each side thereof to provide rows of ice block compartments, said grid also including a member disposed above said longitudinal wall and extending lengthwise therewith, said member, said longitudinal wall and said lateral partitions being secured together in movable relation to one another to form a unitary grid structure, means for elevating said member relative to said longitudinal grid wall, said laterally extending grid partitions being secured to said member and elevated therewith by said means to move ice blocks upwardly relative to said longitudinal grid wall, and all of said laterally extending grid partitions being constructed and arranged with respect to said longitudinal grid wall to be moved relative to one another by said means in another direction of movement relative to said longitudinal grid wall other than said elevating movement thereof to break ice blocks therefrom and cause their liberation from the compartments of said unitary grid structure.

11. A grid for disposition in an ice tray comprising, a substantially non-flexible longitudinal metal wall and a plurality of substantially non-flexible metal partitions extending laterally from each side thereof to provide rows of ice block compartments, said grid also including a member disposed above said longitudinal wall and extending lengthwise therewith, said member, said longitudinal wall and said lateral partitions being secured together in movable relation to one another to form a unitary grid structure, means for elevating said member relative to said longitudinal grid wall, said laterally extending grid partitions being secured to said member and elevated therewith by said means to move ice blocks upwardly relative to said longitudinal grid wall, and all of said laterally extending grid partitions being constructed and arranged with respect to said longitudinal grid wall to be moved relative to one another by said means in a direction longitudinally of said longitudinal grid wall to break ice blocks therefrom and to enlarge said compartments for liberating ice blocks from the unitary grid structure.

12. A grid for disposition in an ice tray comprising, a plurality of substantially non-flexible upright metal sections arranged in horizontal alignment with one another to form a sectional longitudinal partition of predetermined normal length, said grid also comprising a plurality of substantially non-flexible metal partitions extending laterally from each side of said sectional longitudinal partition in spaced apart relation along the length thereof to provide rows of ice block compartments, said sections being movably

connected together to provide a unitary removable grid structure, means for moving the sections of said longitudinal partition relative to one another lengthwise of said grid structure to extend said longitudinal partition beyond said predetermined normal length thereof, and the connections of said plurality of sections with one another being constructed and arranged to move said lateral partitions in a direction to enlarge said compartments and liberate ice blocks therefrom upon movement of said sections relative to one another.

13. A grid for ice cube trays comprising, a series of separate divider sections arranged in succession to form a grid, each section including a longitudinal plate and a laterally extending transverse fin, each plate being pivotally and slidably connected to another plate in the series.

14. A grid for ice cube trays comprising, a series of separate divider sections arranged in succession to form a grid, each section including a first wall portion providing the grid with a longitudinal partition and a second wall portion extending laterally from said first wall portion to form a plurality of spaced apart partitions along the length of said longitudinal grid partition, and each of said sections being slidably connected to another section in the series thereof to permit movement of the sections relative to one another.

15. A grid for ice cube trays comprising, a series of separate divider sections arranged in succession to form a grid, each section including a first wall portion providing the grid with a longitudinal partition and a second wall portion extending laterally from said first wall portion to form a plurality of spaced apart partitions along the length of said longitudinal grid partition, each section being directly connected to its adjacent section to provide a unitary structure, and the connection of said sections being constructed and arranged to permit movement of the sections relative to one another.

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