April 11, 1939. D. H. REEVES 2,154,356

REFRIGERATING APPARATUS

Filed March 30, 1937 2 Sheets-Sheet 1

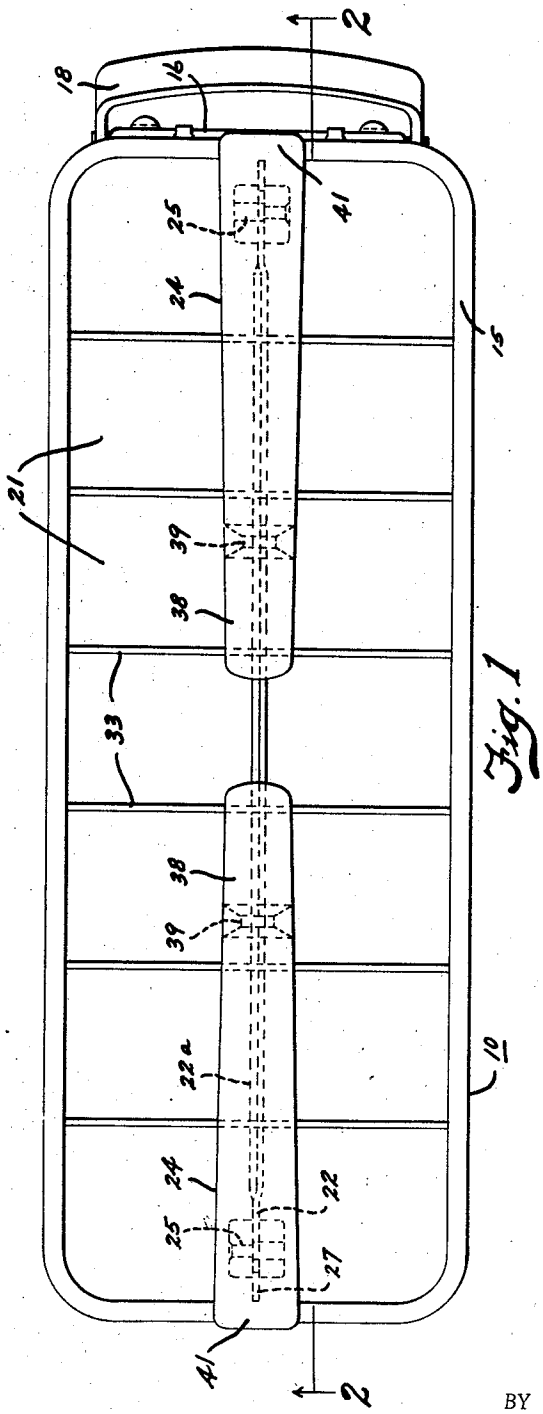


Fig. 1

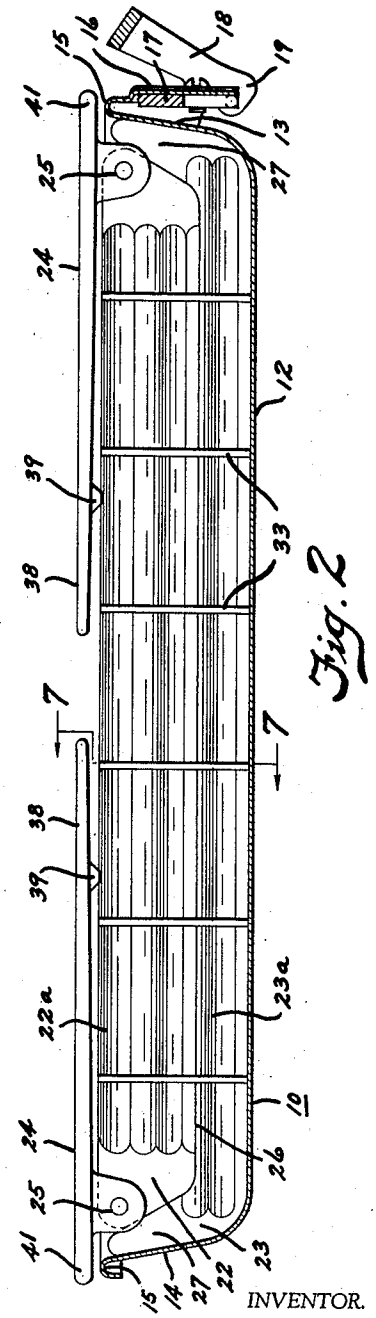


Fig. 2

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Filed March 30, 1937 2 Sheets-Sheet 2

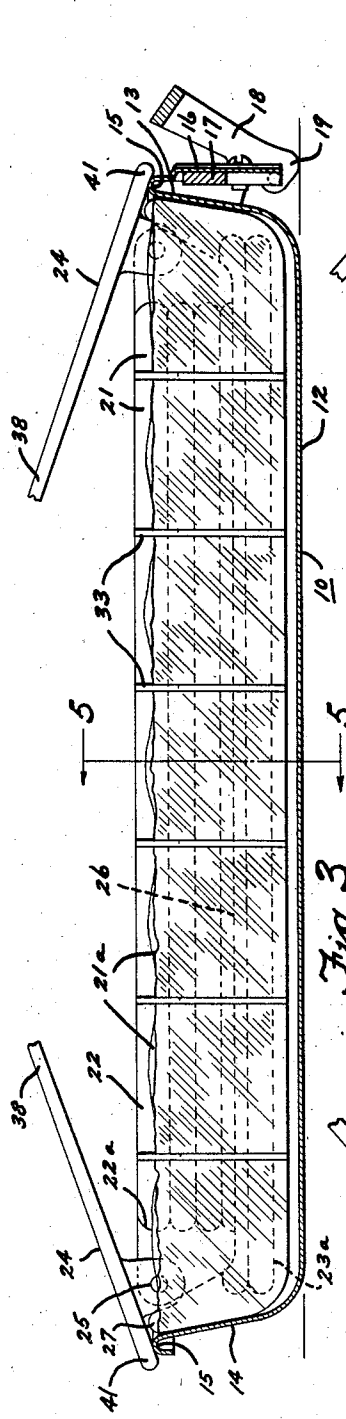


Fig. 3

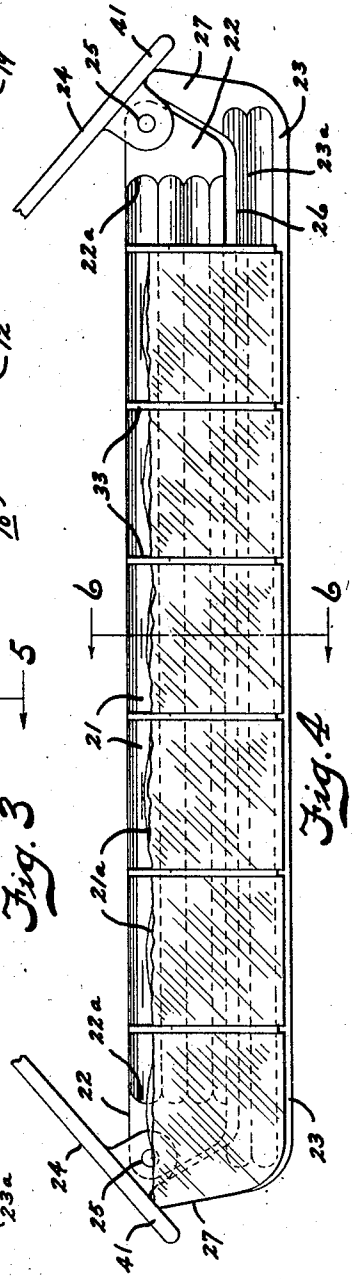


Fig. 4

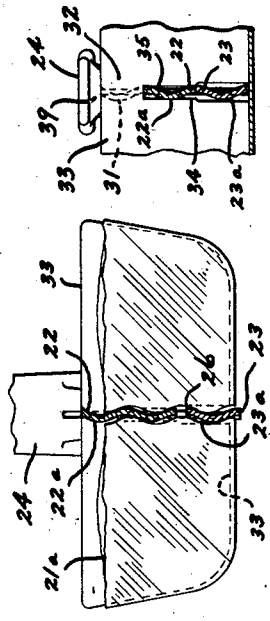


Fig. 6

Fig. 7

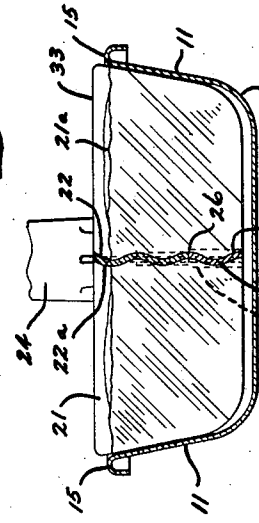


Fig. 5

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Patented Apr. 11, 1939

2,154,356

UNITED STATES PATENT OFFICE

2,154,356

REFRIGERATING APPARATUS

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Application March 30, 1937, Serial No. 133,846

12 Claims. (Cl. 62—108.5)

This invention relates to ice trays and grid structures therefor employed in mechanically refrigerated household refrigerator cabinets.

An object of my invention is to provide an ice tray with an improved removable metallic grid structure from which ice blocks can be removed without applying artificial heat thereto.

Another object of my invention is to provide an improved grid structure for an ice tray of the type which comprises two sections movable relative to one another for effecting release of ice blocks from the structure.

A further object of my invention is to provide an improved grid structure for an ice tray comprising two relatively movable sections each including a portion disposed one above the other in substantially the same vertical plane and being corrugated to provide irregular surfaces which act against the ice during movement of the sections relative to one another for breaking the bond between the ice and walls of the grid structure.

Still further and more specific objects and advantages reside in details of construction of my improved grid structure and in novel combinations and arrangements of parts thereof as will more fully appear in the course of the following description:

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 device shown in Fig. 1 and is taken on the line 2—2 thereof;

Fig. 3 is a view similar to Fig. 2 showing the grid together with ice blocks bonded thereto elevated relative to the tray;

Fig. 4 is a view of the grid and ice blocks removed from the tray with the ice blocks at one end of the structure removed therefrom to more clearly illustrate the movement of the two grid sections relative to one another;

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3 showing portions of the two-part grid structure in cooperative association to form a partition;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 4 showing the cooperating portions of the grid moved relative to one another; and

Fig. 7 is a sectional view taken on the line 7—7 in Fig. 2 showing the association of the cooperating portions of the two-part grid structure with the transverse members thereof.

Referring to the drawings, for the purpose of illustrating the invention, I have disclosed in Figs. 1, 2, 3 and 5 a metal ice tray 10 having side walls 11 (see Fig. 5), a bottom wall 12 and opposed end walls 13 and 14. The tray side walls 11 and the end walls 13 and 14 thereof converge upwardly toward the top of the tray. The upright 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 13 thereof and provides a mounting for a heavy metal piece 17 which has a handle 18 pivotally secured thereto. The handle 18 facilitates placing 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 as is well-known in the art.

A metallic grid structure is removably disposed within tray 10 and divides the interior thereof into a plurality of open-top molds, cells or compartments 21. The grid structure comprises two sections 22 and 23 which are movable relative to one another. The grid section 22 includes a longitudinal portion or member having a lever 24 pivotally secured as by pin 25 to each end thereof. The grid section 23 includes a longitudinal portion or member cut out as at 26 for the reception of the longitudinal portion of section 22 and providing upwardly directed ends 27. The longitudinal portions or members of the sections 22 and 23 are disposed one above the other in substantially the same vertical plane (see Figs. 5, 6 and 7) within tray 10. The longitudinal portions of sections 22 and 23 are each provided with longitudinally extending corrugations 22*a* and 23*a* for a purpose to be hereafter described. By disposing the longitudinal portions or members of sections 22 and 23 one above the other in substantially the same vertical plane they form complementary parts of a longitudinally extending dividing member or partition of single thickness which two-part partition is common to a plurality of the ice block compartments 21. The corrugations 22*a* and 23*a* form obstructions along the sides of the complementary parts of the dividing member or partition and provide the partition with irregular wall surfaces which have a function that will become apparent in the description of the operation of the device. The longitudinal portion of upper section 22 of the grid structure has a plurality of spaced apart slots 31 provided therein (see Fig. 7) for re-

ceiving a web portion 32 of a plurality of members 33 which extend transversely to the longitudinal portions of the grid sections 22 and 23 and contribute to the formation of the compartments 21 adapted to have the ice blocks 21a frozen therein. The transverse members 33 each have a slot 34 cut therein (see Fig. 7) and located beneath the web portion 32 thereof. The side walls of the upper part of slot 34 in members 33 are adapted to firmly engage and be rigidly secured to the web portion 35 of the longitudinal member or section 22 located below the slot 31 therein. The side walls of the lower part of slot 34 in members 33 are spaced a little farther apart than the side walls at the top of the slot to permit the transverse members 33 to loosely fit over the lower section 23 of the grid structure. The transverse members 33 are thereby carried by the upper grid section 22 and straddle the lower grid section 23 to permit the bottoms thereof to extend in the same horizontal plane with the bottom of member 23. It will be noted by referring to Fig. 2 of the drawings that the upper end of the upwardly directed portions 27 on grid member or section 23 is normally disposed below the top or rim 13 of tray 10 when the grid structure is in its normal position within the tray. Levers 24 each have a long handle portion 38 normally spaced by integral lugs 39 from the top surface of the grid structure. Levers 24 also include a short end portion 41 the purpose of which will become apparent in the description of the operation of the device. By virtue of pivotally mounting levers 24 to the grid structure by pins 25 they have but a single direction of rotation for performing two functions as will be fully explained hereinafter.

Assume that water has been frozen in the tray 10 in the form of the blocks of ice 21a in compartments 21, by the refrigerating effect produced by a cooling element of a refrigerating system, and the tray handle 36 has been manipulated to release the tray from the element and it is now desirable to remove the ice blocks from the grid structure. The handles 38 of levers 24 are therefore preferably simultaneously elevated to pivot the levers about pins 25 and to cause the short ends 41 thereof to engage the rim 15 of tray 10 and exert force against the tray. This force applied to tray 10 causes the grid structure including the longitudinal portions or members 22 and 23 and transverse members 33 together with the ice blocks 21a adhering to these members to be elevated relative to the tray. This force applied to the tray breaks the bonds between the ice and the tray and causes the entire grid structure and the ice blocks to be removed as a unit from the tray as can best be seen by referring to Fig. 3 of the drawings. The grid structure with the ice adhering thereto is then moved away from tray 10 preferably into a position over a container adapted to receive the ice blocks 21a. The levers 24 are then further rotated in their single direction of motion about pins 25 to cause the short ends 41 thereof to engage the tops of the upwardly extending portions 27 of members 23. Force applied by levers 24 attached to members 22 causes a vertical movement of the grid sections 22 and 23 relative to one another (see Fig. 4). This relative movement of sections 22 and 23 away from one another causes the convex and concave portions of the longitudinal corrugations or obstructions 22a and 23a to act as cam means against the ice blocks 21a and this camming action moves the ice blocks relative to walls of the grid structure. By referring to Fig. 6 of the drawings it will be noted that the convex portion of the corrugation 22a in member 22 cooperates with the convex portion of the corrugation 23a in member 23 during separation of these members to force the ice blocks 21a lengthwise of the transverse members 33 and outwardly away from the two-part partition. The bond between all the grid walls and the blocks of ice is broken in this manner and the ice blocks 21a can now be readily removed from the grid structure.

While I have disclosed the longitudinal members of the grid sections 22 and 23 as being entirely separable from one another it may be desirable to secure these sections together and permit only sufficient movement therebetween to effect the ice block releasing action. It is also to be understood that while I have corrugated the longitudinal members of the movable sections 22 and 23 of the grid structure to provide the partition with irregular wall surfaces it is well within the realm of my invention to provide other forms of obstructions on the members to provide suitable irregular wall surfaces on the dividing members forming the partition to effect the camming action desired.

From the foregoing it will be seen that I have provided an improved combination and particularly a novel ice tray grid structure which is of simple construction, low manufacturing cost, strong and durable, capable of being operated with a minimum of force to effectively break the bond between ice blocks and the grid walls. My improved structure thereby eliminates the necessity of running water over the grid structure or of applying other artificial heat thereto to release ice blocks therefrom. The improved structure is constructed entirely of metal to thereby retain the fast freezing characteristics of metal tray and grid combinations. In my improved grid structure the levers have a single direction of rotation for elevating the structure together with ice blocks adhering thereto relative to the tray and for breaking a bond between the ice blocks and the grid after the ice and grid structure has been removed from the tray.

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. A grid for ice trays comprising a plurality of sections, said sections of said grid each having a portion extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a dividing member, each portion of said sections of said grid having a corrugation therein providing said dividing member with an irregular wall surface, said sections of said grid being relatively movable, and the corrugation in one of said portions of said sections cooperating with the corrugation in the other portion of said sections to move ice away from the wall surface of said dividing member upon moving said grid sections relative to one another.

2. A grid for ice trays comprising relatively movable sections, said sections of said grid each having a relatively long portion extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a longi-

tudinal dividing member, said grid also having transverse portions carried by one of said long portions thereof and projecting over the other long portion of the grid and cooperating therewith to partition the interior of the tray, each long portion of said sections of said grid having a corrugation therein providing said longitudinal dividing member with irregular wall surfaces, and the corrugation in one of said long portions of said sections cooperating with the corrugation in the other long portion of said sections to move ice lengthwise along the transverse portions of the grid and away from the wall surface of said dividing member upon moving said grid sections relative to one another.

3. In combination, a tray having a grid structure removably disposed therein and dividing the interior thereof into a plurality of ice block compartments, said grid structure comprising relatively movable sections, said sections of said grid each having a member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a partition between certain of said compartments, each member of said sections having a corrugation therein providing said partition with an irregular wall surface, means for elevating said sections of said grid structure together with ice blocks adhering thereto relative to the tray as a unit, means for applying force between said sections after the grid structure and ice adhering thereto has been elevated relative to the tray to move the members of said partition relative to one another, and the corrugation in one of said members cooperating with the corrugation in the other of said members to move the ice block adjacent said members away from said partition upon movement of the members relative to one another.

4. In combination, a tray having a grid structure removably disposed therein and dividing the interior thereof into a plurality of ice block compartments, said grid structure comprising relatively movable sections, said sections of said grid each having a member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a partition between certain of said compartments, each member of said sections having a corrugation therein providing said partition with an irregular wall surface, a lever carried by one of said grid sections and adapted to engage the tray for elevating said sections of said grid structure together with ice blocks adhering thereto relative to the tray as a unit, and said lever being constructed and arranged to apply force between said sections after the grid structure and ice adhering thereto has been elevated relative to the tray to move the members of said partition away from one another, the corrugation in one of said members cooperating with the corrugation in the other of said members to move the ice block adjacent said members away from said partition upon movement of the members relative to one another.

5. In combination, a tray having a grid structure removably disposed therein and dividing the interior thereof into a plurality of ice block compartments, said grid structure comprising relatively movable sections, said sections of said grid each having a member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a partition between certain of said compartments, each member of said sections having a corrugation therein providing said partition with an irregular wall surface, a lever carried by one of said grid sections and having a single direction of rotation for engaging the tray and elevating said sections of the grid structure together with ice blocks adhering thereto relative to the tray as a unit and for thereafter engaging the other of said grid sections to apply force between the sections to move the members of said partition away from one another, and the corrugation in one of said members cooperating with the corrugation in the other of said members to move the ice block adjacent said members away from said partition upon movement of the members relative to one another.

6. In combination, a tray having a grid structure removably disposed therein, said grid structure comprising relatively movable sections, said sections of said grid structure each having a relatively long member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a longitudinal partition, said grid structure also having transverse members carried by one of said long members of said sections and projecting over the long member of the other of said grid sections to divide the interior of the tray into a plurality of ice block compartments, each long member of said sections of said grid having a corrugation therein providing said longitudinal partition with irregular wall surfaces, means for elevating said sections of said grid structure together with ice blocks adhering thereto relative to the tray as a unit, means for applying force between said sections after the grid structure and ice adhering thereto has been elevated relative to the tray to move the grid sections relative to one another, and the corrugation in one of said long members cooperating with the corrugation in the other of said long members to move the ice blocks adjacent said long members lengthwise along the transverse members and away from the wall surface of said longitudinal partition upon moving said grid sections relative to one another.

7. In combination, a tray having a grid structure removably disposed therein, said grid structure comprising relatively movable sections, said sections of said grid structure each having a relatively long member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a longitudinal partition, said grid structure also having transverse members carried by one of said long members of said sections and projecting over the long member of the other of said grid sections to divide the interior of the tray into a plurality of ice block compartments, each long member of said sections of said grid having a corrugation therein providing said longitudinal partition with irregular wall surfaces, a lever carried by one of said grid sections and adapted to engage the tray for elevating said sections of said grid structure together with ice blocks adhering thereto relative to the tray as a unit, and said lever being constructed and arranged to apply force between said sections after the grid structure and ice adhering thereto has been elevated relative to the tray to move the grid sections relative to one another, the corrugation in one of said long members cooperating with the corrugation in the other of said long members to move the ice blocks adjacent said long members lengthwise along the transverse members and away from the wall surface of said longitudinal

partition upon moving said grid sections relative to one another.

8. In combination, a tray having a grid structure removably disposed therein, said grid structure comprising relatively movable sections, said sections of said grid structure each having a relatively long member extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a longitudinal partition, said grid structure also having transverse members carried by one of said long members of said sections and projecting over the long member of the other of said grid sections to divide the interior of the tray into a plurality of ice block compartments, each long member of said sections of said grid having a corrugation therein providing said longitudinal partition with irregular wall surfaces, a lever carried by one of said grid sections and having a single direction of motion for engaging the tray and elevating said sections of the grid structure together with ice blocks adhering thereto relative to the tray as a unit and for thereafter engaging the other of said grid sections to apply force between the sections to move the sections relative to one another, and the corrugation in one of said long members cooperating with the corrugation in the other of said long members to move the ice blocks adjacent said long members lengthwise along the transverse members and away from the wall surface of said longitudinal partition upon moving said grid sections relative to one another.

9. A grid for ice trays comprising a plurality of sections, said sections of said grid each having a portion extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a dividing member, each portion of said sections of said grid having an obstruction thereon providing said dividing member with an irregular wall surface, said sections of said grid being relatively movable, and the obstruction on one of said portions of said sections cooperating with the obstruction on the other portion of said sections upon moving said grid sections relative to one another to apply force to ice adjacent said wall surface for moving the ice away from said dividing member.

10. A grid for ice trays comprising a plurality of sections, said sections of said grid each having a portion extending parallel to one another and being disposed one above the other in substantially the same vertical plane and forming complementary parts of a dividing member, each portion of said sections of said grid being provided with an irregular wall surface, said sections of said grid being relatively movable, and the irregular wall surface of one of said portions of said sections cooperating with the irregular wall surface of the other portion of said sections to move ice away from the wall surface of said dividing member upon moving said grid sections relative to one another.

11. A freezing device comprising in combination, a tray, a grid disposed within said tray, said grid comprising a plurality of sections, said sections of said grid each including an upright portion arranged in alignment along the longitudinal axis of the tray and forming a sectional partition removable from said tray, one of said sections of said removable sectional partition also having a second upright portion carried thereby and extending laterally from said partition on either side thereof to provide another partition removable with said one grid section from the tray, said second upright portion of said one grid section cooperating with said first upright portion thereof and with the tray to provide a plurality of ice contacting walls of ice block compartments, said one section of said plurality of grid sections being arranged to receive a lifting force for moving same relative to another section thereof, and said one section having a part thereof arranged to provide an obstruction to relative straight line movement thereof between ice blocks bonded to said grid to thereby resolve the first mentioned force into components some of which tends to break the bond between the ice blocks and said partitions.

12. A freezing device comprising in combination, a tray, a grid disposed within said tray and removable therefrom, said grid comprising a plurality of sections each movable relative to one another, each section of said grid including an upright portion, each of said upright portions being arranged in alignment with one another along a longitudinal axis of the tray to form collectively a longitudinally extending partition, one of said sections including a second upright portion carried by the first mentioned upright portion and removable therewith from the tray, said second upright portion extending laterally on both sides of said first mentioned portion to form, in cooperation with the longitudinally extending partition, a plurality of ice contacting walls of ice block compartments, said last named one section being provided with means adapted to receive a force for moving said section relative to another section, and each section including an obstruction to relative straight line movement thereof between ice blocks and the ice contacting walls of the ice block compartments whereby, upon application of force to said means, the bond between ice blocks and the ice contacting walls of the ice block compartments is broken.

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