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ICE BLOCK EJECTING DEVICE

Filed April 4, 1956

2 Sheets-Sheet 1

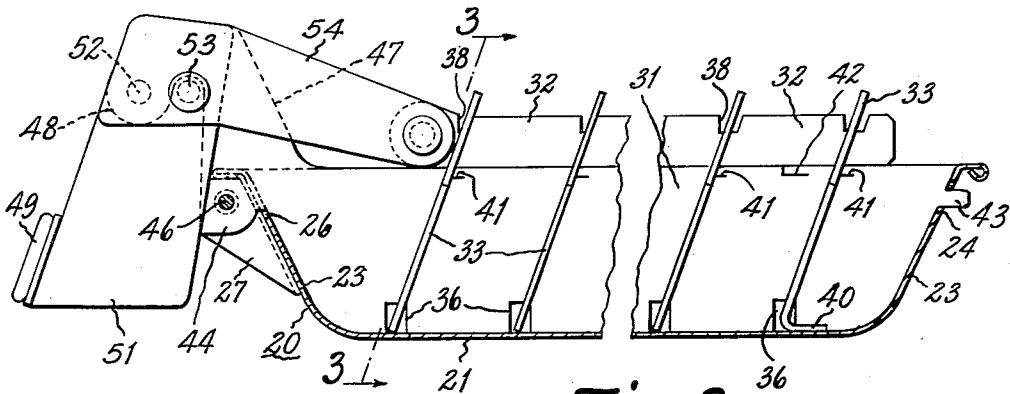


Fig. 2

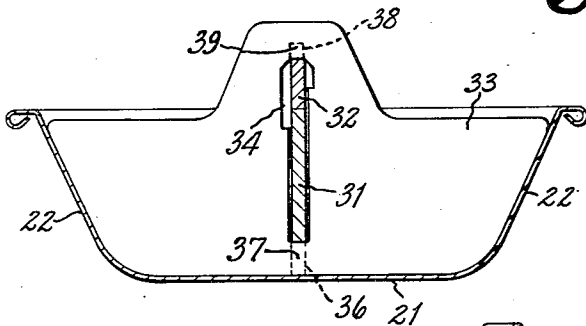


Fig. 3

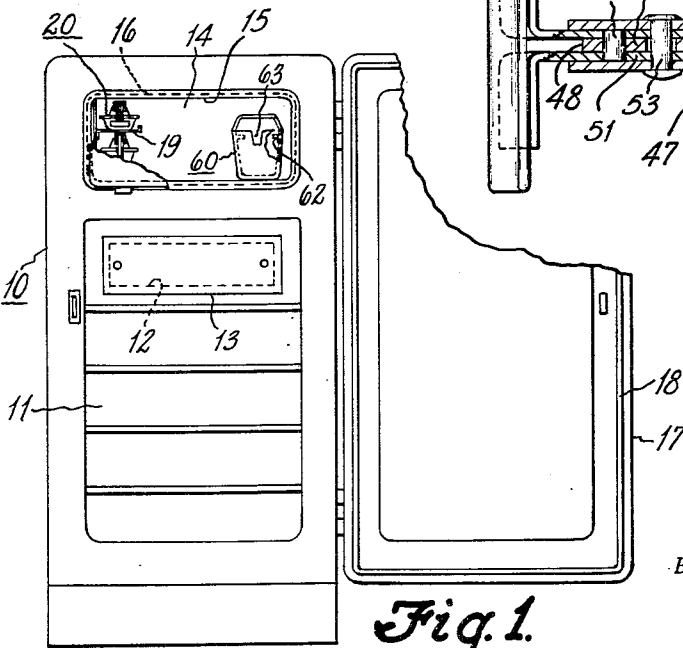


Fig. 1

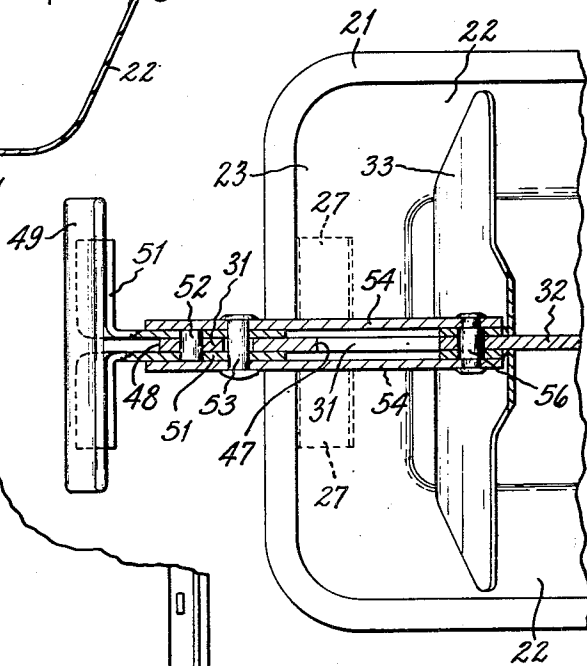


Fig. 4

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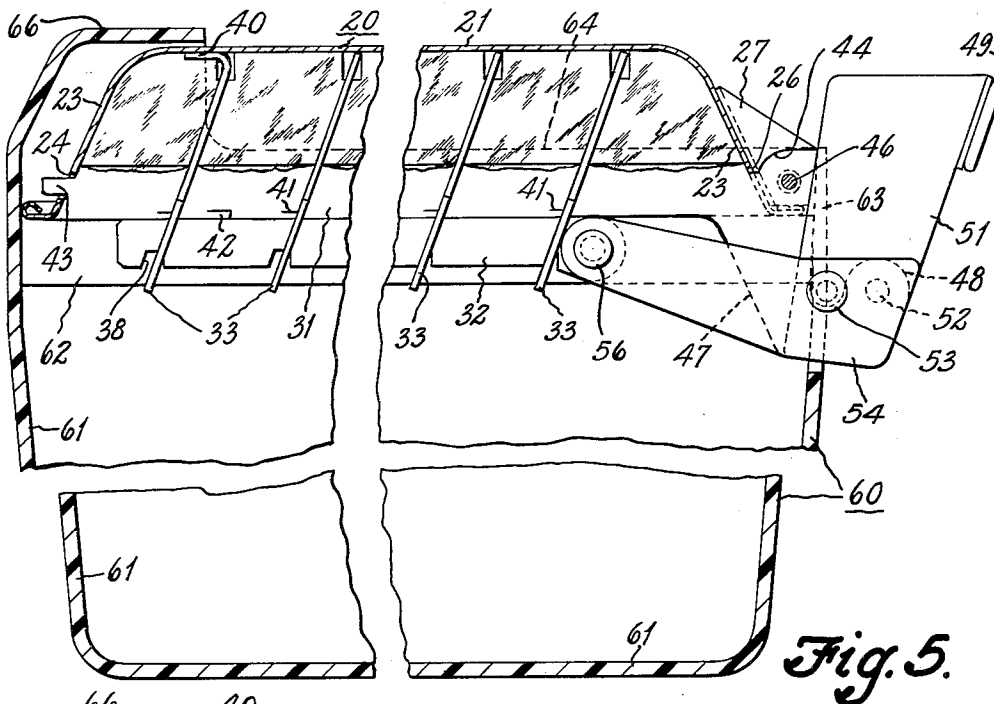


Fig. 5.

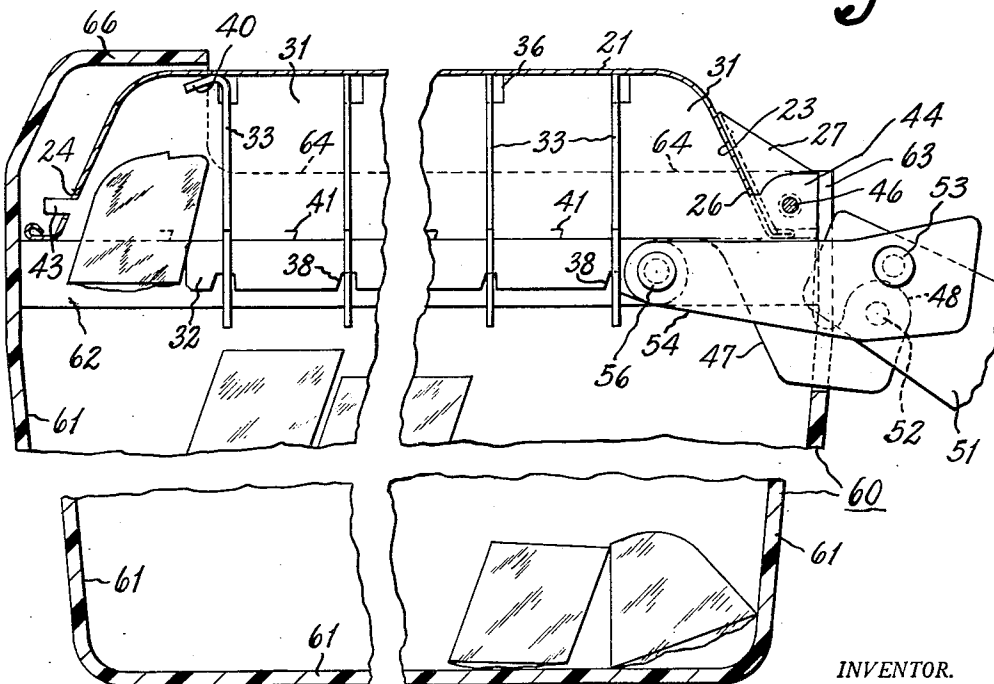


Fig. 6.

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## ICE BLOCK EJECTING DEVICE

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5 Claims. (Cl. 62—166)

This invention relates to refrigeration and particularly to an arrangement for ejecting ice blocks from a freezing device into a storage bin.

There has recently been placed on the market an arrangement whereby ice blocks are ejected from a freezing device including a tray that is twisted by pushing the device along stationary supporting tracks in a freezing compartment of a refrigerator which tracks are inclined or curved relative to one another. While the public has favorably accepted this arrangement, there are some users of refrigerators having the same incorporated therein who have expressed objections thereto. One of these objections is that of the great force required to be applied to the freezing device to push it along the tracks to cause twisting of the tray thereof and ejection of the ice blocks therefrom. Another objection to this now well known ice block ejecting arrangement is that of the ice block ejector being permanently located in the refrigerator thereby eliminating use thereof at a kitchen work ledge where the housewife may be mixing and chilling drinks or the like prior to serving. I contemplate an arrangement for harvesting separated ice blocks from a freezing device without twisting the tray of the device and which harvesting operation can be carried out in or away from a refrigerator cabinet with a minimum of effort on the part of the user of the refrigerator to thereby overcome the aforesaid objections.

An object of my invention is to provide an improved low cost arrangement for releasing or ejecting ice blocks from a freezing device associated with a household refrigerator cabinet.

Another object of my invention is to provide a unitary freezing device including a tray and a movable walled grid locked in the tray against detachment therefrom wherein the grid walls are moved relative to one another and to the tray without twisting the tray with a force multiplying leverage mechanism located on the device for ejecting ice blocks therefrom while the device is supported in an inverted position on a support therefor.

Still another object of my invention is to provide a combined freezing device support and ice block storage receptacle element for the reception of a freezing device from which ice blocks are to be released and collected in the receptacle of a type that can be used either in a refrigerator cabinet or at points remote therefrom.

A further object of my invention is to provide a unitary freezing device including a grid locked in a tray against removal therefrom, the walls of which grid are tiltable relative to one another and to the tray while the device is held stationary in an inverted position on a combined support and ice block storage receptacle without distorting the tray by a manually actuated leverage mechanism on the unitary freezing device.

A more specific object of my invention is to provide a portable combined freezing device receiving and ice block storage receptacle element with means which prevents movement of the tray of a freezing device supported thereon while ice blocks are being released from the device

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and wherein a portion of which means serves as a handle for the combined element in transporting same to or away from a refrigerator cabinet.

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 compartment household refrigerator cabinet with its door open showing a combined portable freezing device support and ice block storage receptacle element constructed according to my invention located in the freezing chamber thereof;

Figure 2 is a view of a unitary tray and grid freezing device with the tray in section and showing means locking the grid in the tray;

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

Figure 4 is a top view of one end portion of the unitary freezing tray showing the connection of a leverage mechanism thereon with parts of the longitudinal partition of the grid therein;

Figure 5 is a sectional view through the combined portable freezing device receiving and ice block storage receptacle element constructed in accordance with my invention showing a freezing device with ice blocks therein supported in an inverted position thereon; and

Figure 6 is a view similar to Figure 5 showing the leverage mechanism on the freezing device moved with walls of the grid of the device shifted relative to one another and ice blocks ejected from the freezing device into the storage receptacle.

Referring to the drawings I show in Figure 1 thereof a refrigerating apparatus including an insulated household refrigerator cabinet 10 of the multiple compartment type in which the present invention is particularly useful. Cabinet 10 is provided with a lower unfrozen food storage compartment or chamber 11 which is cooled to a temperature of from 37° F. to 43° F. by a plate-like sheet metal evaporator 12 of a refrigerating system associated with the cabinet and mounted behind a protecting cover or baffle 13. Cabinet 10 is also provided with an upper freezing or frozen food storage compartment or 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 into ice blocks for table use in chilling drinks in glasses. Chamber 14 is refrigerated by an evaporator of the refrigerating system associated with cabinet 10, which evaporator is in the form of a conduit coiled or wrapped around the outside of and secured to a metal can-like member 15 forming the liner of chamber 14 as indicated by the dotted lines 16 in Figure 1. An insulated door structure 17, hingedly mounted on cabinet 10 for horizontal swinging movement relative thereto, extends across the front of both compartments or chambers 11 and 14 and is provided with a gasket 18 for sealingly engaging the front side of cabinet 10. Another smaller door, shown broken away in Figure 1, separate from door 17 may be hingedly mounted at the front of chamber 14 for vertical swinging movement to provide an individual closure for its access opening as is conventional in the art. A plurality of metal shelves 19 are secured, in any suitable or desirable manner, directly to a side wall of liner 16 so as to be in intimate metal to metal contact therewith and consequently with evaporator 16. Each shelf 19 is adapted to support an elongated unitary freezing device, generally represented by the reference numeral 20 in Figure 1, and shown more in detail in other figures of the drawings.

Each of the unitary freezing devices 20 includes a

stamped sheet metal pan or tray 21 provided with a bottom and outwardly inclined sides 22 and ends 23 (see Figures 2 and 3). The rear end 23 of tray 21 is provided with an opening 24 adjacent the top rim thereof and the other or front end of tray 21 is notched out as at 26 (see Figure 2) and this notch extends downwardly through the top rim to a short distance therebelow for a purpose to be presently described. Two opposed clamping brackets 27 are welded to the notched end of tray 21 one on each side of notch 26. A movable walled grid structure is locked in tray 21 against removal therefrom and includes a two-part metal longitudinal partition and a plurality of spaced apart metal walls extending transversely of the longitudinal partition for dividing the interior of tray 21 into a plurality of rows of compartments in which water is to be frozen into separate ice blocks. The longitudinal partition of the grid structure comprises a lower wall 31 and an upper actuating wall or bar 32 arranged to be slid back and forth upon wall 31. A plurality of spaced apart cross walls 33 are loosely mounted on the longitudinal partition at their lower edges and upon bar or upper wall 32 adjacent their upper edges in such manner that cross walls 33 may be swung or tilted upwardly and forwardly relative to the lower wall 31 of the long partition and to tray 21. The cross walls 33 normally lie in an acute inclined angular plane with respect to the vertical and are adapted to be tilted into a substantially vertical plane when the actuating bar or wall 32 is moved along wall 31. As a general rule a grid structure of this type usually comprises seven or eight of the inclined cross or transverse walls 33. Cross or transverse grid walls 33 each have an elongated key-hole-shaped opening 34 therein (see Figure 3) through which the walls 31 and 32 of the longitudinal partition extend. The opening 34 in the cross walls 33 is so shaped as to permit insertion of the lower wall 31 and upper wall 32 into the openings 34 of the various cross walls 33 one after the other during assembly of parts of the grid structure whereby the wall 32 can be moved above wall 31 while this wall extends through the opening 34 so as to loosely rest on the lower wall 31. The lower wall 31 of the longitudinal partition has a series of notches 36 cut into its bottom edge to loosely receive a small web portion 37 at the bottom margin of cross walls 33 (see Figure 3). The actuating bar or upper wall 32 has notches 38 cut therein and suitably spaced apart along the upper edge thereof to receive continuous or web portions 39 of the cross walls 33. The method of assembling the grid walls 31, 32, 33 into interlocked relatively movable association with one another is now well known to those skilled in the art and is believed to require no detailed or lengthy description herein. It will be noted that the one cross wall 33 at the rear end of device 20 is provided with a lip 40 at its lower edge and this lip facilitates ejection of the pairs of ice blocks at the back of the device. The upper edge of the lower wall 31 is provided with a plurality of spaced apart laterally bent ears 41 which serve as stops for the inclined cross walls 33 and retain these walls in their correct inclined-from-the-vertical position while water in the freezing device 20 is being frozen into ice blocks as is conventional in such grid structures. A portion of the top edge of lower wall 31 is also lanced as at 42 to project laterally therefrom and serve to keep or hold the walls 31 and 32 in vertical alignment with one another when relative movement is imparted to the grid walls. Lower wall 31 of the lower partition of the grid structure is provided at the rear end of device 20 with a projection 43 fitting in opening 24 of tray end wall 23. The other or forward end of lower wall 31 of the longitudinal partition is provided with an ear 44 fitting in notch 26 at the front of device 20 and is secured to the two opposed brackets 27 on tray 21 by a pin or rivet 46. The front end of lower wall 31 is further provided with an upwardly raised part 47 which terminates in a hook-like

end portion 48. A lever of a force multiplying leverage mechanism associated with a device 20 has a handle 49 and two integral spaced apart legs 51. The end of legs 51 of the lever, spaced from the handle 49 thereof, are pivotally mounted to the lower grid wall 31 by a pin 52 disposed in a hole provided in hooked end part 48 of this lower wall. This end of legs 51 of the lever are pivotally connected by a stud or the like 53, spaced from pin 52, to one end of a pair of links 54 which have their other end pivotally connected, by a pin or stud 56, to the forward end of bar or upper wall 32 of the longitudinal grid partition. Stud 53 is adapted to rotate about the pivot pin 52 within a cutaway portion of the hooked end 48 of grid wall 31. Movement of the legs 51 of the lever in a direction outwardly away from the freezing device 20 rotates the stud 53 about the pivotally anchoring pin 52 and shifts the links 54 and consequently actuating bar 32 in a direction toward the front end of the device and the bar 32 moves or tilts the cross walls out of their normal inclined position into a substantially vertical position progressively or one after the other in succession by virtue of the differential in width of notches 38 as is conventional in this art. It is to be noted that pin 52 is locked or held in place in a hole provided in the hook end part 48 of wall 31 by an end portion of the links 54 which at all times overlie this pin. The pins or studs 53 and 56 are riveted or peened over after assembly of the lever and links 54 to one another. Suitable washers are placed over the ends of stud 56 to prevent this stud from tightly binding the links 54 against the actuating bar or wall 32. After assembly of the grid structure the projection or tab 43 on wall 31 thereof is inserted in the opening 24 and the grid is lowered into tray 21 whereby ear 44 at the front of the grid wall 31 moves down into the notch 26 in the front end 23 of tray 21. Rivet 46 is then inserted into suitable holes provided in the opposed brackets 27 and ear 44 on grid wall 31 after which rivet 46 is peened over. This rivet 46 and tab or projection 43 cooperates to lock the grid in tray 21 against removal therefrom whereby to provide the unitary freezing device 20.

In accordance with my invention I provide a portable combined freezing device receiving and ice block storage bucket or receptacle device preferably in the form of an elongated molded plastic transparent box or bucket-like element, generally represented by the reference character 60, for association with the refrigerator cabinet 10 and removably disposed in the freezing compartment or chamber 14 thereof. The receptacle or bucket device 60 includes a plurality of walls 61 forming an ice block storage bin in the lower portion thereof (see Figure 6). Long side walls of receptacle element or bucket device 60 are each provided with an integral rail 62 extending parallel to one another from the front to the rear thereof. The rails 62 form supports on the combined element or bucket device 60 for receiving and supporting portions of the rim of a tray of a freezing device 20. Front wall 61 of receptacle element or bucket device 60 has a cut-out notch at 63 at its top edge providing clearance for the leverage mechanism on a freezing device 20 when supported on the receptacle or bucket. The back wall of receptacle or bucket element 60 extends upwardly of the top edge 64 of wall 61 and inwardly over the rear portion of the opposed rails 62 in the form of a lip 66 (see Figures 5 and 6). Lip 66 serves a double purpose for the substantially open top receptacle element or bucket device 60 in that it provides a handle for transporting the receptacle or bucket from the refrigerator cabinet 10 to a kitchen work ledge when desired and provides hold-down means for a freezing device 20 supported on rails or supports 62 while the leverage mechanism on the device is being operated. That portion of the front wall of receptacle or bucket device 60 between its open top edge 64 and the forward end of rails 62, engaged at either side of notch 63 by the brackets 27, cooperate with

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the handle portion 66 to prevent shifting or tilting of a freezing device 20 with respect to the receptacle or bucket and provides means for holding the tray 21 stationary relative to the element 60 during operation of the leverage mechanism carried by a device 20 supported on the supports 62.

After water has been frozen into separated ice blocks in a freezing device 20 on a shelf 19 within the freezing compartment or chamber 14 of refrigerator cabinet 10 the unitary device together with ice blocks therein is removed from compartment 14, rotated into an inverted position and placed into the open top of receptacle element or bucket device 60 with the top or rim of side walls of the tray thereof supported on the opposed rails or supports 62 as shown in Figure 5 of the drawing. The combined receptacle and ice block storage element or bucket device 60 being portable permits the same to receive a freezing device 20 while it is located in compartment 14 or when it is removed from cabinet 10 and supported on a kitchen work ledge. In order to harvest separated ice blocks from the inverted freezing device 20 on receptacle element or bucket 60 the handle 49 of the force multiplying leverage mechanism is grasped by a hand and pulled in an outward and downward direction relative to device 20 and receptacle 60. This movement of handle 49 pivots legs 51 of the lever about pin 52 and rotates the stud 53 around pin 52 to shift links 54 in a direction forwardly of device 20 and consequently moves actuating bar or wall 32 longitudinally along the grid wall 31. The one wall of notches 38 in actuating bar or wall 32 progressively engages the inclined cross or transverse walls 33 of the grid structure in tray 21 and tilts these walls one after the other toward the vertical in succession from the front to the rear of the freezing device 20. Tilting of the forward grid wall 33 breaks the ice blocks in the compartments at the front of the freezing device loose from walls thereof and cams them against the inclined end wall 23 of tray 21 whereby they are released or ejected from the freezing device. Subsequent tilting of other of the inclined cross transverse walls 33 breaks the ice bond between ice blocks and tray 21 and these walls. The tilting of walls 33 enlarges the ice block compartments in a direction intermediate these walls and the loosened ice blocks are freed or released from the freezing device 20 by dropping out of the enlarged compartments (see Figure 6). The end portion of lip 40 on the rear transverse grid wall moves away from the bottom of tray 21 as the wall is tilted toward the vertical and in so moving pushes the ice blocks at the rear end of device 20 out of their compartments whereby to remove all ice blocks therefrom. The ice blocks fall into the storage bin portion of receptacle element or bucket device 60 and then the freezing device 20 is elevated off the rails 62 and removed from the combined receptacle element or bucket device. Receptacle element or bucket 60 with separated ice blocks therein can remain in the freezing compartment 14 of cabinet 10 and ice blocks removed therefrom through its open top as needed or as desired.

From the foregoing it should be apparent that I have provided an ice block harvesting arrangement which can be operated with the ease of conventional means associated with a freezing device and without distorting or twisting a metal tray. By my improved arrangement the fast freezing characteristics of a freezing device of the metal tray and grid type is retained. My arrangement permits harvesting of ice blocks either in the freezing compartment of a refrigerator cabinet or at a kitchen work ledge. Moreover my freezing device is of substantially a conventional design and requires no special or expensive tooling, etc., in its manufacture. The grid remains locked at all times against removal from the tray of my freezing device and does not become misplaced therefrom. A portion of the means which prevents movement of the tray of a freezing device relative to the combined

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freezing device receiving and ice block storage bucket or receptacle element is formed thereon so as to serve as a handle for transporting the element to or away from the refrigerator.

While the form of embodiment of the invention as herein disclosed constitutes 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. In combination, a combined portable ice bucket device and freezing device support for selectively storing ice blocks in a refrigerator or for transporting ice blocks away from the refrigerator, a unitary freezing device comprising an elongated tray and a grid locked therein against detachment therefrom having spaced apart substantially inflexible walls inclined with respect to the vertical and anchored in the tray for tilting movement relative thereto to loosen ice blocks frozen in the freezing device, said unitary freezing device being receivable in an inverted position on the support of said portable ice bucket device so as to allow loosened ice blocks to fall therefrom, mechanism carried by one of said devices for applying force to said grid walls in a direction lengthwise of said elongated tray to tilt them toward the vertical whereby ice blocks are mechanically released from said freezing device into said ice storage bucket device without distorting the tray, said mechanism including a manually operable means accessible from exteriorly of said devices while said unitary freezing device is supported in its inverted position on the support of said ice bucket device when same is within and/or without the refrigerator, and fixed means on the portable ice bucket device for holding the tray of said inverted unitary freezing device stationary on said support against sliding movement relative thereto during the application of said force to the grid walls by said mechanism.

2. The combination defined by claim 1 wherein the walls of the grid locked in the tray of the unitary freezing device are tilted one after the other in succession to progressively release ice blocks into the combined portable ice bucket device.

3. In combination, a combined portable ice bucket device and freezing device support for selectively storing ice blocks in a refrigerator or for transporting ice blocks away from the refrigerator, a unitary freezing device comprising an elongated tray and a grid locked therein against detachment therefrom having spaced apart substantially inflexible walls inclined with respect to the vertical and anchored in the tray for tilting movement relative thereto to loosen ice blocks frozen in the freezing device, said unitary freezing device being receivable in an inverted position on the support of said portable ice bucket device so as to allow loosened ice blocks to fall therefrom, mechanism carried by one of said devices for applying force to said grid walls in a direction lengthwise of said elongated tray to tilt them toward the vertical whereby ice blocks are mechanically released from said freezing device into said ice storage bucket device without distorting the tray, said mechanism including a manually operable means accessible from exteriorly of said devices while said unitary freezing device is supported in its inverted position on the support of said ice bucket device when same is within and/or without the refrigerator, fixed means on the portable ice bucket device for holding the tray of said inverted unitary freezing device stationary on said support against sliding movement relative thereto during the application of said force to the grid walls by said mechanism, and means on the portable ice bucket device extending upwardly and over a portion of the bottom of the tray of said inverted unitary freezing device for preventing tilting thereof with respect to its support during operation of said manually operable means.

4. The combination defined by claim 3 wherein the means for preventing tilting of the unitary freezing device

serves, when the freezing device is removed from the support on the ice storage bucket device, as a handle for transporting same.

5. The combination defined by claim 1 wherein the mechanical ice block releasing mechanism is carried by the unitary freezing device and is separable therewith from the portable ice bucket device.

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