ICE BLOCK RELEASING AND STORING UNIT

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This invention relates to refrigeration and particularly to a portable combined ice bucket and freezing device receiving and supporting unit for mechanically releasing ice blocks from a freezing device.

In the past it has been customary to provide a manually movable force multiplying leverage mechanism either on each of a plurality of freezing devices employed in a household refrigerator cabinet or on a portable combined ice releasing and storage bucket unit used in conjunction with a refrigerator and in which a freezing device is to be associated when harvesting ice blocks contained therein. In addition to a mechanism of this character increasing the cost of freezing devices of the tray and grid type or the cost of a combined ice block releasing and storage bucket unit objections have been raised to the force necessary to be exerted upon the lever of the mechanism for moving same. I therefore contemplate the omission of a movable force multiplying mechanism from freezing devices of the tray and grid type or from a portable combined ice releasing and storing bucket unit employed in cooperation therewith so as to reduce the manufacturing cost thereof. In this contemplation my innovation consists in the utilization of a great leverage advantage obtained from bodily moving or rotating an elongated freezing device supported in a particular position on stationary means of a combined ice releasing and storage bucket unit relative thereto for ejecting ice blocks from the freezing device into the bucket of the unit.

Another object of my invention is to provide an ice block ejecting unit for freezing devices wherein the leverage advantage of rotating an elongated freezing device while the same is supported at one end thereof on the unit and is utilized for moving walls of a grid in the device to release ice blocks therefrom into the unit.

A further object of my invention is to invertly support a unitary freezing device of the type comprising a tray and a tiltable walled grid located therein against detachment therefrom at one end thereof on stationary means of a combined ice storage bucket and ice block ejecting unit so that the device is in an inclined position on the unit and is bodily rotatable toward or relative thereto whereby rotation of the device causes a portion of the stationary means to shift a grid wall actuating member of the freezing device for tilting the grid walls thereof and releasing ice blocks from the device into the unit.

In carrying out the foregoing objects it is a still further and more specific object of my invention to rotate a unitary freezing device while in such a rotatable supported position on a stationary bracket of a combined ice bucket and freezing device receiving unit used in conjunction with a refrigerator that portions of the stationary bracket create upon rotating the device relative to the unit successively reactive forces between parts of the freezing device and portions of the bracket to progressively tilt grid walls in a tray of the device and release ice blocks sequentially therefrom.

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 form of the present invention is clearly shown.

In the drawings:

Figure 1 is a front view of a multiple chambered household refrigerator cabinet with its main door open and a part of the freezing chamber door broken away to show a freezing device and a portable combined ice bucket and ice ejector unit removably disposed in the freezing chamber;

Figure 2 is a broken view of an elongated unitary freezing device with the tray thereof in section showing a grid structure locked in the tray against detachment therefrom;

Figure 3 is a sectional view taken on the line 3—3 of Figure 2 showing transverse walls of the grid of the freezing device movably interlocked with a longitudinal partition therein;

Figure 4 is a broken top view of the freezing device disclosed in Figure 2;

Figure 5 is a broken view showing one end of the freezing device invertedly supporting same in an inclined position on a combined ice bucket and freezing device support unit; and

Figure 6 is a view generally similar to Figure 5 with the freezing device rotated relative to the unit showing grid walls tilted in the device and ice blocks being released therefrom.

In describing my invention reference is made to the accompanying drawings wherein the invention is illustrated. Figure 1 shows a refrigerating apparatus including an insulated household refrigerator cabinet 10 of the multiple compartment or chamber type to which my invention applies. Cabinet 10 is provided with a lower unfrozen food storage chamber 11 which is cooled to a temperature above freezing by a plate-like sheet metal evaporator 12 of a closed refrigerating system associated with the cabinet and which evaporator is mounted on the back wall of cabinet 10 behind a protecting or concealing baffle 13. Cabinet 10 is also provided with an upper or frozen food storage chamber 14 which is cooled to a temperature well below 32° F. for the storage of frozen foods, for freezing foods and/or for freezing water in freezing devices removably disposed in chamber 14 into ice blocks for table use in chilling salads or the like and drinks in glasses. Chamber 14 is refrigerated by a second evaporator 15, of the refrigerating system associated with cabinet 10, which second evaporator is in the form of a conduit coiled or wrapped around the outside of and secured in contact with a metal can-like member 16 forming the liner or inner walls of chamber 14. A door 17, shown broken away in Figure 1, is hingedly mounted at the front of chamber 14 to provide an individual closure for the access opening thereof as is conventional. Another insulated main door structure 18, hingedly mounted on cabinet 10 for horizontal swinging movement, extends across the front of both chambers 11 and 14 and is provided with a resilient gasket 19 for sealingly engaging the front of cabinet 10.

A plurality of similar or companion freezing devices, generally represented by the reference numeral 20 in Figure 1 and shown more clearly in other figures of the drawings, are located in the freezing chamber 14 and have water frozen into ice blocks therein.

Each of the freezing devices 20 is of a unitary type including an elongated tray and a movable or tiltable...
walled grid structure locked in the tray against detachment therefrom and are preferably of the general character disclosed and fully described in the V. G. Sharpe Patent #2,829,506, dated April 8, 1958 and more specifically they are of the character disclosed and described in the V. G. Sharpe and J. S.Sucro copending application S.N. 634,020, filed January 14, 1957 entitled, "Freezing Device," both assigned to the assignee of this application. The unitary freezing devices herein disclosed differ slightly from those shown in the patent and the copending application referred to in order to carry out the objects of my invention. This difference lies in the provision of a set of doors at one end of a grid wall activating member of the freezing device that extends outwardly of either side thereof and the purpose of which will become apparent hereinafter. Briefly each freezing device 20 includes an elongated sheet metal pan or tray 21 provided with inclined sides 22 and inclined front and rear ends 23 and 24 respectively having a top rim 26 therearound flanged downwardly as at 27. Tray 21 has a movable walled grid structure locked therein against detachment therefrom and this structure comprises a two-part longitudinal partition including a lower wall 31 and an upper actuating wall or member 32 disposed in vertical alignment with the latter. Wall or actuating member 32 is adapted to be shifted lengthwise of partitioning wall 31 along the tray 21. A plurality of longitudinally spaced apart substantially inflexible transverse or cross walls 33 are loosely mounted on or movably interlocked with the longitudinal partition so as to be tilted relative to the tray and to lower wall 31 and projects outwardly or laterally from each side thereof the function of which will be hereinafter described. The transverse grid walls 33 are normally held in an acute inclined angular plane with respect to the vertical and are mounted in such a manner that they may be swung or tilted within tray 21 into a substantially vertical plane when the actuating member 32 is shifted lengthwise along the elongated tray. The normal inclination of walls 33 provide ice block forming compartments in the freezing device which are, in at least one vertical cross sectional contour or area there-through, of a parallelogram shape and when these walls are tilted toward the vertical the compartments are enlarged intermediate their walls. Notches 36 in actuating member 32 are progressively wider than one another in a direction from the handle end 23 of tray 21 to the opposite or rear end 24 thereof and serve, when member 32 is shifted lengthwise along wall 31 or along the tray, to engage and apply force to the walls 33 one after the other in succession to progressively tilt them toward the vertical for sequentially releasing ice blocks from the freezing device. Tilting of the grid walls in this manner is important in the present disclosure since it divides or breaks up the force required to be applied to the walls into a plurality of smaller forces which prevent damaging a stationary means on an ice bucket and/or cracking or breaking a thin wall of the molded plastic bucket itself. The construction of a tray and grid type freezing device as herein shown and fully described in the patent and in the copending application hereinafter referred to is now well-known and therefore a more elaborate description thereof in the present disclosure is unnecessary for an understanding of my innovation.

In accordance with the objects of the present invention I utilize the leverage advantage of rotating an elongated freezing device anchored or supported at one end only thereof on stationary means on an ice bucket for releasing ice blocks from the device. Thus in the present disclosure I show a portable combined open top ice storage bucket and freezing device receiving unit, generally represented by the reference numeral 40, for use in conjunction with the refrigerator 10 which unit is removable disposed in chamber 14 (see Figure 1) and is adapted for cooperation with any one of the unitary freezing devices 20 during the act of hardening to the ice block storage unit 40 may have a freezing device 20 placed in operable cooperation thereon with while the same is disposed in chamber 14 or it may be removed from the refrigerator 10 and transported therewith from a plurality of separate devices in place in association therewith an ice block serving point remote from the refrigerator. Bucket unit 40 has an open top, is substantially rectangular in shape and is preferably molded in one piece from non-metallic material such as poly styrene to provide a rigid light-weight structure. The combined open top ice storage bucket and freezing device receiving or supporting unit 40 includes a bottom 41, long side walls 42 and front and rear walls 43 and 44 respectively (see Figure 5). The top 46 of front wall 43 of unit 40 forms a step for a purpose to be hereinafter described. A stationary means or metal bracket 51 is rigidly mounted upon the lower wall 44 of bucket unit 40 by a plurality of bolts or the like 52. Stationary bracket 51 is provided near the top thereof with an integral hook or first hook portion 54 paralleling wall 44 and an integral second portion comprising two spaced apart inwardly directed projections 56 each having like cam surfaces 57 thereon. Cam surfaces 57 locate wall 44 inwardly of the end wall 44 of bucket unit 40 from hook or hook portion 54 and are stationary relative thereto on the stationary mounted bracket 51. Hook 54 or the first portion of bracket 51 may, if desired, be extended a substantial distance throughout the width of unit 40 (not shown) so as to spread forces applied therewith to the rim of tray 21 over a wide area thereof. Bracket 51, hook 54 and cam surface 57 on projections 56 may be stamped from a single piece of metal or cast integrally with one another to provide a stationary means on the portable combined ice bucket and freezing device support unit which means is utilized in a manner to be presently described. Back 54 is notched out centrally thereof as at 58 so as to provide clearance for a projection on grid wall 31, which extends through the rear end of tray 21, when a freezing device 20 is supported on unit 20 and rotated with respect thereto.

After water has been hard-frozen into separated ice blocks in the upright unitary freezing devices 20 within chamber 14 of cabinet 10 any selected one of the freezing devices together with the grid and ice blocks therein is removed from the chamber, rotated into an inverted position and placed in cooperation association with unit 40 either within or without the refrigerator cabinet. In so placing the freezing device 20 flange 27 on rim 26 at the rear end 24 of tray 21 is hooked to or under the first portion or hook 54 of bracket 51 and the pin 57, on actuating wall or member 32, rests on or abuts the second portion or cam surfaces 57 of bracket 51 with the end part of member 32 disposed between the projections. 56. This invertdly and detachably supports the unitary freezing device 20 from one end thereof on bucket unit 40 in an upwardly inclined position relative thereto whereby the device is capable of rotation with respect thereto or downwardly toward the second portion of bucket 40 (see Figure 5). It is to be understood that flange 27 on rim 26 of tray 21 particularly at the rear end 24 thereof may, if desired, be structurally reinforced in any suitable or conventional manner to withstand forces applied thereto and to prevent deformation of the tray rim. With the unitary freezing device 20 rigidly attached or pivoted to bucket unit 40 by means of bracket 51 or rotated relative thereto to effect release or ejection of separated ice blocks from the freezing device into the bucket unit. Thus by grasping the raised front or han-
dle end 23 of device 20 and rotating same downwardly about its pivotal anchorage, the pin 37 rides along cam surface 57 on bracket 51 to push actuating wall or member 32 lengthwise along tray 21. Member 32 engages and applies force to grid walls 33 one after the other in succession from the forward or handle end 23 of device 20 to the rear end 24 thereof for progressively tilting the walls 33 sequentially loosening or releasing ice blocks therefrom and from the freezing device itself, thereby detaching the ice block unit 40 of the portable combined unit (see Figure 6). The front or handle end 23 of tray 21 engages stop 46 on wall 43 of the bucket to prevent rotation of the freezing device 20 into unit 40 and the loosened ice blocks falling into the bucket unit. In this manner a freezing device 20 is prevented from entering the bucket unit in which position it would be inaccessible for removal therefrom. Device 20 may thereafter be rotated upwardly of bucket 40 and removed from the stationary main bracket 51 on the bucket unit. Ice blocks received in bucket unit 40 may be stored therein and dispensed therefrom while the unit is located in refrigerator 10 or when is removed from the refrigerator and transported to a point remote from cabinet 10 for storing ice blocks thereafter. Tilting or camming of grid wall actuating member 32, in the manner described, is accomplished by a stationary means and is the greatest of ease since I utilize the advantage of rotating an elongated freezing device about its pivotedly supported or anchored one end.

It should, from the foregoing, be apparent that I have provided an improved, simplified and low cost arrangement for harvesting ice blocks from a freezing device. While by my invention a costly and objectionable movable force multiplying lever mechanism has been eliminated from freezing devices or from a portable combined ice bucket and freezing device receiving or supporting unit, I have retained the desirable and popular feature of releasing ice blocks into a portable ice storage container or receptacle either within or without a refrigerator cabinet where a plurality of ice blocks are readily accessible as distinguished from ejecting ice blocks from a grid into an ice tray previously occupied by the grid. A stationary means is provided on an ice bucket unit and I utilize an available leverage advantage of rotating a freezing device relative to the bucket in association with or cooperation with the stationary means to simplify the construction of the bucket unit and to ease the task of ejecting ice blocks from a freezing device. While the form of embodiment is a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. An open top portable combined ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a freezing device containing ice blocks removably disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, stationary means directly on and carried by said ice bucket unit detachably receiving one end of said freezer device comprising a tray, a grid having tiltable walls in said tray and a grid wall actuating member, said tray having a part thereof hooked to a first portion of said stationary means with said actuating member along said tray and apply force to said grid walls for tilting them and releasing ice blocks from the device into the bucket of said unit, and the end of said freezing device opposite its said one end being engageable with a stop on said bucket unit at the open top thereof for preventing rotation of the device into the unit.

2. An open top portable combined ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a freezing device containing ice blocks removably disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, stationary means directly on and carried by said ice bucket unit detachably receiving one end only of said freezing device to invertly support same in an upwardly inclined position thereon above the open top thereof for rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls in said tray and a grid wall actuating member, said tray having a part thereof hooked to a second integral portion of said stationary means with said actuating member abutting a stop on said bucket unit at the open top thereof for preventing rotation of the device into the unit.

3. A combined open top ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a unitary freezing device containing ice blocks removably disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, said bucket unit being selectively insertable into the refrigerator for freezing ice blocks in the bucket therein and transportable away from the refrigerator so as to dispense ice blocks from the bucket at an ice block serving point remote from the refrigerator, stationary means directly on and carried by said ice bucket unit detachably receiving one end only of said unitary freezing device to invertly support same in an upwardly inclined position thereon above the open top thereof for rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls locked in said tray against detachment therefrom and a grid wall actuating member, said tray having a part thereof hooked to a first integral portion of said stationary means with said actuating member abutting a second integral portion thereof when the unitary freezing device is so supported on said unit, said unitary freezing device being rotateable with respect to said unit while supported thereon whereby said integral portions of said stationary means cooperate with one another to shift said actuating member along said tray and apply force to said grid walls for tilting them and releasing ice blocks from the device into the bucket of said unit, and the end of said unitary freezing device opposite its said one end being engageable with a stop on said bucket unit at the open top thereof for preventing rotation of the device into the unit.

4. A combined open top bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a unitary freezing device containing ice blocks removably disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, said bucket unit being selectively insertable into the refrigerator for storing ice blocks in the bucket therein and transportable away from the refrigerator so as to dispense ice blocks from the bucket at an ice block serving point remote from the refrigerator, stationary means directly on and carried by said ice bucket unit detachably receiving one end
only of said unitary freezing device to invertedly support same in an upwardly inclined position thereon above the open top thereof for a rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls locked in said tray against detachment therefrom and a grid wall actuating member, said tray having a part thereof hooked to a first integral portion of said stationary member with said actuating member abutting a second integral portion thereof when the unitary freezing device is so supported on said unit, said unitary freezing device being rotatable downwardly toward said unit while supported thereon whereby said portions of said stationary means cooperate with one another to shift said actuating member along said tray and apply force to said grid walls one after the other in succession for progressively tilting them and sequentially releasing ice blocks from the device into the bucket of said unit, and the end of said unitary freezing device opposite its said one end being engageable with a stop on said bucket unit at the open top thereof for preventing rotation of the device into the unit.

5. An open top portable combined ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a freezing device containing ice blocks removable disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, a metal bracket stationarily secured to and carried by said ice bucket unit, said bracket having a hook portion and a cam surface spaced therefrom formed integrally thereon, said bracket detachably receiving one end only of said freezing device to directly and invertedly support same in an upwardly inclined position on said unit for rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls in said tray and a grid wall actuating member, said tray having a top rim provided with a depending flange hooked to said hook portion of said bracket with said actuating member abutting the cam surface thereon when said freezing device is so supported on said unit, said freezing device being rotatable with respect to said bucket unit while supported thereon, said hook portion on said bracket pivotally anchoring said freezing device to said unit against sliding movement relative thereto during rotation of the device whereby said cam surface on said bracket shifts said actuating member along said tray for applying force to said grid walls to tilt them and release ice blocks from the device into the bucket of said unit, and the end of said freezing device opposite its said one end being engageable with a stop on said bucket unit at the open top thereof for preventing rotation of the device into the unit.

6. An open top portable combined ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a freezing device containing ice blocks removable disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, a metal bracket stationarily secured to and carried by said ice bucket unit, said bracket having a hook portion and a cam surface spaced therefrom formed integrally thereon, said bracket detachably receiving one end only of said freezing device to directly and invertedly support same in an upwardly inclined position on said unit for rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls locked in said tray against detachment therefrom and a grid wall actuating member, said tray having a top rim provided with a depending flange hooked to said hook portion of said bracket with said actuating member abutting the cam surface thereon when said freezing device is so supported on said unit, said freezing device being rotatable with respect to said bucket unit while supported thereon, said hook portion on said bracket pivotally anchoring said freezing device to said unit against sliding movement relative thereto during rotation of the device whereby said cam surface on the bracket shifts said actuating member along said tray for applying force to said grid walls to tilt them and release ice blocks from the device into the bucket of said unit, and the end of said unitary freezing device opposite its said one end being engageable with the upper part of said bucket unit for preventing rotation of the device into the unit.

8. A combined open top ice bucket and freezing device support unit for use in conjunction with a household refrigerator and adapted to have a unitary freezing device containing ice blocks removable disposed in the refrigerator placed in cooperation therewith during the act of harvesting ice blocks from said device, a metal bracket stationarily secured to and carried by said ice bucket unit, said bracket having a hook portion and a cam surface spaced therefrom formed integrally thereon, said bracket detachably receiving one end only of said freezing device to directly and invertedly support same in an upwardly inclined position on said unit for rotation relative thereto, said freezing device comprising a tray, a grid having tiltable walls locked in said tray against detachment therefrom and a grid wall actuating member, said tray having a top rim provided with a depending flange hooked to said hook portion of said bracket with said actuating member abutting the cam surface thereon when said freezing device is so supported on said unit, said unitary freezing device being rotatable downwardly toward said unit while supported thereon, said hook portion of said bracket pivotally anchoring said unitary freezing device to said unit against sliding movement relative thereto during rotation of the device whereby said cam surface on the bracket shifts said actuating member along said tray and applies force to said grid walls one after the other in succession for progressively tilting them and sequentially releasing ice blocks from the device into the bucket of said unit, and the end of said unitary freezing device opposite its said one end being engageable with the
upper part of bucket unit for preventing rotation of the device into the unit.

9. An open top portable combined ice bucket and freezing device support unit for use in conjunction with a refrigerator adapted to have a freezing device containing ice blocks removably disposed in the refrigerator and placeable into association with said unit during the act of harvesting ice blocks from said device, stationary means on and carried by said ice bucket unit detachably receiving and invertedly supporting one end only of said freezing device thereon with the remainder of said device elevated thereabove for rotation relative thereto, said freezing device comprising a tray member and grid member therein, said grid member including walls anchored in the tray member for tilting movement with respect thereto, one of said members having a part at said one end of the freezing device removably hooked to a first portion of said stationary means with a part of the other of said members abutting a second portion of said means spaced from said first portion thereof while the freezing device is so supported on said unit for operating said grid member, and said freezing device being rotatable throughout a predetermined distance toward the open top of said unit whereby said portions of said stationary means cooperate with one another for applying force to said grid member to tilt walls thereof in said tray member and release ice blocks from said device into the bucket of said unit.

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