Jan. 31, 1950 F. W. SAMPSON 2,496,133

FREEZING TRAY

Filed Feb. 7, 1946 2 Sheets-Sheet 1

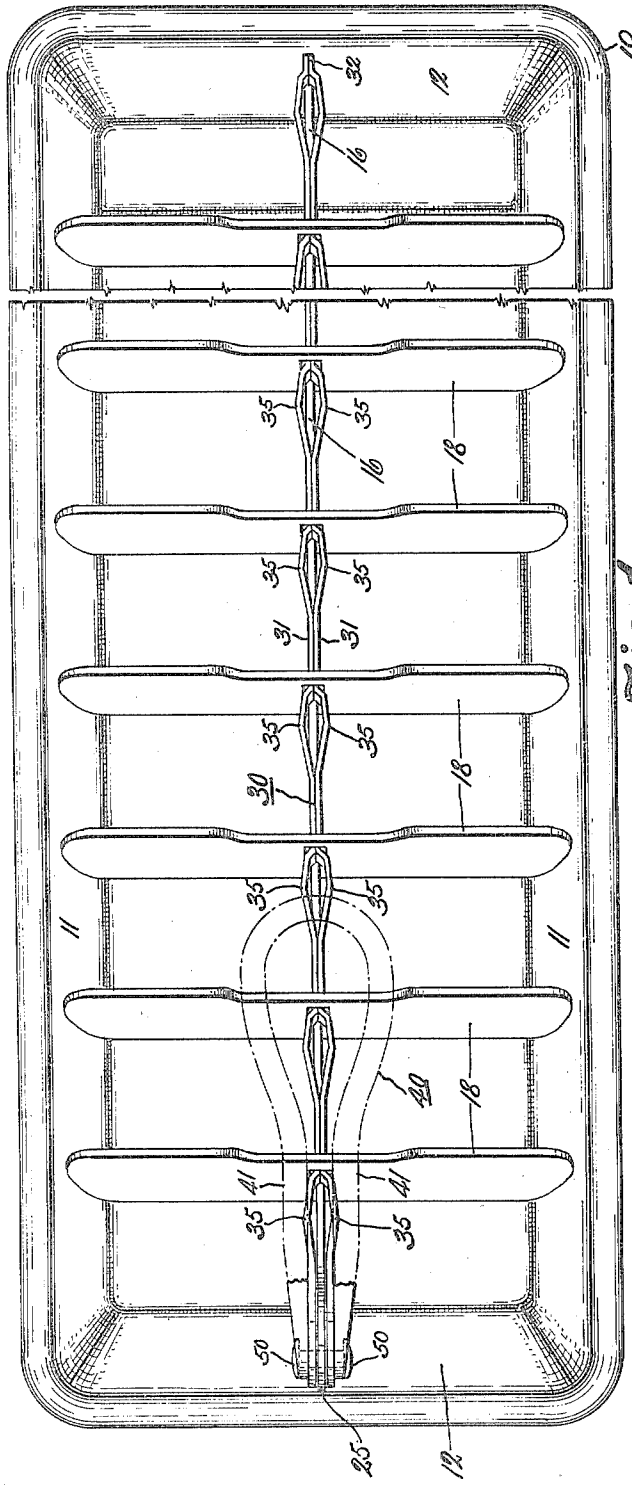


Fig. 1

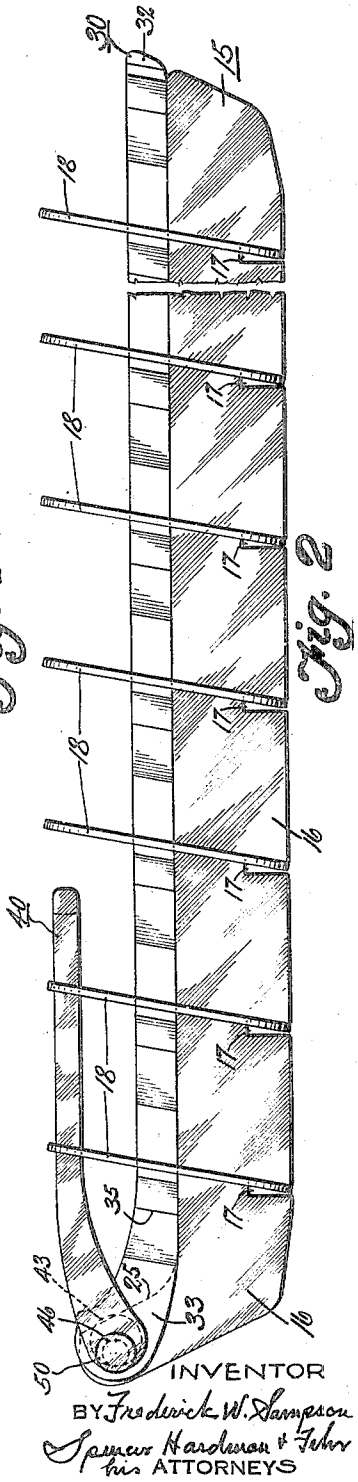


Fig. 2

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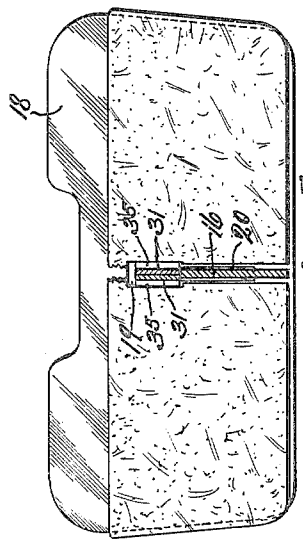


Fig. 5

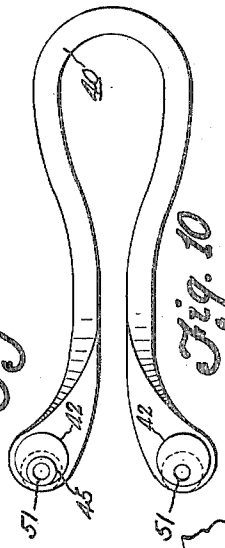


Fig. 10

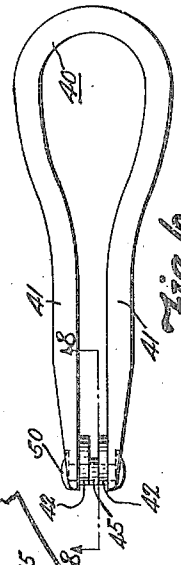


Fig. 6

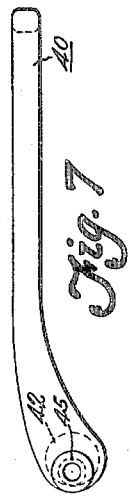


Fig. 7

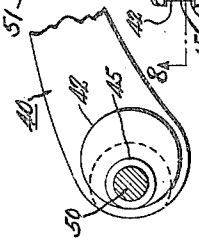


Fig. 8

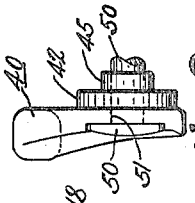


Fig. 9

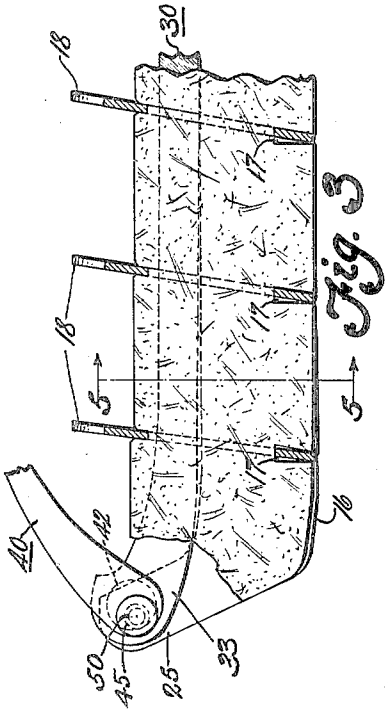


Fig. 3

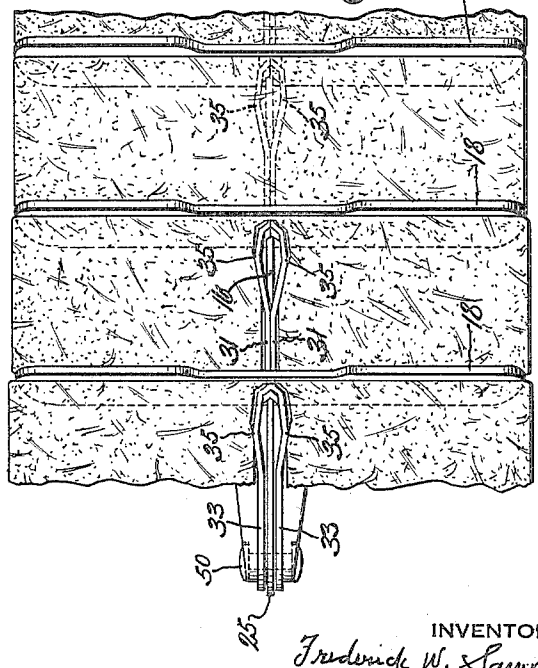


Fig. 4

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## FREEZING TRAY

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Application February 7, 1946, Serial No. 646,099

5 Claims. (Cl. 62—108.5)

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This invention relates to mechanically-ejecting freezing trays for general use in household refrigerators.

An object of this invention is to provide such a device having improved mechanism for mechanically loosening the bonded ice blocks from both the container pan and the grid, or from the grid alone if the pan be first removed leaving the ice blocks still bonded to the grid.

The device of this invention is somewhat similar to that disclosed and claimed in my copending application Ser. No. 639,529, filed January 7, 1946.

A feature of this invention is the slightly distortable ice-block-loosening member which, when forced to move endwise thru the ice in which it is embedded in order to loosen the ice blocks, will distort at successive portions along its length starting at the end thereof at which the endwise force is applied. This will cause the ice blocks to be loosened from the grid progressively along the length thereof and so greatly reduce the force necessary to operate the mechanism.

One feature of this invention is the endwise movable ice-camming member comprising two elongated bars having lateral bends therein which serve to cam the adjacent ice blocks laterally apart and also serve to provide the desired longitudinal stretchability to said member under the endwise force applied thereto.

Another feature of this invention is the provision of loosely mounted cross walls capable of being tilted thru a substantial angle in the direction of movement of the ice-camming member whereby the movement of the ice blocks under the influence of said ice-camming member is facilitated and the loosened ice blocks more readily removed from the grid.

Another feature is the use of lateral bends in the ice-camming member to return the loosely mounted tiltable cross walls to their proper freezing positions when the remaining grid parts are placed in their proper freezing positions at the start of a freezing operation.

Another feature of this invention is the simple and efficient structure of the hand lever and its pivotal connections to the movable ice-camming member and the stationary partition upon which said hand lever is mounted. By casting the eccentric journals for moving the ice-camming member integral with other portions of the hand lever the cost of making and assembling these parts is very materially reduced. In order to facilitate such casting of the two eccentric journals integral with the two legs respectively of the

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U-shaped hand lever, said hand lever is originally cast in a shape with the two eccentric journals extending in the same direction and at right angles to the general plane of the U-shaped lever. Thereafter said two eccentric journals are brought into their final directly opposed positions by twisting each of the two legs of said U-shaped lever thru 90 degrees.

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:

Fig. 1 is a plan view of the ice tray of this invention, the parts being shown in freezing position.

Fig. 2 is a side elevation of the grid of Fig. 1 removed from the pan, the parts all being shown in freezing position.

Fig. 3 is a view illustrating the ice-block-loosening operation with the hand lever moved just far enough to loosen the first two pairs of ice blocks, leaving the remaining ice blocks still bonded to the grid.

Fig. 4 is a plan view of Fig. 3 but shows certain ice-embedded parts in full lines.

Fig. 5 is a section on line 5—5 of Fig. 3.

Figs. 6 to 9 are detail views of the hand lever. Fig. 6 is a plan view of the hand lever in final form.

Fig. 7 is a side elevation of Fig. 6 but omitting the rivet.

Fig. 8 is an enlarged view taken on line 8—8 of Fig. 6.

Fig. 9 is an end view of Fig. 8.

Fig. 10 is a view showing the hand lever as originally die cast.

Similar reference characters refer to similar parts throughout the several views.

10 designates the container pan, which preferably is stamped in one-piece from sheet aluminum or aluminum alloy, and has outwardly inclined side walls 11 and end walls 12. The removable grid 15 comprises a main longitudinal wall 16 having a series of spaced notches 17 in its lower edge to loosely receive the continuous portions of the cross walls 18. Cross walls 18 have central slots 20 thru which the continuous portions of main wall 16 loosely extend. These central slots 20 each terminates at its top in a somewhat wider hole 19 whose bottom edge lies approximately at the top edge of main wall 16 (see Fig. 5). The combined depths of the slot 20

and its communicating hole 19 is sufficient to permit main wall 16 to be assembled endwise thru the cross walls 18 and then cross walls 18 are located in their notches 17 therein.

After cross walls 18 are so assembled upon main wall 16, the two metal strips 31 which form the ice-block loosening member 30 are inserted endwise thru all the holes 19 in cross walls 18 and thereafter serve to retain said cross walls loosely assembled upon the main wall 16. This ice-block-loosening member 30 is composed of two normally contacting metal strips 31 which are preferably of somewhat lighter guage metal than main wall 16 and somewhat flexible. The forward ends 33 of strips 31 are spread apart and lie on opposite sides of the upstanding projection 25 on main wall 16. These metal strips 31 are each provided with lateral bends, such as shown in the drawings, to provide opposed lateral bulges 35 therein which serve to force the ice blocks outwardly from main wall 16 upon the longitudinal movement of member 30 to the left (as viewed in Figs. 1 and 2). When the operating tension is applied to the front end of the two strips 31 the most forward lateral bends therein will slightly straighten out under the applied tension, and so cause a slight stretching of the forward portions of said strips. This will cause a slight forward movement of the forward slopes of the first pair of bulges 35 which are embedded in the first pair of ice blocks, which will result in this first pair of ice blocks being cammed loose from the grid. Thereupon the tension in strips 31 can reach the second pair of bulges 35 which will similarly loosen the second pair of ice blocks. This action proceeds in progressive order throughout the full length of the grid from left to right as viewed in Figs. 1 and 2. Thus the pairs of ice blocks are loosened in successive order from left to right during the ice-block-loosening operation. As soon as the ice blocks are loose in the grid further movement of the bulges 35 to the left further cams them laterally outward causing them to ride upwardly on the inclined walls of pan 10.

Member 30 is pulled to the left (as viewed in Figs. 1 and 2) by means of a hand lever 40 pivoted upon the upstanding projection 25 on main wall 16. Each leg 41 of the U-shaped hand lever 40 has integral therewith an eccentric journal 42 which has a bearing fit within a corresponding hole 43 in each of the front ends 33 respectively of the two metal strips 31. One of these legs 41 is shown as having a further journal 45 which has a bearing fit within a corresponding hole 46 in main wall 16, which serves as the pivot bearing for lever 40.

In order to assemble lever 40 to its connected parts, the two legs 41 thereof may be readily sprung apart sufficiently to slip the two eccentric journals 42 into their bearing holes 43 in the front ends 33 of the two strips 31, and to slip the pivot-journal 45 into its bearing hole 46 in main wall 16. Then a rivet 50 is passed thru the central hole 51 thru both legs 41 of the lever and riveted over to rigidly fix the parts of lever 40 in the position best shown in Fig. 6. During such riveting, pivot journal 45 serves as a spacer to provide proper lateral clearance between the moving parts and so permits the tight riveting of rivet 50 to hold the two legs 41 rigidly fixed together to provide suitable rigidity and strength. It will now be clear than when lever 40 is swung counterclockwise thru 180 degrees from its freezing position, shown in Fig. 2, the two eccentric journals 42 will pull the front end of the ice-block-loosening member 30 to the left a longitudinal travel equal to twice the eccentric offset of the eccentric journals 42. In Fig. 8 this travel is shown as equal to the diameter of the main journal 45, but this maximum travel may be made greater or less, as desired, by increasing or decreasing the eccentric offset of journals 42 relative to the pivot journal 45.



The operation of the device may be as follows:

The removable grid 15 is placed loosely in pan 10, as shown in Fig. 1. Pan 10 is filled with water to its normal water level which is preferably some distance above the top edge of the ice-block-loosening member 30, as indicated in Figs. 3 and 5. This assembly is then placed in a freezing compartment and the water is frozen solid and bonded to the contacting metal surfaces. When it is desired to remove some or all of the frozen ice blocks, the tray is removed from its freezing chamber and the hand lever 40 immediately operated to loosen the ice blocks from both pan and grid, without the necessity of applying any heat to aid in such loosening.

The initial movement of lever 40 about its pivot 45 first slightly raises and applies tension to both of the connected end portions 33 of the two metal strips 31. The first pair of ice blocks may be loosened by the very first movement of the two end portions 33, but if not, the following action takes place. The tension applied to the end portions 33 acts first on the nearest two lateral bulges 35 and causes these bends in strips 31 to straighten out slightly and thereby force the first two ice blocks loose from both the grid and pan. In this connection it should be noted that the flexible bulges 35 are embedded well down in the ice and that ice fills the space between the opposed bulges 35, hence only a very slight straightening of the most forward bends in the metal strips 31 will be sufficient to loosen the contacting ice blocks. This first pair of ice blocks may be loosened without any movement of the first cross wall 18, but said first cross wall may stick to the first ice blocks and be moved thereby.

As soon as this first pair of ice blocks have been loosened, the tension applied to the two metal strips 31 by lever 40 can reach the portions of said strips embedded in the second pair of ice blocks. This will cause the forward slopes on the second pair of bulges 35 to straighten out slightly and move forward sufficiently to wedge this second pair of ice blocks laterally apart and loosen them from both the pan and the grid. Only after this second pair of ice blocks are loose can the tension in strips 31 reach the third pair of ice blocks, which will then be loosened in a similar manner. Similarly all the remaining pairs of ice blocks are loosened successively from the front end to the rear end of the grid.

The forward slopes of each pair of bulges 35 together act as a sort of wedge to force the opposed ice blocks laterally apart and to simultaneously force them toward the front end of the pan 10. Hence the first pair of ice blocks will also be forced against the inclined end wall 12 of pan 10, causing said ice blocks to ride upwardly on said inclined wall 12. The other pairs of ice blocks also tend to move forward as well as laterally apart from each other but since their bottom edges are permitted only a very slight forward movement, due to the anchoring of the cross walls 18 at their bottom edges, the remaining pairs of ice blocks will be urged to tilt forward by the force exerted thereupon by the bulges 35. Since

all the cross walls 18 are free to tilt forward due to the shape of their mounting notches 17, all of the cross walls 18 will freely permit the ice blocks to tilt forward under the influence of the force applied thereto by the bulges 35. This freedom of the ice blocks to be tilted forward while they are being wedged apart laterally by the bulges 35 materially facilitates the ice-block-loosening operation and also permits the loosened ice blocks to more freely slide from the grid by gravity when the grid is lifted from the pan.

Figs. 3 and 4 illustrate the stage of the ice-loosening operation where only the first two pairs of ice blocks have been loosened by the slight distortion at the first two bulges 35, while the third pair of bulges 35 and all the remaining bulges 35 are still solidly embedded in the ice. The first pair of ice blocks are illustrated as having been wedged apart a substantial distance, the second pair has been wedged apart a lesser distance, while the third pair of ice blocks have not been moved at all. The first cross wall 18 has been tilted forward slightly by the forward tilting movement of the second pair of ice blocks. It is to be understood that this successive loosening of the pairs of ice blocks follows very closely one pair after the other, nevertheless the successive order is maintained. This very greatly reduces the force required to move the sliding member 30. After all the ice blocks have been loosened from the grid, the grid may be simply lifted by hand and the loose ice blocks will drop therefrom by gravity down into pan 10. If only several ice blocks are wanted at the time, the hand lever 40 may be swung only far enough to loosen the desired several blocks from both pan and grid, and still leave the remaining ice blocks solidly frozen in the grid for later use.

When starting a freezing operation, the grid is simply set in pan 10 and the hand lever 40 thrown over to the position shown in Fig. 2. This will automatically properly position and retain all the cross walls 18 in freezing position due to the fact that the rear slopes of the bulges 35 will engage and positively move the cross walls to their rearwardly inclined positions shown in Figs. 1 and 2. As shown in Fig. 1, a pair of opposed bulges 35 are normally somewhat wider than the holes 19 in cross walls 18 thru which strips 31 are passed during assembling of the grid. However this will not prevent the two strips 31 from being passed thru holes 19 when the bulges 35 are not positioned directly opposite each other on the two strips 31. Also even if the bulges 35 are directly opposed on the two strips 31, they can be squeezed together by springing the metal thereof sufficiently to pass thru said holes 19. Preferably the strips 31 are fixed together at 32 by spot welding after assembling.

Preferably the hand lever 40 is originally die cast in the shape shown in Fig. 10, which shows the two legs 41 thereof turned upwardly at an angle of 90 degrees from the final shape shown in Fig. 6. By casting lever 40 in this form the eccentric journals 42, the pivot journal 45, and the hole 51 therethru all extend in the same direction and hence may be readily die cast to accurate dimensions which will require no machining. After casting, the two legs 41 are each deformed by twisting same 90 degrees to bring their journal ends into directly opposed position with the two journals 42 in alignment. The final exact alignment of said journals 42 is permanently retained by inserting rivet 50 thru the holes 51



during assembling of the grip parts, as described above.

If so desired, all metal parts of the grid and pan which contact the ice have their ice-contacting surfaces rendered water repellent by any presently known manner. These metal parts may be suitably made of anodized aluminum and finally treated with a hard wax or other water-repellent coating which will strongly adhere thereto.

It will be obvious to those skilled in the art that the cross walls 18 may be loosely mounted upon main wall 16 in any other suitable manner than that shown, for instance, cross walls 18 may extend approximately vertically or be inclined toward the opposite direction from that shown in the drawings.

While the 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 partitioning grid for a freezing tray for dividing the ice contents into ice blocks of suitable size for table use, said grid having a longitudinally stretchable block-loosening member arranged so as to be embedded in the ice contents of said tray, said member having a series of laterally extending yieldable bulges in the material thereof spaced along its length each of which provides for a slight elongation of said member by a partial straightening out of said lateral bulges when substantial endwise force is applied thereto, and means for pulling said member endwise when solidly embedded in the ice so as to stretch said lateral bulges in successive order along the length of said member and thereby loosen the ice blocks in successive order along the length of said grid.

2. A partitioning grid for a freezing tray for dividing the ice contents into ice blocks of suitable size for table use, said grid comprising: a main partition, a series of cross walls spaced along the length of said main partition, a longitudinally stretchable block-loosening strip arranged to be embedded in the ice contents adjacent said main partition and longitudinally movable relative thereto, said strip having a series of laterally extending deformations spaced along its length which cam the contacting ice blocks laterally outwardly from said main partition upon the longitudinal movement of said strip, and means for applying tension to said strip so as to concomitantly stretch and move successive portions of said strip to progressively loosen the ice blocks from said grid.

3. A partitioning grid for a freezing tray for dividing the ice contents into ice blocks of suitable size for table use, said grid having a longitudinally stretchable block-loosening member located between two rows of ice blocks and arranged to be embedded in the ice contents of said tray, said member comprising two adjacent longitudinally extending strips each having a series of yieldable laterally projecting bands therein which serve to cam the adjacent ice blocks laterally upon the longitudinal movement of said member, and force-multiplying means for moving said member longitudinally to loosen the ice blocks from the grid.

4. A partitioning grid for a freezing tray for dividing the ice contents into ice blocks of suitable size for table use, said grid comprising: a main partition, a series of cross walls loosely

mounted thereupon so as to be capable of some movement in a longitudinal direction thereof, a longitudinally stretchable block-loosening member arranged to be embedded in the ice contents adjacent said main partition, said member comprising two adjacent longitudinal strips each having a series of longitudinally yielding laterally projecting bends therein spaced along the length of said strips and arranged to force the contacting ice blocks laterally upon the longitudinal movement of said member, and force-multiplying means for moving said member longitudinally to loosen the ice blocks from the grid.

5. A partitioning grid for a freezing tray, said grid comprising a longitudinally movable member for loosening the ice contents from said grid, a hand lever having a pivot bearing upon a grid wall for moving said member longitudinally, said lever having two opposed legs extending from mutually opposite sides of said pivot bearing, each of said legs having an integral journal thereon eccentric to said pivot bearing and lying closely adjacent opposite sides of said pivot bearing, said eccentric journals being connected to said longitudinally movable member for moving same longitudinally when said lever is swung about said pivot bearing, said two opposed legs being temporarily movable apart from one another to permit assembling of the lever and grid parts, and means for thereafter fixing said two opposed legs together to retain the lever and grid parts in assembled relationship.



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