Oct. 8, 1957 V. G. SHARPE 2,808,708

ICE BLOCK EJECTING DEVICE

Filed Aug. 9, 1956 3 Sheets-Sheet 1

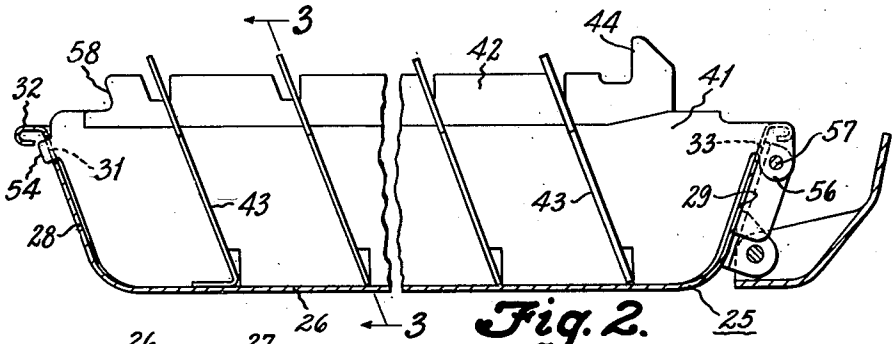


Fig. 2.

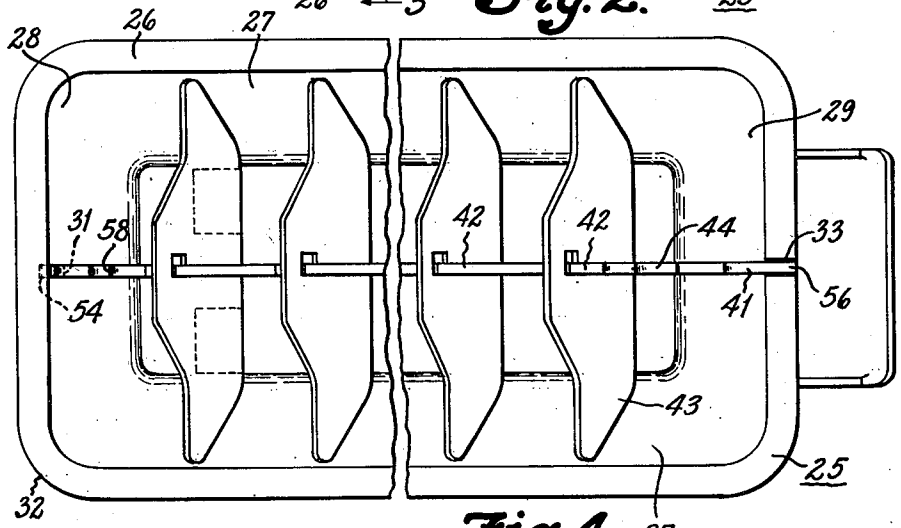


Fig. 4.

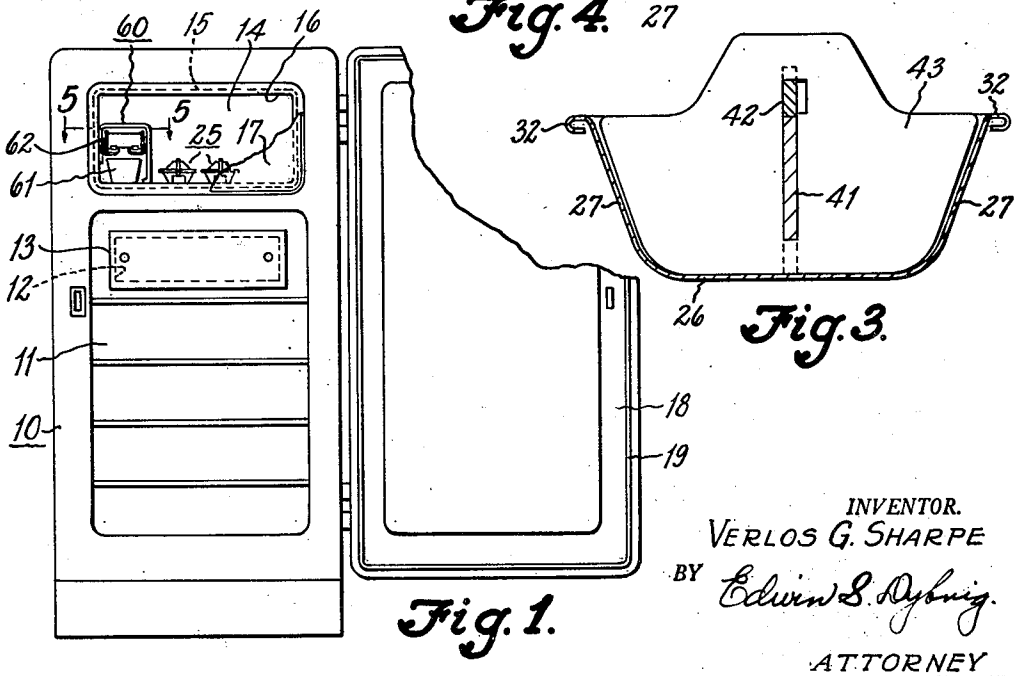


Fig. 1.

Fig. 3.

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ICE BLOCK EJECTING DEVICE

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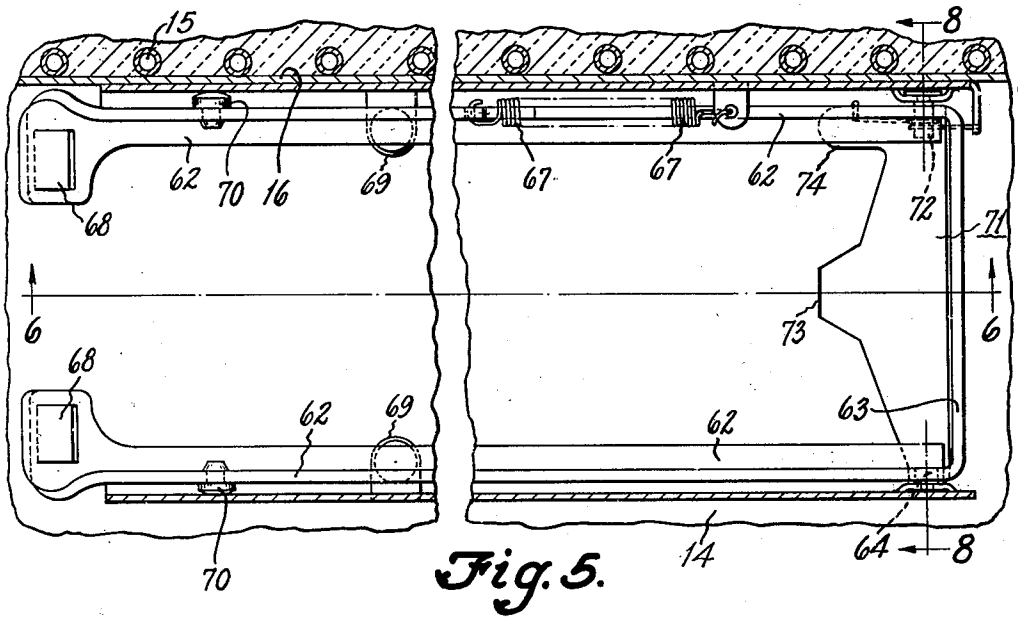


Fig. 5.

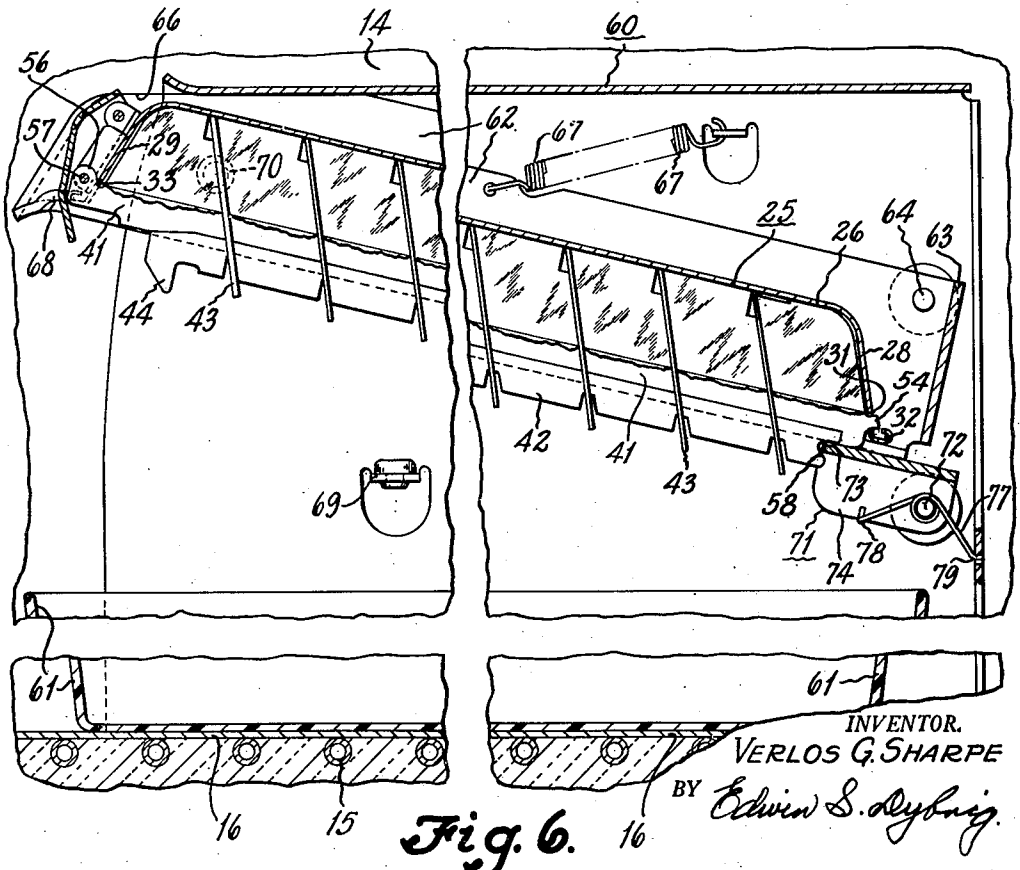


Fig. 6.

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ICE BLOCK EJECTING DEVICE

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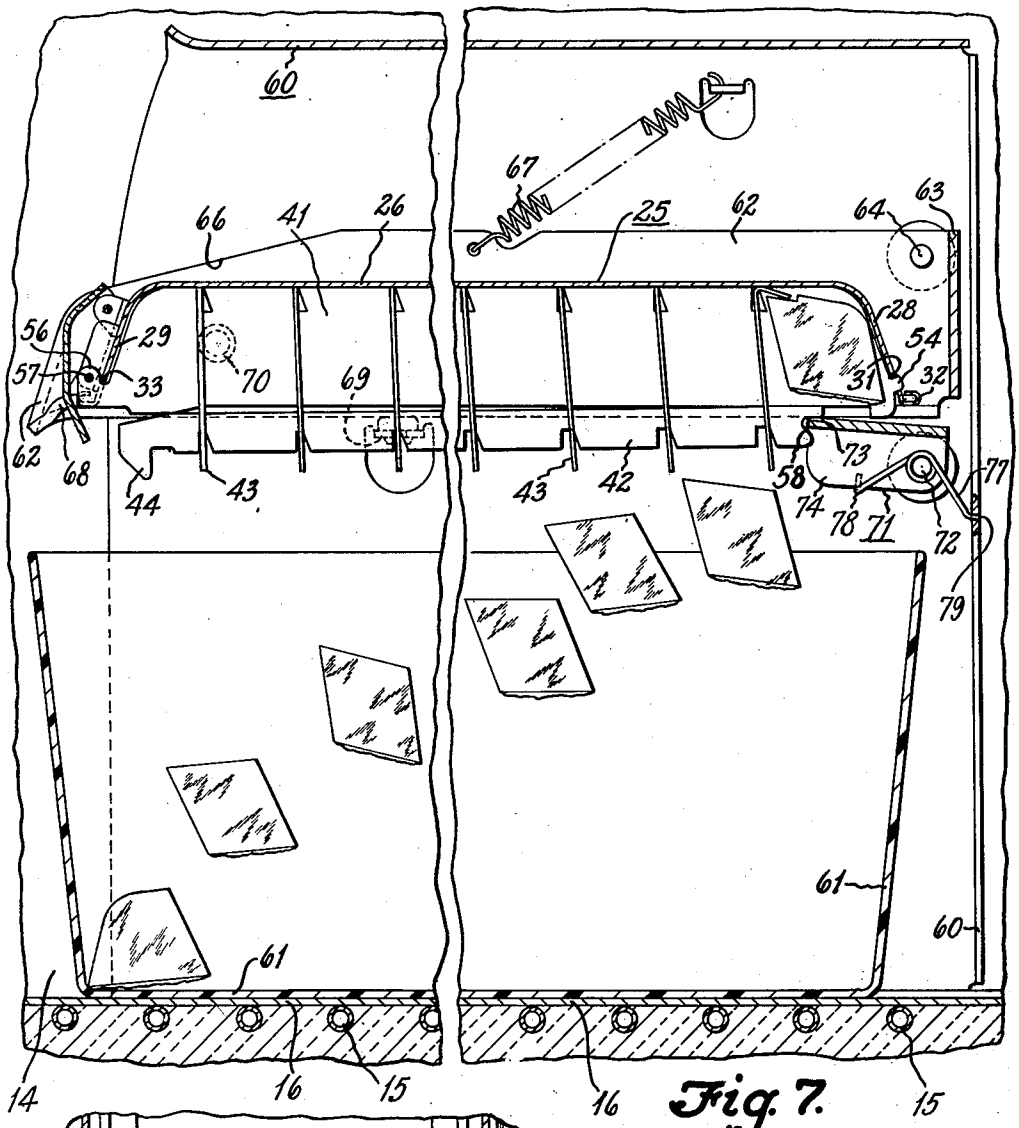


Fig. 7.

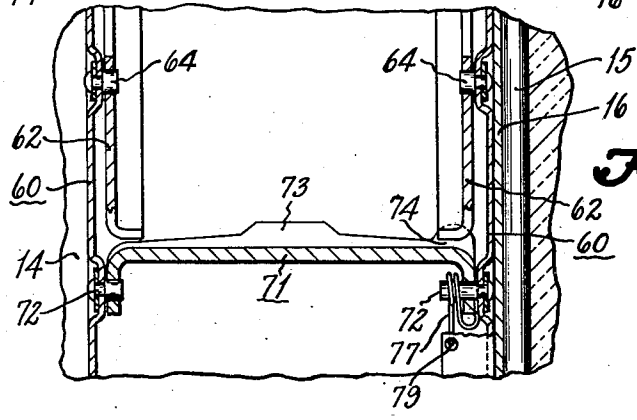


Fig. 8.

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2,808,708

ICE BLOCK EJECTING DEVICE

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Application August 9, 1956, Serial No. 603,074

11 Claims. (Cl. 62—106)

This invention relates to refrigeration and specifically to an arrangement or apparatus for mechanically releasing ice blocks from a unitary freezing device placed in association therewith.

I am aware of the fact that each of a plurality of freezing devices of the tray and grid type employed in conjunction with the use of household refrigerators have heretofore been provided with its own leverage mechanism or other force multiplying means for moving the grid walls in order to release ice blocks from the tray thereof. Obviously the provision of such an ice block releasing mechanism on each individual freezing device renders them very costly as compared to associating a single ice block ejecting device with a household refrigerator which is common to a plurality of freezing devices or trays used in conjunction with the refrigerator. I, therefore, in addition to providing a single ice block ejecting mechanism which is separate from the tray and grid of a freezing device while being adapted to receive and eject ice blocks from all similar or conventional devices used in conjunction with a refrigerator also contemplate the construction of a unitary freezing device having means incorporated therein or thereon for association with a plurality of different types of ice block ejecting mechanisms. In this manner I not only save the expense of providing each of several devices in a refrigerator with individual mechanisms but also render a particular freezing device standard equipment for use in a plurality of models or types of refrigerators having differently constructed ice ejecting mechanisms or devices associated therewith in accordance with the style thereof and price obtained therefor. My invention is particularly advantageous in this respect since the unitary freezing device herein disclosed can be used in refrigerators having associated therewith an ice block ejecting device of the type herein shown and claimed and/or in refrigerators having an ice block ejecting device of the type shown in my copending application, S. N. 597,213, filed July 11, 1956, entitled "Ice Block Harvesting Device" and assigned to the assignee of this application.

An object of my invention is to provide a low cost improved arrangement for releasing ice blocks from a plurality of similarly constructed freezing devices associated with a household refrigerator cabinet.

Another object of my invention is to provide an ice block ejecting mechanism for freezing devices wherein the leverage advantage derived from an elongated platform pivotally mounted at one end thereof and upon which the freezing device is supported, is utilized for manually operating the mechanism.

A further object of my invention is to invertedly support a unitary freezing device of the type comprising a tray and a movable walled grid locked therein against detachment therefrom on a pivotally mounted platform portion of an ice block ejecting mechanism and to prevent movement of the tray of the device relative to the platform during swinging movement thereof about its pivotal mounting to cause a part of the mechanism to engage a grid wall actuating element of the freezing device for shifting grid walls within the tray relative thereto and to one another to release ice blocks from the device.

In carrying out the foregoing object it is a still further and more specific object of my invention to pivotally mount that part of the ice block ejecting mechanism which engages and moves the grid wall actuating element of the freezing device so that it swings with swinging of the freezing device and the platform supporting same to at all times apply force to the element in a direction parallel to its extension whereby the freezing device is prevented from becoming damaged and said part of the mechanism is prevented from disengaging the actuating element during the swinging operation.

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 the main door open and a part of the freezing chamber door broken away to show a freezing device, an ice block ejector and an ice block storage receptable in the freezing chamber;

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

Figure 3 is a sectional view taken on 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 elongated freezing device shown in Figure 2;

Figure 5 is an enlarged fragmentary and broken sectional view of the ice block ejector taken on the line 5—5 of Figure 1;

Figure 6 is a broken fragmentary sectional view taken on the line 6—6 of Figure 5 showing a unitary freezing device and ice blocks therein invertedly supported on a pivotally mounted platform of the ice block ejector of the present invention;

Figure 7 is a fragmentary sectional view similar to Figure 6 with the inverted freezing device and platform of the ice block ejector swung downwardly to tilt grid walls in the tray of the freezing device and showing ice blocks being released from the device; and

Figure 8 is a sectional view taken on the line 8—8 of Figure 5 showing the pivotal mounting of elements of the ice block ejector.

Referring to the drawings, wherein the invention is illustrated, I show in Figure 1 thereof a refrigerating apparatus including an insulated household refrigerator cabinet 10 of the multiple compartment or chamber type in which the present invention is incorporated. Cabinet 10 is provided with a lower unfrozen food storage chamber or compartment 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 mounted behind a protecting or concealing cover or baffle 13. Cabinet 10 is also provided with an upper or frozen food storage chamber or compartment 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 to a metal can-like member 16 forming the liner or inner walls of chamber 14 (see

Figures 5 and 6). 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 relative thereto, extends across the front of both chambers 11 and 14 and is provided with a resilient gasket 19 for sealingly engaging the front side of cabinet 10. A plurality of unitary freezing devices, generally represented by the reference numeral 25 in Figure 1 and shown more clearly in other figures of the drawings, are supported on the bottom wall of chamber 14 so as to be in metal to metal contact with the evaporator 15.

Each of the unitary freezing devices 25 is substantially like the freezing device shown and more fully described in my copending application hereinbefore referred to. The present freezing devices are slightly modified in a manner whereby ice blocks can be mechanically released from the device when placed into supported position on an ice block ejector of the type illustrated in said copending application and/or when placed into supported position on an ice block ejector of the character herein disclosed and claimed. Briefly each freezing device 25 includes an elongated sheet metal pan or tray 26 provided with inclined sides 27 and inclined ends 28 and 29 having a rolled-over rim 32 at the top thereof which extends around the tray. The rear end 28 of tray 26 is provided with an opening 31 adjacent rim 32 and the other or front end 29 of tray 26 is notched out as at 33 (see Figure 2). The notch 33 extends downwardly through rim 32 to a short distance therebelow. Brackets are welded to the front end 29 of tray 26 for supporting a cam handle on the freezing device and for providing a mounting for a pin or stud which locks a movable walled grid in the tray against removal or detachment therefrom as is fully described in my copending application hereinbefore identified. The tray and a movable walled grid structure locked therein form one of the plurality of freezing devices 25. The grid structure within tray 26 includes a two part metal longitudinal partition and a plurality of spaced apart substantially inflexible metal walls extending transversely of the longitudinal partition for dividing the interior of the tray 26 into rows of ice block forming compartments in which water is to be frozen into separated ice blocks. The longitudinal partition of the grid structure comprises a lower wall 41 and an upper actuating wall or element 42 disposed in vertical alignment therewith and adapted to be shifted back and forth therealong. The plurality of longitudinally spaced apart substantially inflexible transverse or cross walls 43 are loosely mounted or movably interlocked with the longitudinal partition at their bottom edges in notches provided in lower wall 41 and at their upper edges in notches provided in actuating element 42. Cross walls 43 are normally disposed or lie 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 relative to lower wall 41 and to the tray 26 into a substantially vertical plane when the actuating element 42 is shifted lengthwise along wall 41. By virtue of the normal inclined freezing position of the transverse walls 43 the ice block compartments are, in at least one vertical cross sectional contour or area therethrough, of a parallelogram shape and when the walls 43 are tilted toward the vertical, to break bonds between walls of the compartments and ice blocks therein, these compartments are enlarged in a direction between the walls 43. It is to be noted that the lower wall 41 of the longitudinal partition of the grid structure is provided at the rear end of the freezing device 25 with a projection 54 fitting in the closed walled opening 31 of tray and wall 28. The other or forward end of wall 41 is provided with a punctured ear 56 which is slid into notch 33 at the front end 29 of device 25 and is secured to a part of the brackets on this end of the tray of the device by a pin or the like 57. Since walls 41, 42 and 43 are all movably interlocked together and wall 41 is secured to tray 26, by the projection 54 fitting in opening 31 and by ear 56 being secured to the tray, the grid structure is locked in the tray against removal therefrom to provide a unitary freezing device 25 devoid of a grid wall moving force multiplying mechanism. Actuating wall element 42 is provided with a hook-like end 44 at the front or cam handle end of device 25 so that walls of the grid can be moved by the ice block ejector mechanism shown and described in my copending application hereinbefore referred to. The other or rear end of actuating element 42 is cut away to provide same with a slightly angled shouldered end surface 58 and this is the only difference between the presently disclosed freezing device 25 and that shown in my hereinbefore identified copending application. The purpose of the shouldered end surface 58 on actuating element 42 will become apparent hereinafter.

In accordance with the objects of the present invention I provide a single force multiplying or leverage mechanism for acting upon any selected one of several similarly constructed companion freezing devices 25 within chamber 14 of the refrigerator cabinet 10 to move the movable walls of the grid locked in the tray of a device to mechanically eject or release ice blocks therefrom. This mechanism is, in the present disclosure, incorporated in a walled structure or device which comprises an inverted substantially U-shaped metal member generally represented at 60 in Figure 1. The one side wall of member 60 is secured in any suitable or conventional manner to a side wall or liner 16 of compartment 14 and the end of the leg of the other side of the U-shaped member 60 is secured to the bottom wall of liner 16 to form a stationary box-like structure within compartment 14. A receptacle 61 is removably disposed in chamber 14 within the box-like structure or device 60 therein and is adapted to receive and store ice blocks in the freezing chamber released from a freezing device 25 placed in association with member 60 in a manner to be presently described. The mechanism incorporated in member 60 includes a yoke-like platen or platform having parallel angle-like arms 62 and a connecting rear portion 63 (see Figure 5). The vertical part of each angle-like arm 62 of the platform at the rear thereof is pivotally mounted, as by stud 64, to side walls of the box-like member or device 60 for permitting the platform to be swung vertically about the pivot studs 64. The vertical top part of the front portion of at least one of the angle-like arms 62 of the yoke-shaped platform is cut away as at 66 to engage the top or bight portion of the U-shaped box or wall member 60 and forms a stop for limiting upward swinging of the platform. A coil spring 67 normally holds the edge 66 of the one arm of the platform against the top of member 60. The arms 62 of the yoke-like platform are adapted to receive the rim portion 32 of a tray 26 of a freezing device 25 and the forward end of each of these arms are provided with a lip 68 raised above the horizontal flat surface thereof. The lips 68 are engageable by the tray rim 32 at the front end of the device to prevent movement of the tray thereof relative to the platform when a device 25 is invertedly supported thereon. Side walls of box member 60 are provided with cut-out and bent inwardly portions 69 and these opposed portions 69 form stops for the yoke-like platform to limit downward swinging movement thereof. The vertical portion of each arm of the platform carries a non-metallic button 70 which may engage and slide along a side wall of member 60 to space the arms 62 therefrom and to center the platform in member 60 during swinging movements thereof about its pivotal mounting studs 64. A movable member 71 extends across the interior of box or wall member 60 below the platform and is pivotally mounted to sides of member 60 by studs 72. Member 71 is provided with a forwardly extending central part 73 which forms a means adapted to engage behind the shouldered surface 58 of the actuating wall ele-

ment 42 of a grid within a tray of a freezing device 25 when such device is placed on the yoke-like platform of the ice block ejector. Member 71 is also provided with a side extension 74 which is parallel to the central extension 73 and engages under an arm 62 of the platform to limit upward movement of member 71. A spring 77 coiled about one of the studs 72 has its one end 78 hooked over the side extension 74 of pivotally mounted member 71 and has its other end 79 hooked to a flanged portion of a side wall of member 60. The spring 77 normally biases the extension 74 on member 71 upwardly against an arm 62 of the freezing device support or platform.

After water has been hard-frozen into separated ice blocks in the compartments of the freezing device 25 supported upright within the frozen food storage or freezing chamber 14 of the refrigeraator cabinet 10 any selected one thereof, together with the grid and ice blocks therein, is removed from chamber 14, rotated into an inverted position and placed upside-down on the arms 62 of the yoke-like platform of the ice ejector (see Figure 6). When so placed the shouldered end surface 58 on the actuating wall element 42 of the grid within the freezing device abuts against the central extension 73 of pivoted member 71 and the rim 32 of tray 26 at the front of the device 25 engages the raised ear 68 on the outer end of arms 62 of the platform. In order to now release ice blocks from the freezing device 25, invertedly supported on arms 62 of the platform within the box member 60, a downward force is manually applied to the outer end of the tray of the device. This force swings the device 25 and its supporting platform vertically downward relative to and within the member 60 about the pivotal mounting studs 64 into engagement with the stops 69. The great leverage afforded between the forward end of the elongated freezing device and the pivotal mounting of its supporting platform during swinging thereof together with the breaking of ice bonds between walls of the ice block compartments and ice blocks therein one after the other in succession to progressively release ice blocks renders the ice ejector easily operable. Downward swinging movement of the platform and freezing device 25 supported thereon causes extension 73 on member 71 to engage and push forward on the shouldered end surface 58 of the grid wall actuating element 42 to shift this element lengthwise along grid wall 41 relative to the tray 26 of the device 25. It is to be noted that the rim 32 at the front of device 25 is abutted against the raised ear 68 to maintain the tray 26 of the inverted freezing device stationary with respect to the yoke-like supporting platform during the swinging movement. The notches in grid wall actuating element 42 are arranged, as has heretofore been conventional, so that a wall thereof engages the transverse grid walls 43 one after the other in succession along the length of the freezing device to progressively tilt these inclined walls 43 toward the vertical. Tilting of transverse walls 43 out of their normal inclined position toward the vertical in addition to breaking ice bonds between walls of the ice block compartments and ice blocks therein also enlarges the compartment to free the loosened ice blocks therefrom whereupon the freed ice blocks fall into the storage receptacle 61. The pair of ice blocks at the rear of the inverted freezing device will fall into receptacle 61 when the device is removed from the ice block ejector member 60. When the downward force applied to the inverted freezing device is released, after ejecting ice blocks therefrom, the device 25 is removed from member 60. The spring 67 then returns the yoke-like platform to its normal inclined position within the box member 60 and spring 77 swings movable member 71 into engagement with an arm 62 of the swingable platform. By pivotally mounting member 71 on member 60 the extending part 73 thereof, which forms a means to be associated or registered with a part, shouldered end surface 58, on actuating element 42 this part or extension 73 is so rotatable or swingable with the inverted freezing device on the platform. The swinging of member 71 with the platform and freezing device thereon causes the force applied by extension 73 to the shouldered end surface 58 of actuating wall element 42 to be exerted on this element in a direction parallel to the length thereof at all times during swinging of the yoke platform and the freezing device supported thereon. Thus there is little danger of extension 73 becoming disengaged from the end surface 58 of element 42 during ice block releasing operations.

From the foregoing it should be apparent that I have provided a simple inexpensive force multiplying mechanism which is easily operable to release separated ice blocks from a unitary freezing device. I have provided means on a unitary freezing device for moving grid walls thereof which device is capable of being associated with a plurality of differently constructed ice block ejectors to thereby render my freezing device standard equipment in various models or types of refrigerators. Thus the invention in addition to accomplishing the provision of a single ice block ejector for receiving any selected one of a plurality of unitary freezing devices within a refrigerator for harvesting ice blocks therefrom, to eliminate the expense of incorporating a force multiplying mechanism on each of the freezing devices within a refrigerator, also provides a standard freezing device for association with different types of ice block ejectors to thereby reduce manufacturing costs of freezing devices. My present ice block ejector device or mechanism utilizes the leverage afforded by a pivotally mounted elongated freezing device and in this respect is an improvement over the mechanism disclosed in my aforesaid copending application.

While the form of embodiment of the invention as 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 refrigerator cabinet having a chamber therein, a refrigerating system associated with said cabinet including an evaporator for cooling said chamber to a temperature below 32° F., a unitary freezing device normally disposed in said chamber and exposed to the below 32° F. temperature of said evaporator, said unitary freezing device including a tray and a grid locked therein against removal therefrom, said grid comprising a plurality of spaced apart substantially inflexible walls inclined with respect to the vertical and a grid wall actuating element extending across said plurality of inclined walls adapted to engage and move same, said grid walls being anchored within said tray for tilting movement relative thereto and cooperating therewith to divide the interior thereof into open top compartments in which water is to be frozen into separated ice blocks, an ice block ejecting mechanism for receiving said unitary freezing device comprising a member having one end of a platform pivotally mounted thereon for vertical swinging movement relative thereto and a means on said member separate from said platform adapted for association with a part of said grid wall actuating element of said freezing device, said device together with said grid and ice blocks therein being removable from said chamber and rotatable into an inverted supported position on said platform with said part of said grid wall actuating element registering with said means on said member, said platform and said freezing device thereon being swingable about said pivotal mounting to cause said means on said member to engage said part of said actuating element and apply force thereto for shifting said element relative to the tray of said device, and the shifting of said actuating element tilting said inclined grid walls with respect to said tray toward the vertical for ejecting ice blocks downwardly out of the open top of the compartments in said inverted freezing device while the grid walls remain locked in the tray thereof.

2. The combination defined by claim 1 wherein means

on the platform holds the tray stationary with respect thereto during the swinging operation.

3. The combination defined by claim 1 wherein the actuating element engages the inclined grid walls one after the other in succession to progressively tilt same from end to end of the freezing device.

4. The combination defined by claim 1 wherein the means of the ice block releasing mechanism separate from the platform is pivotally mounted on the member and is swingable about its mounting with the inverted freezing device and the platform to apply force to the grid wall actuating element in a direction paralleling its extension at all times throughout the swinging operation.

5. The combination defined by claim 1 wherein a receptacle is removably associated with the member of the ice block releasing mechanism beneath the platform thereof and receives the separated ice blocks released from the inverted freezing device.

6. In combination, a refrigerator cabinet having a chamber therein, a refrigerating system associated with said cabinet including an evaporator for cooling said chamber to a temperature below 32° F., a unitary freezing device normally disposed in said chamber and exposed to the below 32° F. temperature of said evaporator, said unitary freezing device including a elongated tray and a grid locked therein against removal therefrom, said grid comprising a longitudinal partition, a grid wall actuating element above and substantially coextensive with said partition and a plurality of spaced apart substantially inflexible walls inclined with respect to the vertical extending transversely across and being movably interlocked with said partition and said actuating element, said actuating element being adapted to engage and tilt said inclined walls, said partition and said walls cooperating with said tray to divide the interior thereof into rows of open top compartments in which water is to be frozen into separated ice blocks, an ice block ejecting mechanism for receiving said unitary freezing device comprising a stationary member having one end of an elongated platform pivotally mounted thereon for vertical swinging movement relative thereto and a means on said member separate from said platform and spaced below the pivotal mounting thereof adapted for association with an end portion of said grid wall actuating element of said freezing device, said device together with said grid and ice blocks therein being removable from said chamber and rotatable into an inverted supported position on said platform with said end portion of the grid wall actuating element registering with said means on said stationary member, said platform and said unitary freezing device thereon being swingable downwardly about said pivotal mounting to cause said means on said stationary member to engage the end portion of said actuating element and apply force thereto for shifting said element lengthwise of said longitudinal partition relative to the tray of said device, and the shifting of said actuating element tilting said inclined grid walls with respect to said partition and said tray toward the vertical for ejecting the separated ice blocks downwardly out of the open top of the compartments in said inverted freezing device while the grid walls remain locked in the tray thereof.

7. The combination defined by claim 6 wherein means on the platform holds the tray stationary with respect thereto during the swinging operation.

8. The combination defined by claim 6 wherein the actuating element engages the inclined walls one after the other in succession to progressively tilt same from end to end of the freezing device.

9. The combination defined by claim 6 wherein the means of the ice blocks releasing mechanism separate from the platform is pivotally mounted on the stationary member and is swingable about its mounting with the inverted freezing device and the platform to apply force to the grid wall actuating element in a direction paralleling its extension at all times throughout the swinging operation.

10. The combination defined by claim 6 wherein a receptacle is removably associated with the stationary member of the ice block releasing mechanism beneath the platform thereof and receives the separated ice blocks released from the inverted freezing device.

11. In combination, a refrigerator cabinet having a chamber therein, a refrigerating system associated with said cabinet including an evaporator for cooling said chamber to a temperature below 32° F., a unitary freezing device normally disposed in said chamber and exposed to the low temperature of said evaporator, said freezing device comprising a tray and substantially inflexible grid walls locked therein against detachment therefrom and anchored thereto for tilting movement relative to the tray, said grid walls dividing the interior of said tray into open top compartments in which water is to be frozen into a plurality of separated ice blocks, an ice block ejecting device comprising a member having one end of a platform pivotally mounted thereon for vertical swinging movement relative thereto, a grid wall actuating element on one of said devices, said freezing device together with said grid walls and ice blocks therein being removable from said chamber and rotatable into an inverted supported position on said platform with a portion of said actuating element abutting a part of said member and with other portions thereof registering with said grid walls, said platform and said freezing device thereon being swingable about said pivotal mounting whereby said part of said member applies force to said actuating element and shifts same relative to the tray of said freezing device while supported on said platform, and the shifting of said actuating element causing said other portions thereof to engage and tilt said grid walls about their anchorage in said tray with with respect thereto and to one another for ejecting the plurality of separated ice blocks downwardly out of the open top of the compartments in said inverted freezing device while the grid walls remain locked in the tray thereof.

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