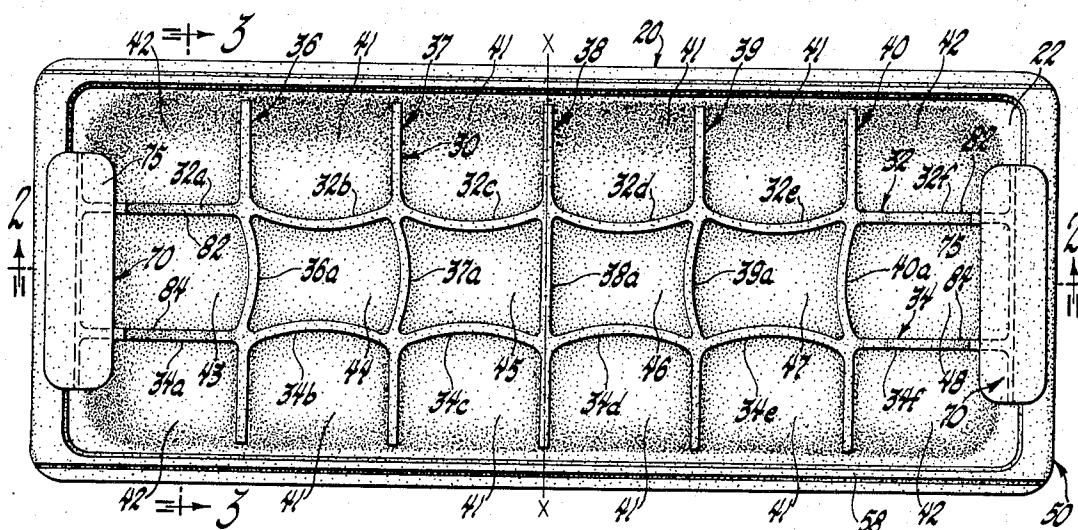
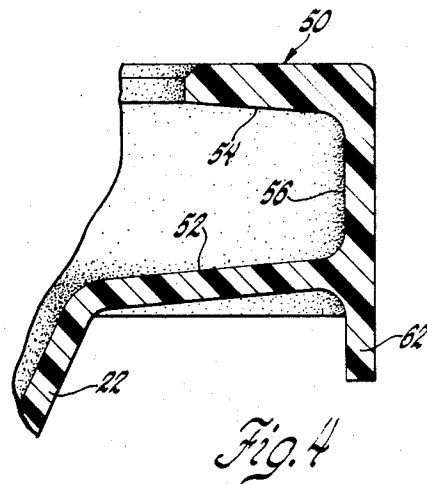
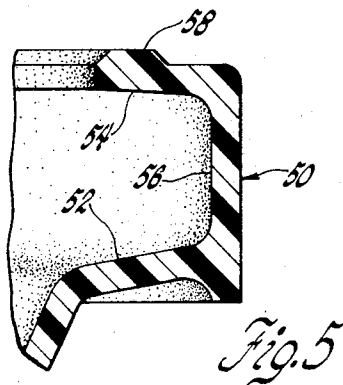
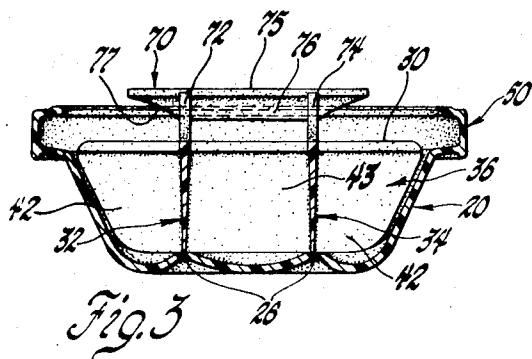
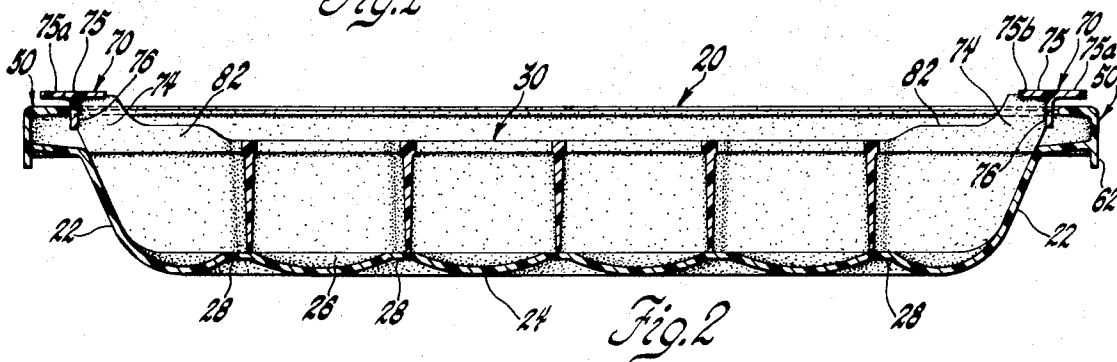
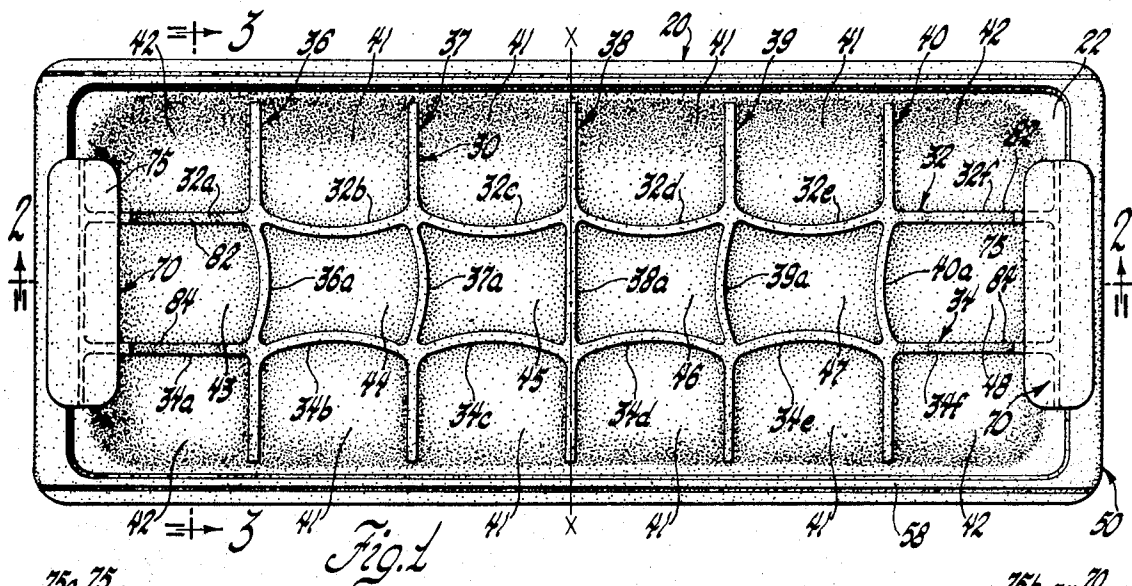


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| 1,631,901 | 6/1927 | Threadgill | 249/131 X |
| 2,367,573 | 1/1945 | Gibson | 249/128 |

6 Claims, 9 Drawing Figures





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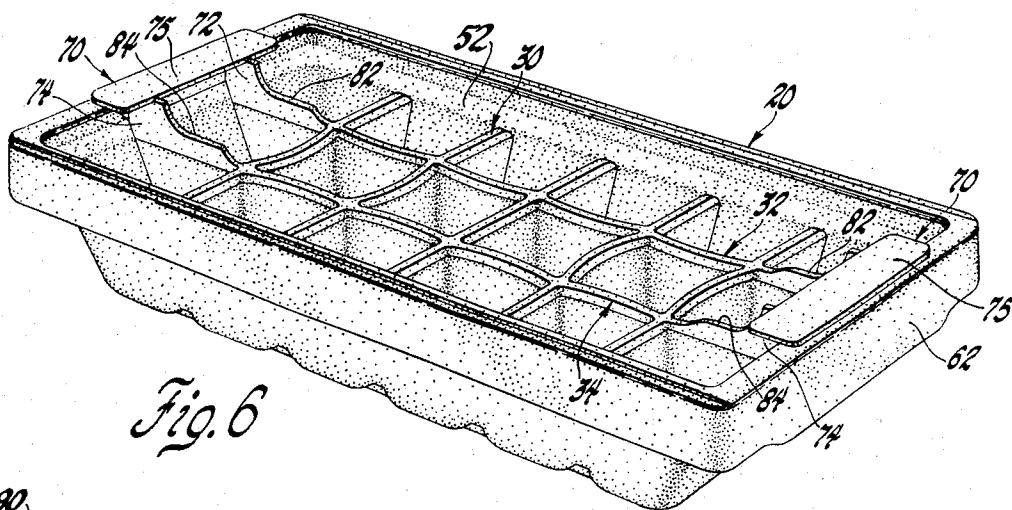


Fig. 6

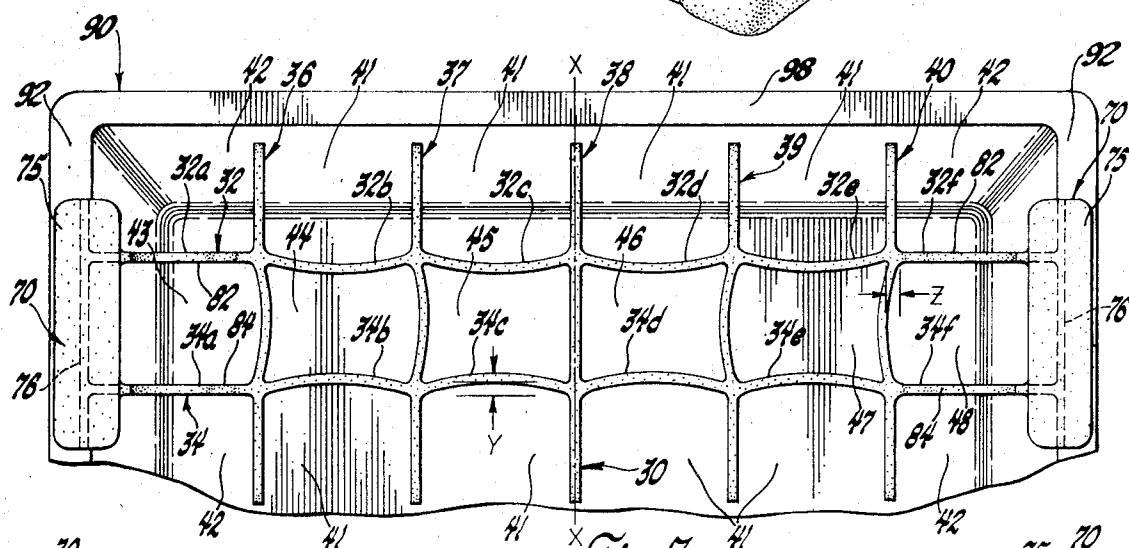


Fig. 7

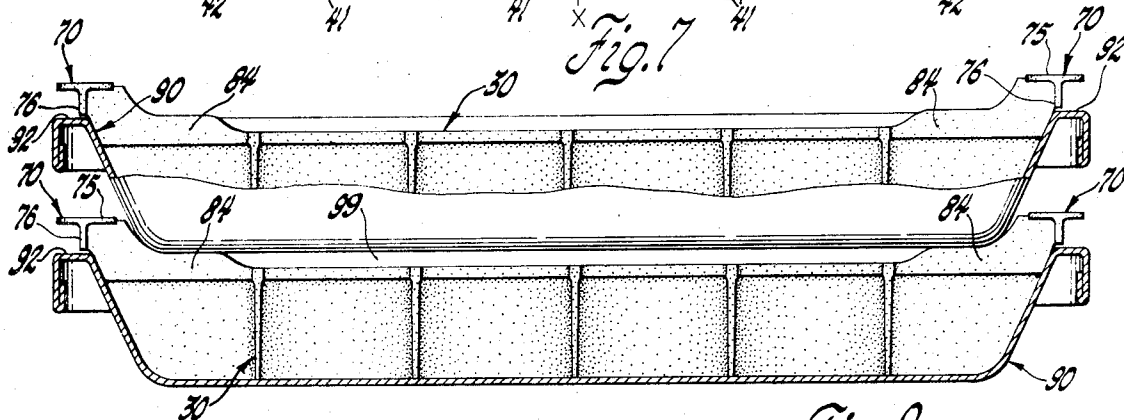


Fig. 8

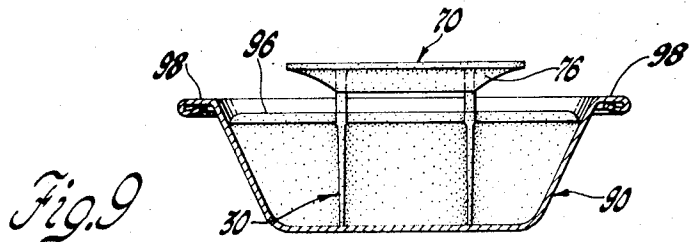


Fig. 9

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FLEXIBLE GRID FOR FREEZING TRAYS

This invention relates to an improved flexible grid for freezing trays for use in freezing compartments of household refrigerators.

Many attempts have been made to provide ice trays with removable flexible grids wherein the ice pieces can be easily ejected without the application of tap water to the grid or the necessity of handling the ice pieces or "cubes." The present invention contemplates, in a preferred embodiment thereof, improvements in removable ice tray grid structures of the kind including a plurality of longitudinal partitions and transverse partitions integrally molded to define rows of flexible ice cube compartments or pockets. The longitudinal partitions define a series of juxtaposed lobe grid wall segments having their convex surfaces facing inwardly toward each other with transverse grid partitions positioned at the cuspidal junctions of the lobes. Certain of the transverse grid wall segments intermediate the longitudinal partitions define lobe wall segments arranged with their convex surfaces facing toward the symmetrical transverse axis of the grid in paired, mirror opposite relation. Integrally molded palm hold handles, located at either end of the grid, are formed such that the grid can be twisted in combination with the tray during a primary ice release operation. The lobe wall segments of the grid enable a secondary ice cube release operation wherein the grid palm hold handles serve as grips for lifting the grid from the tray and after removal of the grid allowing the grid to be elongated and twisted freeing the ice cubes.

It is an object of this invention to provide an ice freezing mold in the form of an open grid of elastic material in combination with a tray from which the ice pieces can be readily removed by first flexing the tray in combination with the grid by means of palm hold handle means after which the grid is removed from the tray and stretched by gripping of the handle means thereby readily removing any remaining ice pieces which are then free to fall out of the grid into the tray or a suitable storage bin.

It is another object of this invention to provide a combination flexing tray and removable flexible grid such that the grid provides handle means which cooperate with lobed partition walls of the grid compartments and the grid and tray may be readily flexed in unison during a primary ice release operation to loosen the ice pieces from the compartments of the grid and upon removal of the grid from the tray the grid may be flexed and extended by said handle means in a secondary ice release operation by virtue of the lobed compartment walls to provide ready discharge of the ice cubes from the grid.

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 a spillguard ice tray with a removable grid inserted therein;

FIG. 2 is a section on line 2—2 of FIG. 1;

FIG. 3 is a vertical sectional view taken on line 3—3 of FIG. 1;

FIGS. 4 and 5 are partial enlarged cross section views illustrating side and end configurations, respectively, of the spillguard:

FIG. 6 is a perspective view showing a freezing tray and removable grid assembly approved in accordance with this invention;

FIG. 7 is a plan view of the removable flexible grid in combination with a conventional metal tray;

FIG. 8 is a side elevation of the grid and metal freezing tray with a similar tray stacked thereon in nested spaced relation;

FIG. 9 is an end elevation of the grid and metal tray of FIG. 8 with the tray shown in cross section.

Referring now to FIGS. 1 to 5, there is shown a molded plastic rectangular freezing container or tray 20 having sloping end walls 22 extending at an angle of about 25° in the vertical for easy ejection. The bottom wall 24 may be of any desired contour, however as shown, the bottom wall is provided with two longitudinally upwardly extending ribs 26 and five transverse upwardly extending ribs 28 which in conjunction with removable grid 30 divide the interior of the container into 18 ice cube compartments or cavities. The portions of the bottom wall 24 between the ribs 26 and 28 are arcuate in shape for easy ejection of the ice cubes. The grid 30 has twin longitudinal walls 32, 34 and five transverse walls, 36, 37, 38, 39 and 40 such that the longitudinal walls 32, 34 of the removable flexible grids rest upon the longitudinal ridges 26 and are aligned with them while the transverse walls 36—40 of the grid rest upon the five ribs 28 and are aligned with them.

The freezing container or tray 20 is of the general type disclosed in U.S. Pat. application Ser. No. 1,748, filed Jan. 9, 1970 and entitled "Freezing Container with Spill Guard" and assigned to the same assignee as the instant application. The tray 20 will be described only as it relates to the instant invention and for a more detailed description reference should be had to the aforementioned patent application. The tray 20 has an intumed square U-shaped flange 50 extending continuously along the outer edges of the side and end walls and has an inwardly faced continuous groove defined by a flat bottom wall 52, a flat inner top wall 54 and a flat inner side wall 56. If desired the top of the flange 50 may be provided with stiffening rib 58 extending the full longitudinal length of the tray. To stiffen the end walls of the container the U-shaped flange 50 may have in alignment with its outer face a continuous downwardly extending rib 62 and which also serves as a finger grip portion when the tray is held at either end for holding the tray and for use in the ice release operation to be described. The flange 50 is located entirely outside of and above the side and end walls below so that it does not impede the removal of frozen cubes from the compartments of the grid and the container.

The one piece separate flexible plastic grid 30 has its pair of longitudinal partition walls 32 and 34 and integrally molded transverse partition walls 36—40 forming three rows of ice cube compartments. As best seen in FIG. 1, the grid 30 is symmetrical about the transverse axis indicated at X—X in FIG. 1, which coincides with transverse wall 38, such that the intermediate compartments 41 of the outer longitudinal rows each has an open side and the four corner compartments 42 each has two open sides to permit transverse or downward removal of the ice cubes formed therein. The center longitudinal row has compartments 44, 45, 46 and 47 formed by four wall segments together with end compartments 43 and 48 formed by three wall segments.

The longitudinal partition walls 32, 34 have integrally molded handle means 70 at each end of the grid which function in cooperation with the tray flange 50 as palm hold handle pads during the primary ice release operation while serving as finger gripping handles for removing and stretching the previously loosened grid and contained ice cubes from the tray during a secondary ice release operation. Each of the handle means 70 is formed by a pair of upwardly directed fin-like extensions 72 and 74 formed at each end of the longitudinal walls 32 and 34. The handle means 70 are in the form of transverse palm pads or plates 75 bridging or spanning across the upper end of each pair of the fins 72, 74 in integrally molded fashion. The palm plates 75 have rib members 76 extending between the fins 72 and 74 such that the handle means 70 are T-shaped cross section with the rib member 76 forming the stem and the palm plate 75 forming the head of the T. The corner portions of the ribs 76 are scalloped as indicated at 77 to eliminate any sharp corners. As seen in FIG. 2, the fins 72 and 74 terminate in outwardly directed square corner for integral association with the rib 76 and inner wing 75b of their associated plate 75.

As best seen in the combination of FIG. 2, the handle means 70 are formed such that the horizontal plates 75 are positioned at an elevation slightly above the flange 50 such that the outwardly extending wings 75a portions of the plates 75 are superimposed above the top walls of tray flange 50. It will further be observed that the vertical stems or ribs 76 are of such a depth as not to obstruct the U-shaped flange opening and thus will not interfere with the spillguard function of the flange 50. Thus, when the operator grips the tray with his fingers positioned on the underside of bottom wall 52 and his palms positioned on plates 75 he is able to exert a compressive force therebetween with the result that the plates 75 will flex downwardly and contact or bottom on flange 50 allowing the tray 20 and grid 30 to be twisted in unison during the primary grid release operation.

The longitudinal upright partitions 32 and 34 each include a plurality of integral juxtaposed lobed or arcuate compartment wall segments with the partitions 32, 34 each having four lobe segments indicated by reference numerals 32b-32e and 34b-34e respectively. Each of the longitudinal lobe wall segments is a section of a cylinder with equal radius such that each pair of opposed lobes 32b, 34b; 32c, 34c; 32d, 34d and 32e, 34e are located in spaced relationship to each other with their convex surfaces facing inwardly toward each other. The transverse partitions 36-40 each have a pair of planar wall segments extending outwardly from the cuspidal junctions of the longitudinal lobe segments while planar wall segments 32a, 32f, 34a and 34f are located at each end of the longitudinal partitions 32 and 34. The intermediate transverse wall segments 36a, 37a, 39a and 40a are also in the form of lobes, each being a section of a cylinder with equal radius positioned at the junctures of the longitudinal lobes. The transverse lobed wall segments are disposed in paired, mirror opposite relation with the convex surfaces of lobes 36a and 37a facing toward the convex surfaces of lobes 39a and 40a. Expressed differently, the transverse lobed wall segments are arranged in reversely symmetrical relation about the transverse symmetrical

axis X-X which coincides with transverse planar wall 38. It will be noted that the amount of curvature offset imparted to the lobed wall segments, as indicated by the dimensions Y and Z in FIG. 7, are equal and of the order of .09 inch for the disclosed embodiment.

By virtue of having the wing portions 75a of plates 75 overlying the flange 50 in a vertical spaced manner, it will be appreciated that the tray 20 and grid 30 are capable of being twisted as a unit during the primary ice release operation by applying vertically opposed forces to the flange 50 without the operator's hands contacting the ice cubes. After the bond is broken between the grid and tray, the handle means returns to their unflexed position allowing for the ready removal of the tray by gripping each of the vertically spaced plates 75 after which a secondary ice cube removal operation is performed.

The secondary ice cube release or harvesting operation involves gripping the handle means 70 such that the grid is simultaneously twisted and elongated. As a result of forming the longitudinal partitions with lobe segments 32b-32e and 34b-34e, the grid is capable of flexing in a longitudinal direction to overcome the freezing bond between the ice cubes and the grid walls. In a similar manner the transverse lobe wall segments 36a, 37a, 39a and 40a are flexed in unison with the longitudinal segments while the grid is being twisted. It will be seen that because the longitudinal lobe wall segments are formed with their convex surfaces facing inwardly, the four walled intermediate row of ice cube compartments will have their wall segments flexed away from the ice cubes to readily free the bond between the cubes and the compartment walls for discharging by gravity into an underlying container. In a similar manner the transverse lobed wall segments 36a, 37a, 39a and 40a are formed with their convex surfaces directed inwardly such that when they are elongated they tend to further increase the volume of the intermediate row of four walled compartments 44, 45, 46 and 47 thus facilitating the release of the ice cubes from the grid. It will be noted that the lobed wall segments thus not only tend to increase the size of the four walled compartments but, in addition, prevent overstressing of the grid partitions at their junctures during the primary and secondary ice cube release operation.

FIG. 8 shows the grid 30 in combination with a conventional tray 90 which is preferably formed of metal such as aluminum but could be manufactured from other suitable material such as plastic or rubber. In the FIG. 8 arrangement the stem 76 of handle means 70 is positioned above the tray end flanges 92 so as to provide a small vertical dimensional clearance. With this arrangement when the operator grasps the tray 90 and handle means 70 during the primary ice cube release operation the vertically opposed pressure of the operator's palms on the handle plates 75 and his fingers on the underside of flanges 92 will flex the stems 76 downward into contact with the tray end flanges 92 and thereby allow the tray and grid to be twisted in combination in a manner similar to that described for the tray 20 and grid 30. This design also allows ready insertion of the operator fingers under the palm plates 75 for ease of removal of the grid 30 from the tray.

Applicant's tray and grid combination also provide for ready vertical nesting of one tray and grid combination upon another for storage in the freezer compartment of a refrigerator, for example. With reference to FIG. 8 there is shown a pair of tray and grid combinations stacked one above the other such that the upwardly extending fins 72 and 74 at either end of the underlying grid serve to nest the upper tray 90 thereon to restrict longitudinal movement of the upper tray 90. Also, as seen in the end view of FIG. 9, the upper edges of the grid partitions indicated at 96 are positioned at a defined distance below the tray side flanges 98 such that the overlying tray is prevented from sidewise movement when in its stacked position on the underlying grid and tray combination. It will be noted that a similar stacking and nesting arrangement is attained with the tray 20 and grid 30 combination.

As viewed in FIG. 8, the stepped fillet portions 82 and 84 formed as upper extensions of the longitudinal wall segments 32a, 32f and 34a and 34f respectively serve to position the overlying stacked tray 90 a vertical distance thereabove to provide an air circulation space 99 between the stacked trays to allow the freezer cold air to flow therebetween and thereby promote the freezing of the water in the trays.

While the embodiment of the present invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted.

We claim:

1. In combination, an elongated freezing tray having an upper flange at each end thereof and a closely fitting deformable grid of molded plastic material removably positioned therein to form with the tray a plurality of ice cube compartments, said grid comprising: a pair of spaced longitudinal partitions extending from end to end of the grid and a plurality of transverse partitions defining two outer longitudinal rows of ice cube compartments and a center longitudinal row of ice cube compartments, each of said longitudinal partitions including lobed wall segments extending between adjacent pairs of transverse partitions shaped such that each is a section of a cylinder, said wall segments having their convex surfaces facing toward each other, and handle means attached at each end of said grid allowing an operator to grip said grid thereby so as to flex said grid upon its removal from the tray whereby said lobed longitudinal wall segments facilitate the release of ice cubes from said grid.

2. In combination, an elongated freezing tray having an upper flange at each end thereof and a closely fitting deformable grid of molded plastic material removably positioned therein to form with the tray a plurality of ice cube compartments, said grid comprising: a pair of spaced longitudinal partitions extending from end to end of the grid and a plurality of transverse partitions defining two outer longitudinal rows of ice cube compartments and a center longitudinal row of ice cube compartments, each of said longitudinal partitions including lobed wall segments extending between adjacent pairs of transverse partitions shaped such that each is a section of a cylinder with equal radius, said wall segments having their convex surfaces facing toward each other, said longitudinal partitions having at each end thereof paired upwardly directed fin-like extensions, and handle means attached at each end of

said grid in the form of transverse palm pads bridging the upper ends of each pair of fin-like extensions such that said palm pads extend outwardly over the end flanges of the tray allowing said palm pads to be gripped by an operator in cooperation with the tray end flanges during a primary ice cube release operation to release said grid from the tray and said palm pads serving as finger gripping handles for removing said grid from the tray and allowing an operator to flex said grid during a secondary ice cube release operation whereby said lobed wall segments facilitate the release of the ice cubes from said grid.

3. In combination, an elongated freezing tray having an upper flange at each end and closely fitting deformable grid of molded plastic material removably positioned therein to form with the tray rows of ice cube compartments, said grid comprising: a pair of spaced longitudinal partitions extending from end to end of the grid and a plurality of transverse partitions defining two outer longitudinal rows of open sided ice cube compartments and a center longitudinal row having a plurality of four sided ice cube compartments, each of said longitudinal partitions including intermediate lobed wall segments extending between adjacent pairs of transverse partitions shaped such that each is a section of a cylinder with equal radius, said lobed wall segments having their convex surfaces facing toward each other, said transverse partitions including intermediate lobed wall segments extending between said longitudinal partitions, said plurality of transverse partitions totaling an uneven number so as to be equally spaced on either side of a center planar transverse partition located on the symmetrical transverse axis of said grid, said intermediate transverse wall segments formed such that each is a section of a cylinder and directed toward the symmetrical transverse axis of said grid such that said transverse wall segments on one side of the symmetrical axis are disposed in paired, mirror opposite relation to the transverse wall segments on the other side of the axis, and handle means attached to each end of said grid allowing an operator to flex said grid upon its removal from the tray whereby said lobed longitudinal and transverse wall segments facilitate the release of the ice cubes from said grid.

4. In combination, an elongated freezing tray having an upper flange at each end and closely fitting deformable grid of molded plastic material removably positioned therein to form with the tray rows of ice cube compartments, said grid comprising: a pair of spaced longitudinal partitions extending from end to end of the grid and a plurality of transverse partitions defining two outer longitudinal rows of open sided ice cube compartments and a center longitudinal row having a plurality of four sided ice cube compartments, each of said longitudinal partitions including intermediate lobed wall segments extending between adjacent pairs of transverse partitions shaped such that each is a section of a cylinder with equal radius, said lobed wall segments having their convex surfaces facing toward each other, said transverse partitions including intermediate lobed wall segments extending between said longitudinal partitions, said intermediate transverse wall segments formed such that each is a section of a cylinder and directed toward the symmetrical transverse axis of said grid such that said transverse wall segments on one

side of the symmetrical transverse axis of said grid are disposed in paired, mirror opposite relation to the transverse wall segments on the other side of the axis, said longitudinal partitions having at each end thereof paired upwardly directed fin-like extensions, handle means attached to each end of said grid in the form of transverse palm pads bridging the upper ends of each pair of fin-like extensions, said palm pads being T-shaped in cross section providing a horizontal plate and a vertical stem whereby said stem extends downwardly for contact with said tray end flanges allowing said palm pads to be gripped by an operator in cooperation with the tray end flanges during a primary ice release operation and said palm pads serving as finger gripping

handles for removing said grip from said tray and allowing an operator to flex said grid in a secondary ice cube release operation whereby said lobed wall segments facilitate the release of the ice cubes from said grid.

5 5. The combination as defined in claim 2 wherein said longitudinal partition fin-like extensions have stepped fillet portions for supporting an overlying tray in vertical nested relation above the grid of the underlying tray thereby providing a horizontal air circulation space between the nested trays.

10 6. The combination as defined in claim 3 wherein the curvature offset distance of said longitudinal and transverse wall segments are substantially equal.

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