

July 9, 1946.

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2,403,846

ICE TRAY

Filed Oct. 31, 1938

4 Sheets-Sheet 1

FIG. 1.

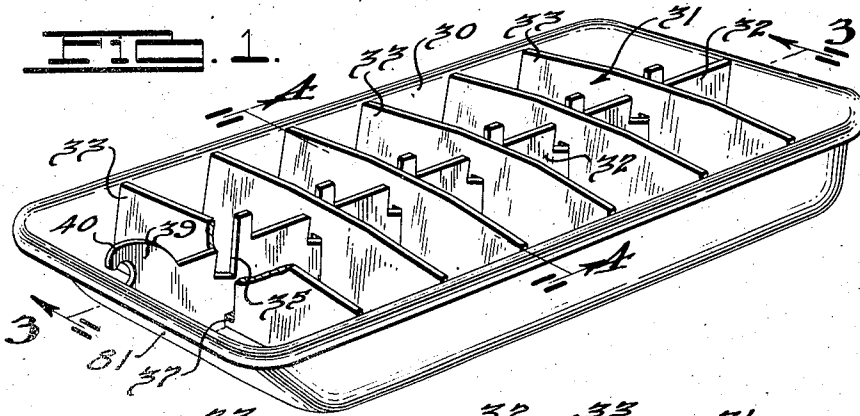
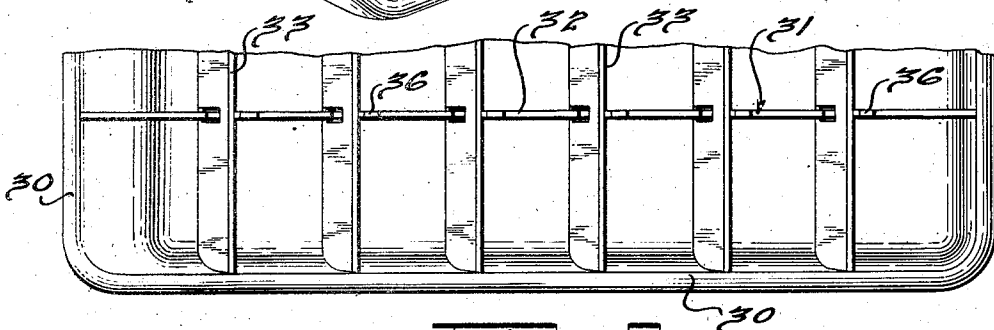


FIG. 3.

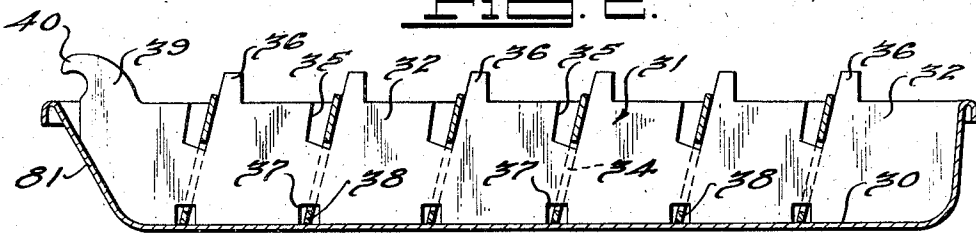


FIG. 4.

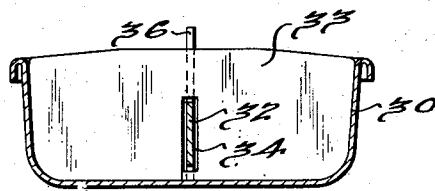
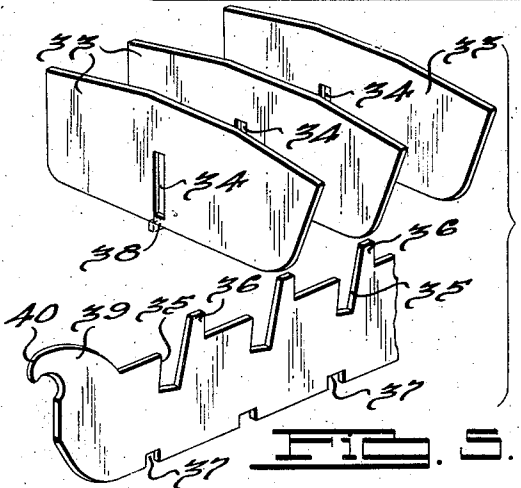


FIG. 5.



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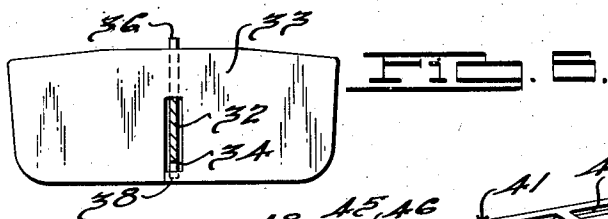
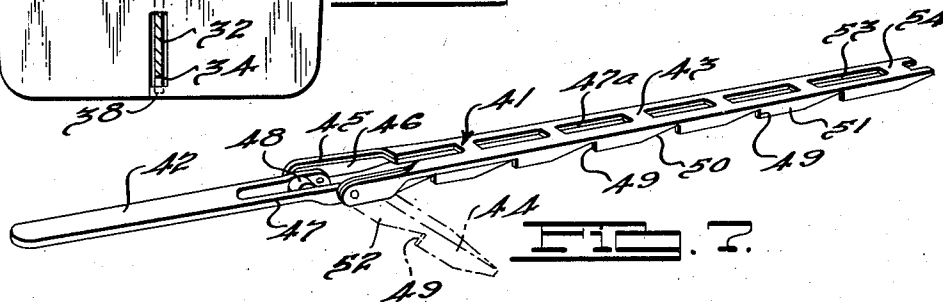
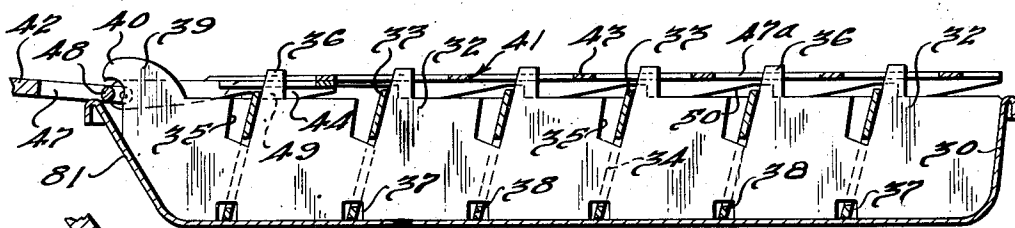
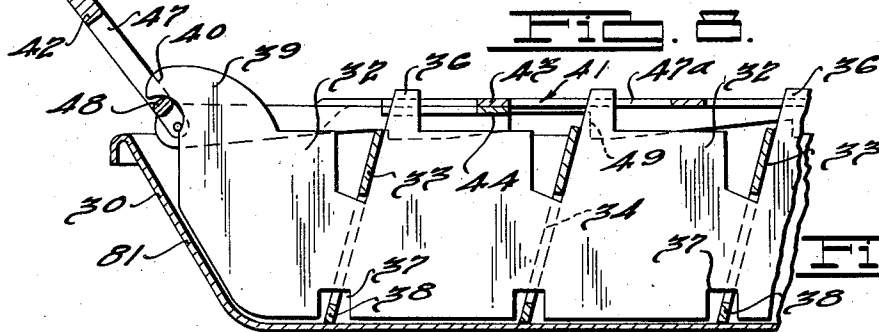
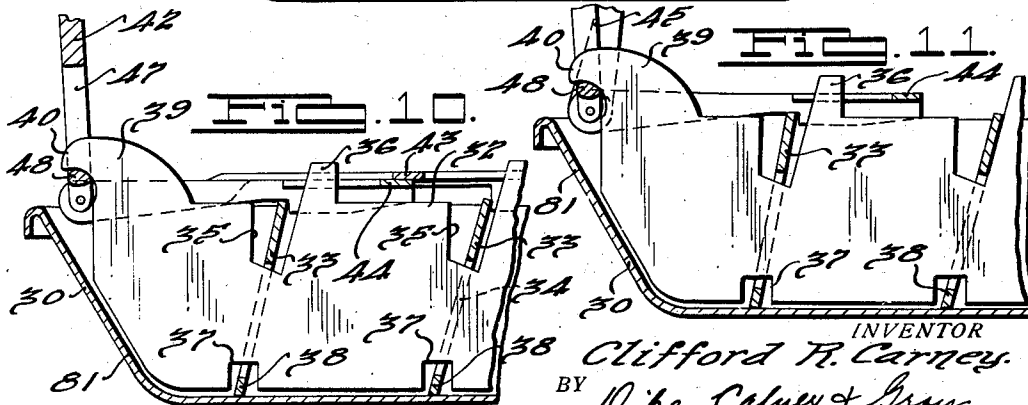
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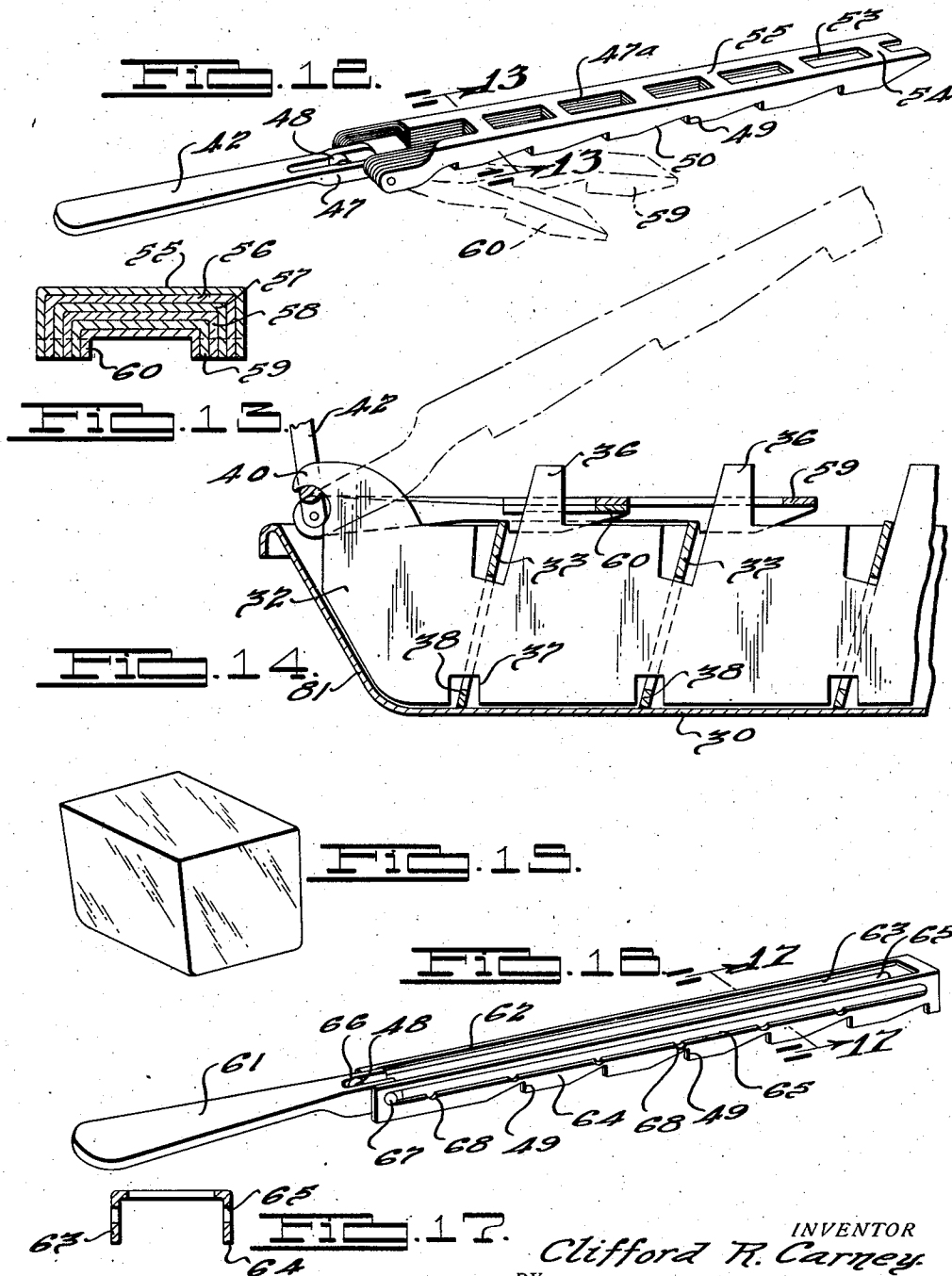
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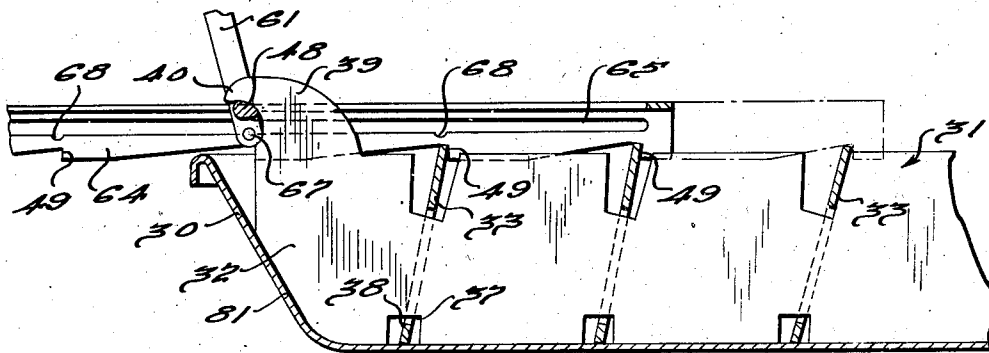


FIG. 18.

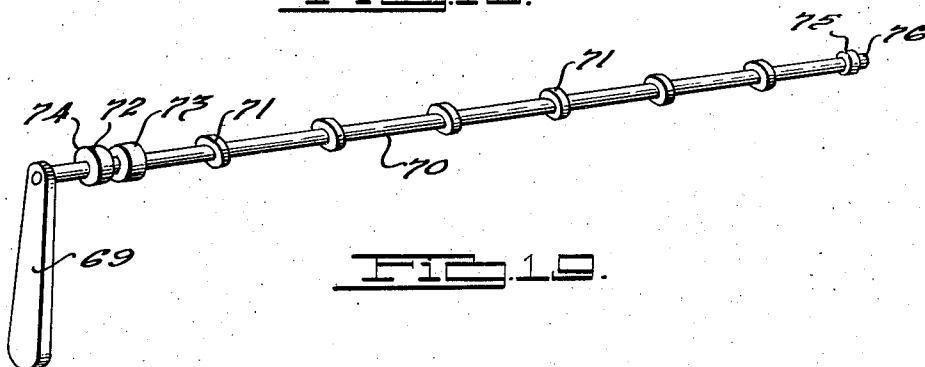


FIG. 19.

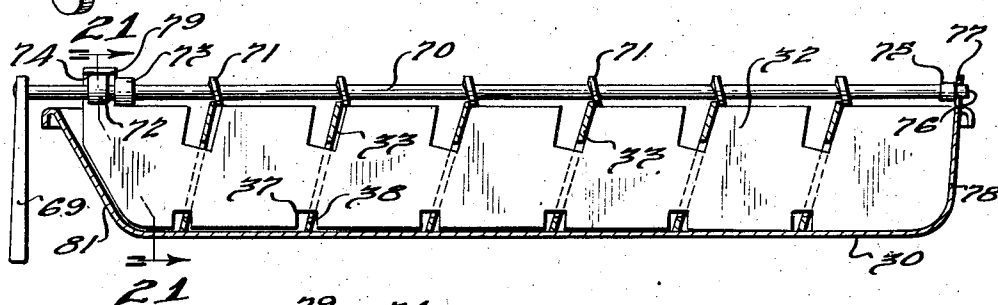


FIG. 20.

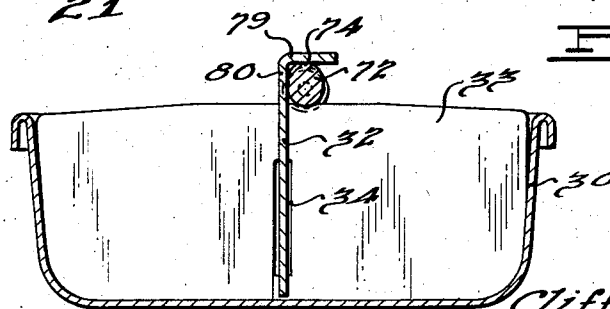


FIG. 21.

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UNITED STATES PATENT OFFICE

2,403,846

ICE TRAY

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Application October 31, 1938, Serial No. 237,834

4 Claims. (Cl. 62—108.5)

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This invention relates to an ice tray of the type provided with a removable grid, and more particularly to a grid for such trays which is easily and quickly removable from the tray and which is provided with separate manually actuated mechanical means for releasing the ice cubes from the grid and the tray.

It is an important object of the present invention to provide an ice tray grid which is so constructed as to permit the mechanical removal not only of the grid from the tray but also of the ice cubes from the grid by a continuous application of power to the grid.

Another object of the invention is to provide an ice tray grid which is so constructed as to effect the progressive release of either all or a portion of the ice cubes contained therein without first partially melting said cubes.

A further object of the invention is to provide an ice tray grid from which the ice cubes may be removed selectively in multiples of two, either successively or as separate pairs as desired.

A still further object of the invention is to provide an ice tray grid which may be removed from the tray by a wrench or lever and from which the ice cubes may be released by a relative movement of the separate elements of the grid and in which a portion of the grid is used as a fulcrum for the application of power by the wrench or lever to release the cubes from the grid.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views, and in which:

Fig. 1 is a view in perspective of an ice tray and grid constituting a preferred embodiment of an important part of the present invention.

Fig. 2 is a plan view of a portion of the tray and grid shown in Fig. 1.

Fig. 3 is a longitudinal section taken substantially on the line 3—3 of Fig. 1, looking in the direction of the arrows.

Fig. 4 is a transverse section taken substantially on the line 4—4 of Fig. 1, looking in the direction of the arrows.

Fig. 5 is a view in perspective of the various parts of the grid shown in separated relationship.

Fig. 6 is a sectional view similar to Fig. 4 but showing the position taken by the cross partitions of the grid with relation to the longitudinal partition when the grid is removed from the tray.

Fig. 7 is a view in perspective of one form of

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an operating member or lever constituting another important part of the present invention.

Fig. 8 is a longitudinal section similar to Fig. 3, but showing the operating member of Fig. 7 applied over the grid in the position it assumes prior to the application of power to free the grid and frozen ice cubes from the tray.

Fig. 9 is a longitudinal section of one end of the tray and grid, showing the position taken by the operating member after power has been applied to loosen the grid from the tray.

Fig. 10 is a sectional view similar to Fig. 9, but showing the position taken by the operating member and by the cross partitions of the grid after power has been applied to release the ice cubes contained therein.

Fig. 11 is a sectional view similar to Fig. 10, but showing the method of using the operating member to release the first two ice cubes only.

Fig. 12 is a view in perspective of another form of operating member or lever adapted to be used in the present invention.

Fig. 13 is a transverse section taken substantially on the line 13—13 of Fig. 12, looking in the direction of the arrows.

Fig. 14 is a longitudinal section of one end of the tray and grid, showing the lever of Fig. 12 applied thereover.

Fig. 15 is a view in perspective of an ice cube after its removal from the tray.

Fig. 16 is a view in perspective of still another form of an operating member or lever suitable for use in the present invention.

Fig. 17 is a transverse section taken substantially on the line 17—17 of Fig. 16, looking in the direction of the arrows.

Fig. 18 is a longitudinal section of one end of the tray and grid showing the operating lever of Fig. 16 applied thereover.

Fig. 19 is a view in perspective of still another form of a suitable operating member or lever.

Fig. 20 is a longitudinal section of a slightly modified tray and grid, showing the operating lever of Fig. 19 applied thereto.

Fig. 21 is a transverse section taken substantially on the line 21—21 of Fig. 20, looking in the direction of the arrows.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or

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terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

In the embodiment of the invention shown in Figs. 1 to 11, 30 represents an ice tray of the usual size and shape, and 31 represents the grid member, which is constructed to provide a plurality of compartments for forming ice into cubes or any other desired shape within the tray 30. The grid 31 comprises a longitudinal partition 32 and a plurality of transverse partitions 33. Each transverse partition 33 is provided with a vertical slot 34 which extends from approximately the central portion of the partition down almost but not quite to its lower edge, while the longitudinal partition 32 is cut out at spaced points along its upper edge to provide a series of wide slots or cut-out areas 35 extending from the upper edge of the partition approximately to its mid-point to provide slots which permit the transverse partitions to be moved from their normal rearward tilting position in said slots to a substantially vertical position. The longitudinal partition 32 is also provided with lugs 36, which extend upwardly beyond the upper edges of the cross partitions 33, and with longitudinally spaced slots 37 opening in its lower edge and adapted to receive the strips or lugs 38 adjacent the lower edge of each transverse partition 33. The lugs 38 are formed by providing a slit in the cross partitions 33 immediately below one edge of the slot 34 and extending from the bottom of slot 34 to the bottom edge of the partition. Thus a strip of metal is provided beneath slot 34, which when bent permits assembling the transverse partitions on the longitudinal partition 32, and which after assembly may be bent back to retain the partitions in their assembled relationship.

The longitudinal partition 32 is provided at the front or operating end of the grid with an upwardly extending projection 39 having an outwardly extending nose 40 thereon, the forward and lower edges of which constitute a fulcrum for the removable operating member or lever 41 (see Figs. 7 to 11). Although various forms of levers may be utilized in operating the grid of the present invention, a folding lever of the type shown in Figs. 7 to 11 has been found to be satisfactory for the stated purpose. This lever preferably comprises a handle member 42 and a pair of nested or nestable dragging or gripping members 43 and 44, each of which is provided at one end with a pair of prongs 45 and 46 respectively, adapted to be pivotally connected to each other and to the prongs 47 on the handle member 42, and with one or a series of longitudinally spaced slots 47a which are adapted to receive one or more of the lugs 36 on the partition 32. The prongs 47 are joined at a point spaced from their pivotal connection with the prongs 45 and 46 by means of a cam 48, which is adapted to contact the nose 40 on projection 39 and is offset from the pivotal connection of the handle member 42, which causes a constantly increasing forward movement of the gripping members 43 and 44 as the handle is raised or rotated about the prongs 45 and 46.

In operation, the gripping members 43 and 44 are applied over the lugs 36 and the projection 39 on the longitudinal partition 32 in the manner shown in Figs. 8 to 10. The tray 30 may be held on any suitable support, and the handle 42 is moved upwardly until the cam 48 strikes the lower edge of the nose 40 as previously described, Upon

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first contacting the nose 40 the force applied tends to loosen the grid 31 and its contained ice as a unit from the tray, as shown in Fig. 9. The upward force applied through the handle 42 and grid structure operates to exert a downward force on the end of the tray remote from the cam 48 to assist in holding the tray on the supporting surface. The effect of further raising of the handle 42 is shown in Fig. 10. Thus the gripping members 43 and 44 of the lever 41 are moved further forward, and during this movement the downwardly extending projections or teeth 49 formed by the notches 50 in the side walls or flanges 51 and 52 of the gripping members contact the upper edges of the cross partitions 33 adjacent thereto and tend to tilt them forwardly away from their normal rearwardly tilting position, at the same time causing a release of the ice cubes situated forwardly thereof.

In the preferred embodiment of the invention the teeth 49 are spaced progressively farther apart in direct proportion to their distance from the forward end of the lever, as this causes them to progressively contact the various cross partitions 33, beginning with the most forwardly situated one, thereby successively loosening or releasing the pairs of ice cubes situated immediately forward thereof. It should be understood, however, that the teeth 49 may be spaced an even distance apart, although such an arrangement is usually not so desirable in view of the fact that far greater force is required on the handle 42 in order to simultaneously release the entire content of ice cubes in the tray than where the action is a progressive releasing of successive pairs of ice cubes as above described.

In the operation of the lever 41 in the above manner, it is seen that the first cross partition is tilted forward by the teeth 49 on the gripping member 44, while the remaining cross partitions are tilted by the teeth 49 on the gripping member 43. When it is desired to remove only the first pair of ice cubes, the lever 41 may be applied as shown in Fig. 11. Thus the gripping member 43 is folded over in alignment with the handle 42, and the gripping member 44 is applied over the forward end of the grid with its teeth 49 in position to grab the upper edge of the most forwardly situated cross partition 33, as the member 44 is forced forwardly in the manner described above. The tray may then be returned to the refrigerator, and either all or a portion of the remaining cubes of ice may be removed at any time by applying the gripping member 43 over the grid and lifting the handle in the manner shown.

When using the lever 41 in the manner described above, it is sometimes necessary to hold the rearward end of the gripping portion 43 to prevent it from springing upwardly as a result of the downward force applied at its pivoted end. Any suitable means may be provided to accomplish this, such as a slotted lug (not shown) on the rear end of the longitudinal partition 32, which may be positioned to extend upwardly through the rearmost slot 53 on the gripping member 43 and over the end strip 54 thereon. In the drawings, however, no means is shown, as it is usually satisfactory to press down manually on the rear end of the gripping member, when necessary.

An operating lever similar in many respects to the one shown in Fig. 7 is shown in Figs. 12 to 14. This lever differs however, from the lever of Fig. 7 in the provision of a multiplicity of nested or nestable gripping members equal in number to

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the number of cross partitions 33 in the grid and each of different length. Thus, any one or all of the six gripping members 55, 56, 57, 58, 59 and 60 provided in this instance may be applied over the grid to remove any pair or series of pairs of ice cubes in the manner shown in Fig. 14, each gripping member being provided with one or more slots 47a for the same purpose as the slots 47a in the lever of Fig. 7. As the various gripping members each have a different number of teeth 49, varying in accordance with their length, it is seen that any desired number of cross partitions may be tilted by selecting the gripping member of sufficient length and folding the longer gripping members over in alignment with the handle member, while leaving the shorter ones in nested relation with the selected gripping member.

Another form of operating lever which may be advantageously utilized in the present invention is shown in Figs. 16 to 18. The lever in this instance comprises a handle member 61 and a gripping member 62, which consists of a pair of spaced parallel side walls 63 and 64, which are integrally connected at one end and are each provided with a longitudinal slot 65 extending substantially from end to end. The side walls 63 and 64 are spaced sufficiently far apart to receive the spaced prongs 66 on the handle 61 which are each provided with a pivot pin 67 adapted to slidably fit in the slots 65. The space between the side walls 63 and 64 is also adapted to receive the lugs 36 on partition 32, thereby facilitating the correct placement of the lever on the grid. As in the other embodiments of this invention, the gripping member is provided with teeth 49 on the lower edges of the side walls 63 and 64, which cooperate with the cam 48 on handle 61 in the same manner as described above to tilt the cross partitions 33 forwardly away from their normal rearwardly inclined position.

In utilizing the lever of Fig. 16 in accordance with the present invention, the gripping member 62 may be adjustably applied over the upper surface of the grid 31 in the manner shown in Fig. 18, notches 68 being provided in the lower edges of the slots 65 to permit retaining the pins 67 and the handle 61 in the desired position adjacent the projection 39 and nose 40 on the longitudinal partition 32 regardless of the number of cross partitions it is desired to tilt or loosen. Thus, when the lever is correctly positioned over the desired number of cross partitions in the grid, the cam 48 will contact the nose 40 upon raising the handle 61 and thereafter serves as a pivotal point about which a forwardly directed force is transmitted to the cross partitions as shown in Fig. 18. With this construction it is therefore possible, as in the previous instances, to remove all of the ice cubes, either simultaneously or progressively, or to remove separate pairs from time to time as desired.

A still further embodiment of the invention is shown in Figs. 19 to 21, in which instance the tray and grid are slightly modified in order to provide retaining means for the operating member, which is also somewhat modified in construction. The operating member comprises a handle member 69 which is fixedly mounted on one end of the gripping member 70 and extends at right angles thereto. The gripping member 70 is preferably made in the form of a longitudinally extending shaft and is provided at spaced points with fixed disk-like cams 71 which are preferably progressively spaced in the same man-

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ner as the teeth 49 on the previously described embodiments of the invention. The gripping member 70 is also provided at its forward end adjacent the handle member with a pair of collars 72 and 73, the collar 72 being provided with a lobe 74 which extends beyond the periphery of the cylindrical collar 73. The collar 73 and the collar 75 on the rear end of the gripping member constitute stop members or guides which facilitate correct positioning of the gripping member.

In applying the lever, the end portion 76 of the gripping member 70 is inserted in a suitable upwardly extending apertured bearing 77 in the rear wall 78 of the tray 30, and the lobate collar 72 is inserted under the sidewardly extending lug 79 on the upwardly extending projection 80 on the forward end of the longitudinal partition 32 with its lobe portion 74 initially extending sidewardly. After being applied in the manner stated it is seen that a rotation of the handle 69 and the gripping member 70 through 90° will turn the lobe 74 to an upwardly extending position beneath the sidewardly extending lug 79 where the force thus exerted tends to lift the forward end of the longitudinal partition 32 throughout substantially its whole length, as shown in Figs. 20 and 21. During this rotation the cams 71 are also rotated and tend to progressively contact the upper edges of the cross partitions 33 thereby tilting them successively forward and loosening the cubes of ice attached thereto.

To further facilitate the loosening of the grid and the removal of the ice cubes, particularly the first pair removed, the tray 30 may be provided with a sloping forward wall 81, although it should be understood that the effective operation of the grid is not dependent on a tray of this nature and trays of ordinary shape or construction may readily be used.

It should be observed that this invention is not restricted to a progressive flow of power through the grid or a progressive movement of the cross partitions. Thus the invention described herein may be readily modified in the manner previously suggested to provide an embodiment thereof which is capable of readily dispensing the entire contents of the tray at one and the same time with a single application of power by actuation of the wrench or lever.

In the description herein and in the appended claims reference has been repeatedly made to a forward or rearward position or movement of the various parts of the tray. By "forward" is meant that portion of the tray or grid which is provided with the fulcrum or projection against which force is applied to release the ice cubes from the grid. The rearward portion of the grid or tray is the opposite end.

I claim:

1. In a freezing tray, in combination: a container pan, a grid within said pan for dividing the frozen contents into ice blocks and comprising a longitudinal wall, a plurality of cross walls mounted thereon and movable longitudinally relative thereto, and operating means for moving said cross walls relative to said longitudinal wall to loosen the ice blocks from said grid, said operating means comprising a movable actuator bar arranged to be set in any one of a plurality of different starting positions prior to starting the ice-ejecting movement thereof so as to move only some of said cross walls upon subsequent

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movement thereof, and force-multiplying means for moving said actuator bar.

2. In a freezing tray, in combination: a container pan, a grid within said pan for dividing the frozen contents into ice blocks and comprising a longitudinal wall, a plurality of cross walls mounted thereon and movable longitudinally relative thereto, and operating means for moving said cross walls relative to said longitudinal wall to loosen the ice blocks from said grid, said operating means comprising a longitudinally slidable actuator bar arranged to be set in any selected one of a plurality of different starting positions prior to starting the ice-ejection movement therefor so as to move only the selected cross walls upon subsequent movement of said actuator bar, and force-multiplying means for sliding said actuator bar longitudinally from any selected starting position.

3. In a freezing tray, in combination: a container pan, a grid within said pan for dividing the frozen contents into ice blocks and comprising a longitudinal wall, a plurality of cross walls mounted thereon and movable longitudinally relative thereto, and operating means for moving said cross walls relative to said longitudinal wall to loosen the ice blocks from said grid, said

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operating means comprising a slidable actuator bar arranged to be set in any selected one of a plurality of different starting positions along the length of the grid so as to be capable of engaging and moving only some of said cross walls upon being subsequently moved longitudinally of the grid, and force-multiplying means for sliding said actuator bar from any selected starting position thereof.

4. In a freezing tray, in combination: a container pan, a grid within said pan for dividing the frozen contents into ice blocks and comprising a longitudinal wall, a plurality of cross walls mounted thereon and movable longitudinally relative thereto, and operating means for moving said cross walls relative to said longitudinal wall to loosen the ice blocks from said grid, said operating means being capable of being selectively positioned in any selected one of a plurality of different starting positions along the length of said grid so as to be capable of moving only one or more selected cross walls when operated from each of said starting positions, said operating means having a hand lever reacting upon said longitudinal wall when operated from any of said starting positions.

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