Jan. 27, 1970 B. STERNER 3,492,040

ICE TRAY

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Fig.2

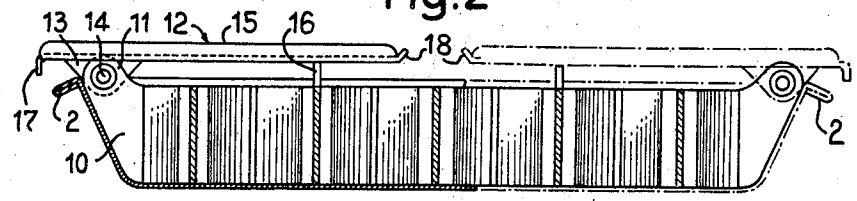


Fig.1

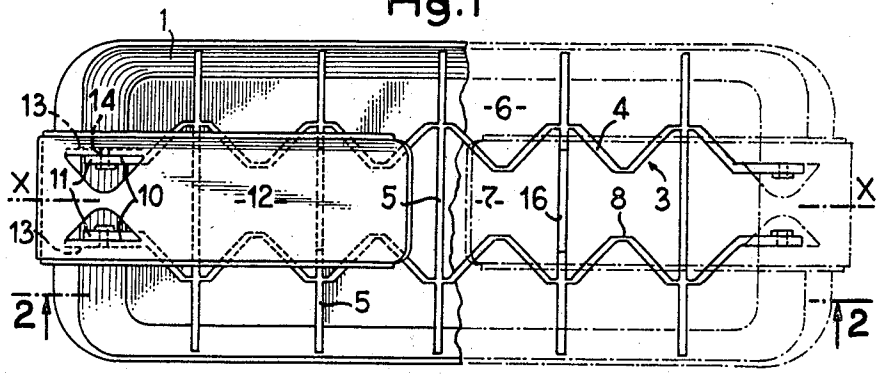


Fig.4

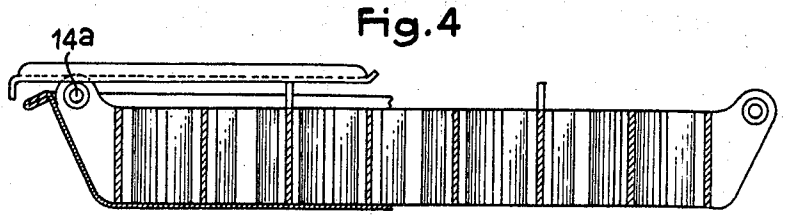
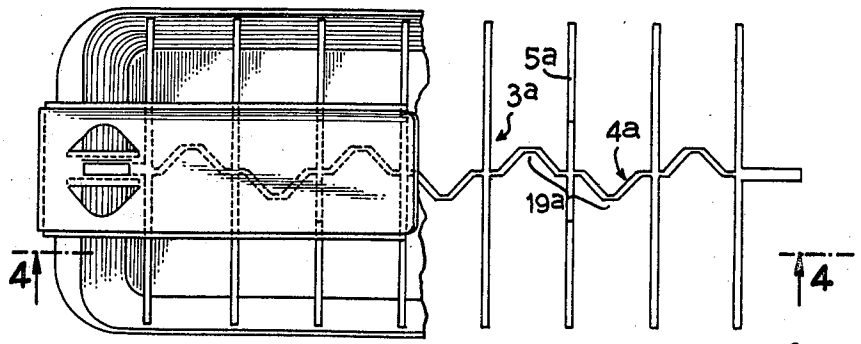


Fig.3



Bernard Sterner
Inventor

By. Wenderoth, Lind & Ponack
attorneys

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Fig. 5

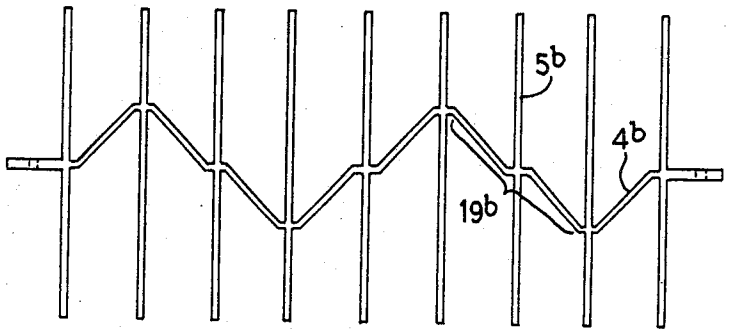
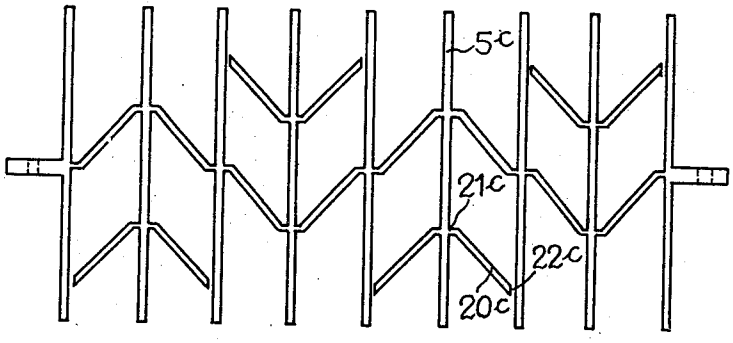


Fig. 6



Bernard Sterner,
Inventor

By, Wenderoth, Lind and Ponack,
Attorneys

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ICE TRAY

Bernard Sterner, 7 Square Gabriel Faure,
75 Paris, France

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ABSTRACT OF THE DISCLOSURE

An ice tray structure having a deformable grid and two handles respectively pivoted to the ends of the grid on portions of the grid projecting above the water or ice level in the ice tray, the handles being adapted to bear against the upper edge of the tray when pivoted so as to raise the grid, stretch it longitudinally and detach the ice blocks from the tray and the grid of which the following is a specification.

The present invention relates to ice trays employed in refrigerators for producing ice blocks or cubes.

A first type of known ice tray comprises a container containing a rigid grid of metal or plastics material, but this device is not practical since the ice blocks are difficult to detach from the tray and the grid. Another type of ice tray is also known in which the grid is composed of longitudinal and transverse elements disposed with respect to each other in such manner as to form compartments in the shape of an oblique prism, a handle being provided for shifting one series of elements with respect to the other and imparting to the compartments the shape of a right prism which increases their volume and thus releases the ice blocks. This device is unsatisfactory since the pivotal connection of the handle to the grid freezes and becomes blocked. Moreover, the force exerted on the handle is considerable and the handle often breaks.

The object of the invention is to remedy these drawbacks. The invention provides an ice tray structure employed in refrigerators for producing ice blocks, said tray structure comprising a deformable grid having at least one extensible longitudinal partition wall and transverse partition walls defining compartments, the or each longitudinal partition wall having at each end a portion which extends above the level of the water or of the ice in the tray and to which a handle is pivoted, each handle cooperating with the upper edge of the tray so as to raise and stretch the grid and detach the ice blocks from the tray and the grid.

The shape of the elements which constitute the grid is such that when the handles are shifted, all the compartments are deformed horizontally and increase in volume.

Further features and advantages of the invention will be apparent from the ensuing description with reference to the accompanying drawings.

In the drawings:

FIG. 1 is a plan view of an ice tray structure according to the invention;

FIG. 2 is a longitudinal sectional view taken along line 2—2 of FIG. 1;

FIG. 3 is a partial view similar to FIG. 1 of a modification of the invention;

FIG. 4 is a sectional view taken along line 4—4 of FIG. 3, and

FIGS. 5 and 6 are plan views of grids of utility for the tray structure according to the invention.

In the preferred embodiment shown in FIGS. 1 and 2, an ice tray structure according to the invention comprises a tray proper 1, having a roughly rectangular shape and including on its two small sides an outer flange 2. The

tray is completed by a grid 3 having two longitudinal walls 4 and transverse walls 5 defining cavities or compartments 6, 7.

The two longitudinal walls have a "concertina" or zig-zag shape and are disposed symmetrically relative to the longitudinal axis X—X of the tray. The transverse partition walls are plane and perpendicular to the axis X—X and disposed in sections of the two longitudinal partition walls which are spaced the maximum distance apart.

The grid is deformable and the articulations 8 and 9 of the partition walls are, in the presently-described embodiments, in the form of a thinning down of the material of which the partition walls are composed, this material being preferably a plastics material.

At each end, the longitudinal walls comprise a tab 10 which is parallel to the axis X—X and slightly thicker and extended at 11 in such manner as to partially extend above the level of the water or the ice contained in the tray. Mounted between these tabs are handles 12 comprising lugs 13 which are lanced and bent down from the handles and pivoted to the grid by means of rivets 14.

The handles 12 have an upper surface 15 which is plane so as to enable a plurality of ice tray structures to be stacked one on top of the other. Further, one of the transverse partition walls comprises a projecting portion 16 on which the handle rests in its normal position so as to ensure that this handle does not freeze and become held in the ice.

Each handle comprises outside the tray a downwardly extending flange 17. The other end of the handle is designated by the reference numeral 18.

The ice tray structure operates in the following manner:

Assuming that ice blocks or cubes are formed in the compartments, to detach the ice blocks from the tray and the grid it is sufficient to raise simultaneously the two ends 18 of the handles. The outer ends of the latter bear on the flanges 2 of the tray and cause an initial upward displacement of the compact block consisting of the grid and the ice blocks. This separates the compact block from the tray.

When the handles are turned still further about their pivot pins 14 the flanges 17 hook onto the flanges 2 of the tray and the initial vertical displacement is followed by a traction in the longitudinal direction exerted on the ends of the partition walls 4. The latter have a longitudinal elasticity and stretch under the action of this traction and this separates the transverse partition walls from each other. The compartments 7 expand laterally and longitudinally and the ice blocks contained therein are consequently released. Further, the longitudinal partition walls are deformed and urge the ice blocks out of the compartments 6, in particular in the region of the articulations 8.

In the course of exerting the traction on the ends of the longitudinal partition walls, the ice blocks are detached in succession, from the ends toward the centre of the grid and this has for effect to diminish the force to be exerted on the handles.

The pivotal connection of the handle on the grid is outside the tray and does not freeze and therefore cannot become blocked. The handle itself is always held out of contact with the ice by the projecting portion 16 and can be easily actuated.

Another advantage resides in the fact that there is no connection between the grid or the actuating device and the tray itself, the latter merely providing a support point when rotating the handles.

FIGS. 3 and 4 show another embodiment in which the grid 3*a* has a different shape and includes only a single longitudinal partition wall 4*a* having a zig-zag shape and consisting of portions 19*a* from the middle of which the transverse partition walls 5*a* extend. Since

there is only one longitudinal element, the pivotal connection of the handles on this longitudinal element is in the form of a single rivet **14***a*.

Two other forms of the grid are shown by way of example.

FIG. 5 shows a grid which comprises a single longitudinal element **4***b* having a zig-zag shape and transverse partition walls **5***b* are disposed at each corner and in the middle of the segments **19***b* constituting the longitudinal partition wall.

The grid shown in FIG. 6 is similar to that shown in FIG. 5 except that the transverse partition walls **5***c* carry additional partition walls **20***c* articulated along one transverse portion **21***c*, the other transverse portion **22***c* being free so as to allow an easy deformation of the thus defined compartments. When the grid is of plastics material, the articulations are usually constructed by decreasing the thickness of the material in the region of these articulations.

Grids can also be constructed from longitudinal partition walls and above all transverse partition walls composed of thin metal sheets.

The partition walls of both series can be merely interlocked or imbricated in one another.

Further, the longitudinal partition walls can be rendered elastic by giving these partition walls a suitable shape (zig-zag, "concertina" or like shape) or by choosing for these partition walls an elastic material such as rubber.

As is clear from these various embodiments, many embodiments can be contemplated which are different in construction and shape but which retain the essential features and operation.

Although specific embodiments of the invention have been described, many modifications and changes may be made therein without departing from the scope of the invention as defined in the appended claims.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. An ice tray structure of use in refrigerators for producing ice blocks, said structure comprising an ice tray and a deformable grid having at least one extensible longitudinally extending partition wall and transversely extending partition walls defining ice block compartments with the longitudinally extending wall and the tray, said longitudinally extending wall having a zig-zag shape and being articulated at each angle of said zig-zag, said longitudinally extending wall having at each end thereof a projecting portion which extends above the intended level of the ice in the tray, a handle pivoted to each projecting portion, each handle having a portion thereof extending outwardly of the tray beyond its pivoting point and a flange depending from said portion, the tray having an upper edge which is provided adjacent each handle with an outwardly extending flange, said flange of each handle being adapted, when the handles are pivoted, to engage the corresponding flange of the tray so as to raise the grid, stretch said longitudinally extending wall and detach the ice blocks from the tray and the grid.

2. An ice tray structure as claimed in claim **1**, wherein the grid comprises two longitudinally extending partition walls having a zig-zag shape and arranged opposite to each other, the transversed extending walls being located in portions of the longitudinally extending walls in which the distance between the longitudinally extending walls is maximum, an articulation being provided at each angle of the longitudinally extending partition walls and at each junction between the transversely extending walls and the longitudinally extending walls, the handles being located between and pivotally connected to the longitudinally extending walls by pins.

3. An ice tray structure as claimed in claim **1**, wherein the grid has a single longitudinally extending partition wall having a zig-zag shape, the transversely extending walls being located in the sections midway between the angles of said zig-zag shaped partition wall and an articulation being provided at each angle of the longitudinally extending partition wall and at each junction between the transversely and the longitudinally extending partition walls.

4. An ice tray structure as claimed in claim **1**, wherein the grid is in one piece and composed of plastics material, the angles of the longitudinally extending wall and the portions of the grid in which the transversey extending walls are connected to the longitudinally extending wall being of a reduced thickness so as to constitute said articulations and facilitate deformation of the grid.

5. An ice tray structure as claimed in claim **1**, wherein the partition walls are composed of thin metal sheets.

6. An ice tray structure as claimed in claim **1**, wherein the longitudinally extending partition wall is composed of an elastomer.

7. An ice tray structure as claimed in claim **1**, wherein the grid has a single longitudinally extending partition wall having a zig-zag shape, the transversely extending walls being located at each angle of said zig-zag and midway of said angles, an articulation being provided at each junction between the transversely and the longitudinally extending walls.

8. An ice tray structure as claimed in claim **7**, wherein the longitudinally extending partition wall divides each transversely extending partition wall into two portions of unequal length, additional partition walls substantially parallel to the elements of the longitudinally extending partition wall being articuated to the longest of said portions whereas the other portions of the transversely extending walls are free of additional partition walls.

9. An ice tray structure as claimed in claim **1**, wherein said longitudinally extending partition wall has a plurality of faces which define with the transversely extending partition walls acute angles of about 45°.

References Cited

UNITED STATES PATENTS

2,048,412	7/1936	Sissman	249—130
2,043,881	6/1936	Buchanan et al.	249—73
2,173,696	9/1939	Saler	249—73
2,496,331	2/1950	Buchanan	249—72
2,589,022	3/1952	Page et al.	
2,752,762	7/1956	Gaugler	249—127
2,772,542	12/1956	Gaugler et al.	249—127 X
3,350,492	10/1967	Grootenboer.	
3,380,702	4/1968	Strahan	249—131 X

J. HOWARD FLINT, JR., Primary Examiner

U.S. Cl. X.R.

249—71, 128