Feb. 18, 1941. H. L. BINFORD 2,232,651

ICE CUBE TRAY

Filed July 13, 1937

Fig. 1.

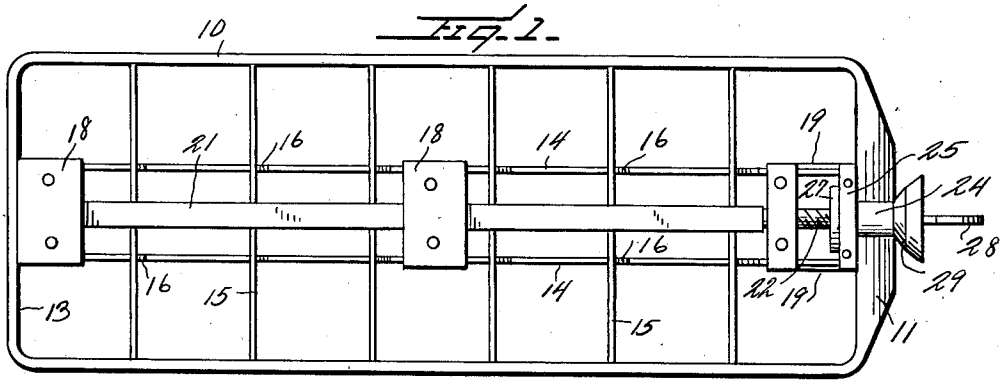


Fig. 2.

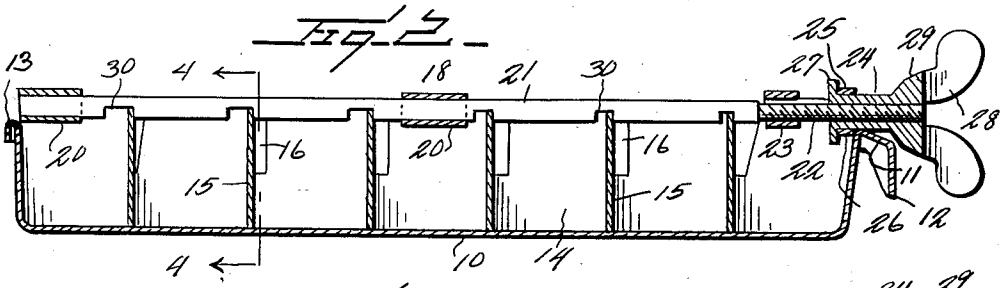


Fig. 3.

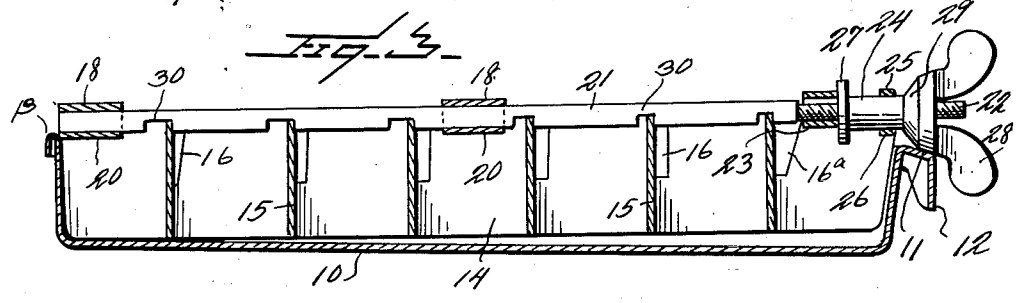


Fig. 5.

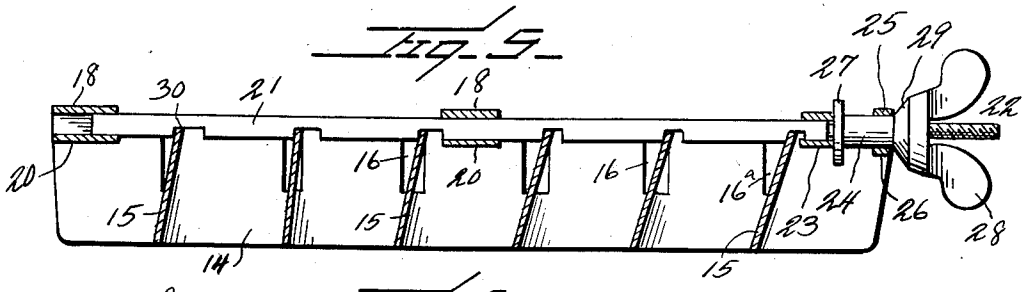
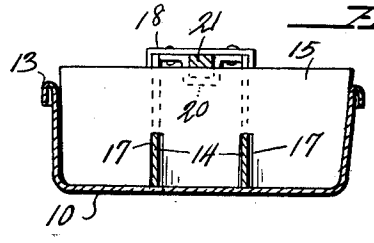


Fig. 4.



Inventor

H. L. Binford

By Watson E. Coleman

Attorney

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2,232,651

UNITED STATES PATENT OFFICE

2,232,651

ICE CUBE TRAY

Hugh Lawley Binford, Houston, Tex., assignor, by mesne assignments, to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application July 13, 1937, Serial No. 153,417

6 Claims. (Cl. 62—108.5)

This invention relates to ice cube trays which are used in electric and other refrigerators and particularly to means for discharging the ice cubes from the trays.

It is well known that it is a difficult matter to detach ice cubes from such trays inasmuch as the ice adheres very tightly to the wall of the tray and to the partitions which divide the tray into compartments. It is necessary usually first to lift the grid or set of partitions from the tray itself, which is sometimes difficult, and then to run hot water over the grid with the cubes of ice therein to thus detach the cubes from the partition plates of the grid. This is troublesome and unduly melts the cubes. Electrical means have also been devised for this purpose but this takes some little time to detach the cubes and, furthermore, renders the user liable to shock.

My invention is designed to provide means whereby the grid formed of the partition plates and the ice cubes within the cells or compartments may be bodily lifted up within the ice tray to thus break the adhesion between the cubes and the wall of the tray and provide further means whereby the partition plates may be drawn away from each other to break the adhesion between the plates and the cubes and widen the space between the partition plates to permit the cubes to drop out from the compartments.

A further object in this connection is to provide for detaching the cubes in serial order, that is, one set of cubes at the forward end of the tray, then another set of cubes and so on, so that all cubes will not be discharged at one time or only the number of cubes discharged which it may be desired to use.

My invention is illustrated in the accompanying drawing wherein:

Fig. 1 is a top plan view of an ice cube tray and a grid constructed in accordance with my invention.

Fig. 2 is a longitudinal sectional view thereof.

Fig. 3 is a like view to Fig. 2 but showing the grid lifted and freed from its adhering engagement with the tray.

Fig. 4 is a section on the line 4—4 of Fig. 2.

Fig. 5 is a like view to Fig. 3 but showing the grid removed from the tray and the transverse partitions shifted to permit the discharge of ice therefrom upon an inversion of the grid.

Referring to the drawing, 10 designates the tray itself which has the ordinary form save that at one end the rim of the tray is widened and downwardly inclined, as at 11, to form a handle 12. The top end of the tray is beaded at 13.

The grid which forms the cube compartments is composed of the two parallel longitudinally extending plates 14 and the transverse plates 15. The plates 14 are formed with the relatively wide slots 16 extending down from the upper edge half the depth of the plates. The end slots 16a of the two plates have an upwardly inclined rear wall so that the upper end of each of these slots is wider than the lower end. The transverse plates 15 are slotted upward from the lower edges at 17 to fit over the plates 14. The walls of the tray 10 are slightly flaring and the end edges of the partition plates fit these flaring walls.

The longitudinal plates are connected at one end, as for instance, by a U-shaped yoke 18, though I do not wish to be limited to this. A second such yoke 18 extends across and connects the longitudinal plates midway between their ends, and a third connecting member or yoke 19 connects the forward ends of the plates 14. Sliding within transverse straps 20 on the yokes 18 is a longitudinally extending rod 21, the forward end of which is threaded at 22 and passes through a strap 23 on the yoke 19. Having threaded engagement with the threaded end 22 of the rod is a rotatable sleeve 24 held in place between a cross-bar 25 of yoke 19 and a strap 26. At its inner end the sleeve is provided with a stop collar 27 and at its outer end with a winged head 28 having a tapered or cone-shaped inner end face 29. The sleeve 24 is interiorly threaded to engage the threads of the part 22.

The rod 21 is formed on its underface with a series of notches 30. The notch 30 adjacent the forward end of the rod is relatively short. The next adjacent notch is slightly longer and the notches are successively longer toward the rear end of the rod, as shown clearly in Figs. 2, 3 and 5.

While I have illustrated the longitudinally extending plates 14 as being connected by U-shaped yokes, it is to be distinctly understood that any web or like element extending across the plates so as to connect the plates 14 at a plurality of points and provide a bearing for the longitudinally extending rod is within the purview of my invention.

The operation of this structure is as follows:

When the ice cubes are being frozen, that is, when the ice tray is within the refrigerator, the parts are in the position shown in Fig. 2, the nut or sleeve 24 having been turned outward until its stop collar 27 bears against the cross-bar 25. This causes all of the transverse partition plates

to be shifted into perpendicular relation to the bottom of the tray and held in this position. When it is desired to remove the ice cubes from the tray, the sleeve 24 is turned inward, as shown in Fig. 3, and this causes the cone-shaped portion 29 to ride up on and wedge against the wall 11, and this wedging action lifts the rack or grid bodily upward at one end. This action is relatively powerful and breaks the adhesion between the ice cubes and the side and end walls of the tray. The grid with the ice cubes therein may then be lifted out. Upon a further rotation of the sleeve 24, the rod 21 will be drawn rearward or toward the sleeve and this will cause the successive tilting of the transverse partitions from the position shown in Fig. 3 to that shown in Fig. 5. This is permitted by the wide slots 16 and 16a. The successive lengthening of the notches 30 causes the first partition to be drawn over to an inclined position before the second partition is drawn over so that if three cubes are wanted, for instance, this is all that need be done. If, on the other hand, six cubes are wanted, the sleeve may be turned until the second partition has been drawn over and so on until when all the partitions have been drawn over to the position shown in Fig. 5 and the grid is inverted, the ice cubes will fall out for the reason that the partitions will be further apart at their edges engaging the bar 21 than at their opposite edges. Thus it will be seen that the cubes are discharged not all at one time but serially. This tends to prevent the breakage of dishes into which the ice cubes may be discharged and further permits, as before stated, the discharge of only as many ice cubes as may be needed. The thread on the portion 22 of the rod 21 will be a relatively quick thread so that the action of elevating the grid from its position within the tray and the action of discharging the ice cubes therefrom may be accomplished with celerity.

I do not wish to be limited to any particular material as obviously this structure might be made of many different materials suitable for the purpose but preferably the parts will be made of aluminum or some material which will not in any way affect the ice and which will not rust.

While I have illustrated certain details of construction which I have found to be thoroughly effective for the purpose, it is obvious that many minor changes might be made without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. An ice tray having an upstanding rim, a compartment-defining grid therein, the grid having a portion thereof formed with a longitudinally extending screw thread extending over the rim of the tray, and an annular wedging member mounted upon the screw thread and adapted when turned in one direction to wedge against the adjacent rim of the tray to thereby lift the grid upward with relation to the tray.

2. An ice tray having a rim, a compartment-defining grid therein, a member attached to the grid and extending over the rim at one end of the tray, and having a portion extending over the rim of the tray screw threaded, and a cone-shaped member having threaded engagement with the member and manually rotatable to shift it into or out of wedging engagement with the adjacent rim of the tray.

3. An ice tray, a compartment-defining grid therein and removable therefrom, the grid comprising longitudinally extending plates and transversely extending plates, the longitudinal plates being slotted and the transverse plates being tiltable from a position perpendicular to the tray into an angular position relative thereto, a rod extending longitudinally of the grid and having sliding engagement therewith, one end of the rod extending over the one end wall of the tray and being screw threaded, there being a bearing mounted on the longitudinal plates and through which the screw threaded portion passes, and a sleeve having threaded engagement with the threaded portion of the rod and manually rotatable, the sleeve having a conical portion adjacent its outer end which when the sleeve is turned inward engages the adjacent wall of the tray to thereby lift this end of the grid, the sleeve having a stop engageable with said bearing whereby upon a further rotation of the sleeve, the rod will be shifted longitudinally, the rod having a series of notches on its underface engageable with the transverse plates, the notches being successively longer toward the rear end of the rod whereby as the rod is shifted outward by the sleeve, the transverse plates will be successively tilted from a parallel position into angular relation to each other.

4. In combination, a tray having a grid disposed therein, said grid comprising a plurality of spaced apart one-piece single thickness rigid longitudinal walls and a plurality of single thickness rigid walls extending transversely thereto through the plane thereof in spaced apart relation along their length to divide the interior of the tray into three or more rows of ice block compartments, said walls being connected together to form a unitary grid structure removable from said tray as a unit, the transverse walls of said unitary grid structure being movable relative to said one-piece longitudinal walls thereof, an annular member adapted to be rotated and having an inclined surface for engaging and applying force to said tray to elevate said unitary grid structure together with ice blocks adhering thereto relative to the tray, and means operable by rotation of said member for engaging said transverse grid walls and moving same relative to said one-piece longitudinal grid walls after said unitary structure has been elevated relative to the tray for breaking an ice bond between the compartment walls and ice blocks therein to release the ice blocks from said compartments.

5. An ice tray having an upstanding rim, a removable unitary grid structure within the tray comprising longitudinal and transverse partitioning walls dividing the interior of the tray into rows of ice block compartments, a rod operatively connected to said grid structure and extending longitudinally thereof, said rod having portions thereof adapted to engage certain walls of said grid structure and having a screw threaded part extending over the rim of the tray, a wedging member movably mounted upon the screw threads of said rod and adapted when moved in one direction along the rod to wedge against the adjacent rim of said tray to lift the grid structure together with ice blocks bonded thereto upwardly relative to the tray, and said wedging member being further movable along said rod in said one direction of movement thereof to move said rod longitudinally of said grid structure and cause said rod portions to engage and move said certain grid walls rela-

tive to certain other of the grid walls for releasing ice blocks from said compartments.

6. An ice tray having an upstanding rim, a removable unitary grid structure within the tray comprising longitudinal and transverse partitioning walls dividing the interior of the tray into rows of ice block compartments, a rod operatively connected to said grid structure and extending longitudinally thereof, said rod having portions thereof adapted to successively engage certain walls of said grid structure and having a screw threaded part extending over the rim of the tray, a wedging member movably mounted upon the screw threads of said rod and adapted when moved in one direction along the rod to wedge against the adjacent rim of said tray to lift the grid structure together with ice blocks bonded thereto upwardly relative to the tray, and said wedging member being further movable along said rod in said one direction of movement thereof to move said rod longitudinally of said grid structure and cause said rod portions to engage and progressively move said certain grid walls relative to certain other of the grid walls for releasing ice blocks from said compartments in succession.

HUGH LAWLEY BINFORD.

CERTIFICATE OF CORRECTION.

Patent No. 2,232,651. February 18, 1941.

HUGH LAWLEY BINFORD.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 70, claim 2, strike out the words "screw threaded" and insert the same before "portion" in line 69, same claim; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 18th day of March, A. D. 1941.

Henry Van Arsdale,
Acting Commissioner of Patents.

(Seal)