March 3, 1953 E. F. CHASE 2,629,987

REFRIGERATOR ICE MOLD

Filed Aug. 23, 1949 2 SHEETS—SHEET 1

Fig. 1

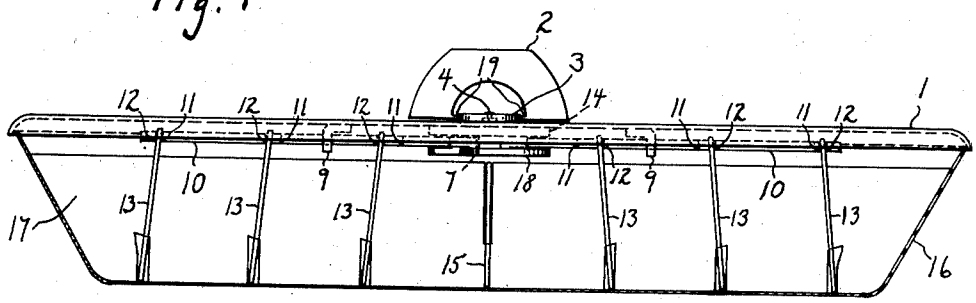



Fig. 7

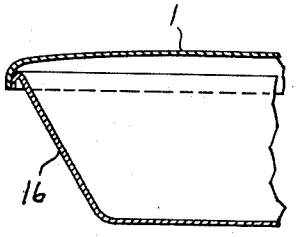
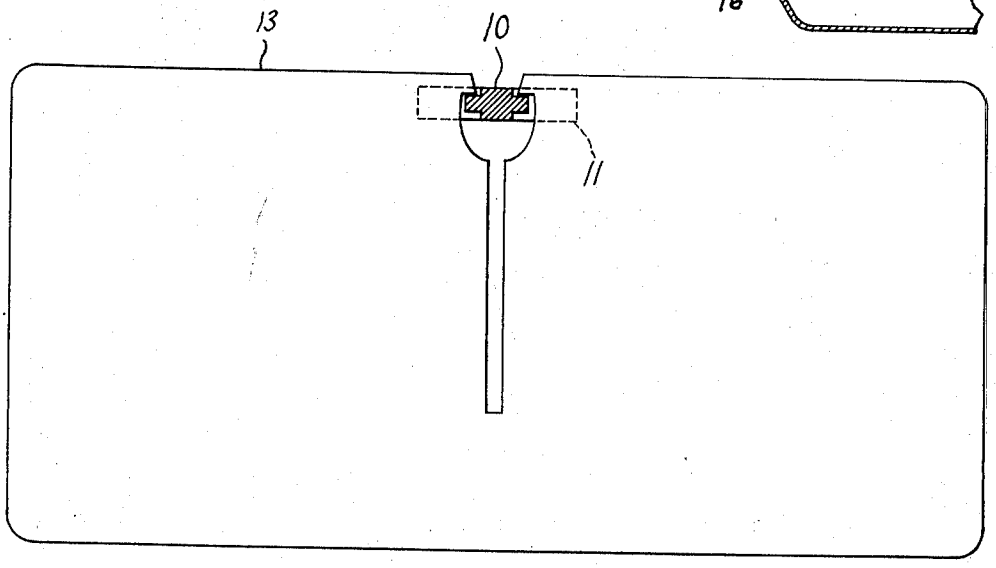



Fig. 2




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Fig. 6

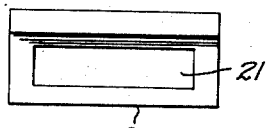



Fig. 3

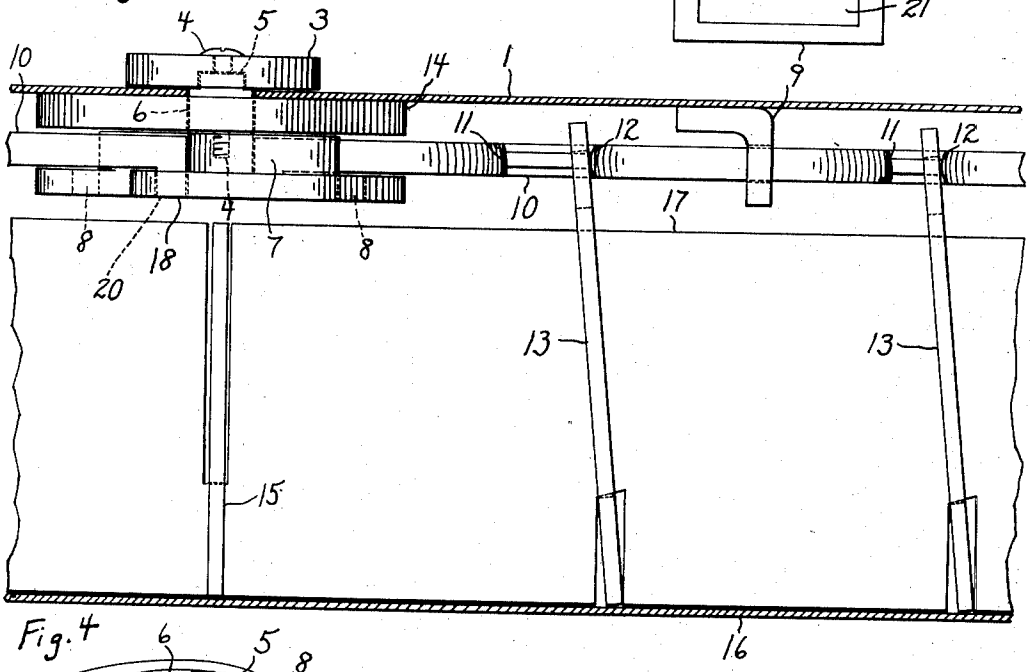



Fig. 4

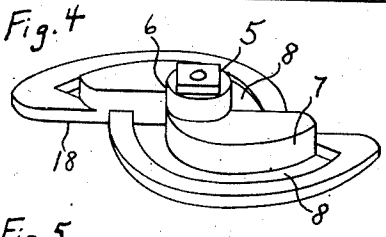
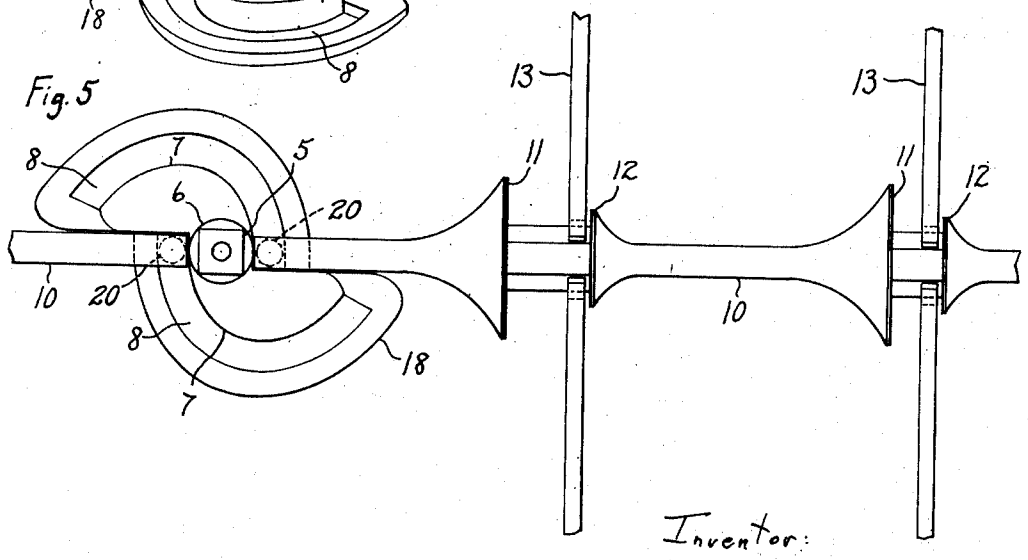



Fig. 5




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## REFRIGERATOR ICE MOLD

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13 Claims. (Cl. 62—108.5)

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The aim of my invention is to provide a cover over the water which is placed in refrigerator trays to be frozen into ice cubes, and at the same time provide means for simple and easy removal of the ice cubes at will. By covering the water which is placed in the molds much of the cause of frost formation on the evaporator will be eliminated, the refrigerator will not need to be defrosted nearly as often and will operate more efficiently, and the trays will be easier to remove when ice cubes are desired. What I have pictured in the drawings is an assembly made entirely of metal, but the construction material is of no importance to the functioning of the device herein described.

Fig. 1 is a view of one side of the mold with the near side of the tray 16 removed in order to show the interior workings more clearly. Fig. 2 is a front elevation of one of the transverse dividers 13, also showing a sectional view of one of the impelling and retrieving rods 10, 10 at that point. Fig. 3 is a side view of the mechanism, less the handle 2, which impels the transverse dividers 13 to break the ice cubes loose and also serves to bring said transverse dividers back to their starting, or most inclined positions. Fig. 4 is a perspective view of the one piece of metal 18 which incorporates the four-sided driving surface 5, the round bearing surface 6, the impelling cam surfaces 7, 7 and the retrieving cam tracks 8, 8. Fig. 5 is a top view of the mechanism shown in Fig. 3, less than the tray cover 1, the handle 2, the circular hub 3 to which the handle 2 attaches and the bolt 4 which secures the said hub to part 18. Fig. 6 is a view of one of the L-shaped brackets 9, 9 as seen from the left of its position in Fig. 3 (where it is seen from the side) showing the opening 21 through which the rod 10 passes, said opening being wide, as shown, to allow the passage therethrough of the impelling ears 11 as the mechanism is assembled.

Similar numerals refer to similar parts throughout the several views.

This invention makes use of the principle of leverage to increase applied force. When one grasps the handle 2 between the thumb and forefinger and the handle is turned in a clockwise direction, as one would wind the spring on a movie camera, the force applied by the fingers is multiplied several times as it is applied to the combination impelling and retrieving rods 10, 10 at the impelling cam surfaces 7, 7; this is occasioned by the leverage of the force as applied by the fingers in relation to the position of the ends of the rods 10, 10 as they rest against the impelling cam surfaces 7, 7. Also, the curvature of each impelling cam surface, as it is turned through its full arc of approximately 155 degrees, is of aid in increasing the force applied by the fingers; this is the result of the fact that the distance which the ends of the rods 10, 10 travel along the impelling cam surfaces 7, 7 is approximately twice the distance the rods move longitudinally in the tray. After one turns the handle 2 in a clockwise direction through its full arc of approximately 155 degrees, one lifts up on the handle bringing with it the tray cover and the entire cube-loosening mechanism, leaving the ice cubes in the tray. The four ice cubes immediately adjacent to the center transverse divider 15 will usually be broken loose by reason of the cubes on both sides of them having been broken loose, otherwise they can be easily broken loose by hand after the cover and cube-loosening mechanism have been lifted from the tray by the handle; or, downward extending ears could be fabricated onto the bottom of the center part 18 on opposite sides of the center of same so as to come into contact with ears on the top of the center transverse divider 15 immediately prior to the time that said center part 18 is turned through its full arc of approximately 155 degrees.

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The rods 10, 10 are each fabricated out of one piece of metal and are square except where they incorporate the impelling ears 11 (3 on each side of center of tray), the retrieving ears 12 (also 3 on each side of center of tray) and where they pass through the transverse dividers 13 (see Figs. 2, 3 and 5) of which there are also three on each side of the center of the tray, longitudinally speaking. These rods could be composed of parts thereof, fastening said parts together as by screwing or other means, but I believe the one-piece construction to be more commercial.

The round bearing 14 is fastened to the tray cover 1 by welding or other means so that the round hole in the center of said bearing is in line with the same size round hole in the center of the tray cover 1. The method of assembly of the rest of the mechanism is to first place the brackets 9, 9 in their proper positions on the rods 10, 10, i. e., between the first retrieving ear and the second impelling ear from the center of the tray; then thread the rods through the tops of the transverse dividers 13 for which operation a large opening is provided in the upper part of each transverse divider as is shown in Fig. 2; then the ends of the rods toward the center of the tray are placed against the impelling cam surfaces so

that the downward extending round lugs 20 on the ends of the rods are between the impelling cam surfaces and the retrieving cam surfaces, i. e., in the retrieving cam tracks 8, 8; then the center piece 18 (the bearing surface 6 thereof) is inserted into the round holes provided in the centers of the round bearing 14 and the tray cover 1 and the hub 3 is placed in position on the top of said center piece 18 and secured to same by means of bolt 4 or other fastening means. The final step is the fastening by welding or other means of the brackets 9, 9 to the tray cover 1 at such points on the bottom of said tray cover so as not to interfere with the operation of the ears 11 and 12 of the rods 10, 10, substantially as shown in Figs. 1 and 3. Then the entire cube-loosening mechanism is ready to be placed into the tray 16, which is to be filled with water only as high as where the resulting ice will not protrude above the top of the longitudinal divider 17; this limit for the amount of water can be indicated on the inside wall of the tray, or a small hole can be made on a side of the tray at the proper level to prevent excessive filling of the tray with water.

The handle 2 is mounted on the hub 3 by means of two pivots 19, 19, substantially as is shown in Fig. 1. This pivotal mounting allows the handle to be easily moved down to horizontal position so that it will lay flat on the tray cover 1.

It will be noted from Figs. 1, 3 and 4 that the impelling ears 11 are at varying distances from the transverse dividers 13 when said transverse dividers are at their position of maximum inclination toward the center of the tray, as when all of the retrieving ears 12 are bearing against all of the transverse dividers so as to force them to their position of maximum inclination toward the center of the tray. The object of this variation in distance is to break the end ice cubes loose first, then the second set from the end next and then the third set; that is, the ice cubes are loosened successively; of course, any number of sets of cubes may be handled by the above described mechanism depending upon the size of the tray and the size of the ice cubes desired.

The bearing surface 6 of part 18 is designed to fit snugly into the similar round holes in the bearing 14 and the cover 1 so as to render the tray substantially air and water tight at this point, particularly in combination with the circular hub 3 which rests on the cover 1. The cover resting on the tops of the walls of the tray makes the whole tray substantially air-tight.

Of course, any type of handle may be attached to the circular hub 3.

I claim:

1. In a refrigerator ice tray having a partitioning grid structure, said grid structure comprising a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall and individually interlocked therewith for movement within fixed limits thereupon, said walls cooperating with the tray to form compartments in which a liquid is frozen into ice blocks, a cam actuated by a manually operable lever, the surface of said cam being adapted, on manipulation of said lever, to impart motion and force to a force-transmitting member, said force-transmitting member being so constructed so as to thereupon engage and move at least some of said transverse walls relative to said longitudinal wall in a successive manner, starting with the one most distant from said cam.

2. A refrigerator ice tray having a cover and a partitioning grid structure, said grid structure cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, said cover sealing said tray so as to render same substantially air-tight and water-tight, a force-carrying member extending into the interior of said covered tray from the exterior thereof in such manner as to leave said covered tray substantially air-tight and water-tight, said force-carrying member being operable by a force applied external to said covered tray, means to transmit force from said force-carrying member to dividing members of said grid structure so as to loosen said ice blocks from said tray and grid structure.

3. A refrigerator ice mold of the character described in claim 2 wherein said grid structure comprises a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall, said transverse walls being movable relative to said longitudinal wall, means to transmit force from said force-carrying member to said transverse walls so as to move them relative to said longitudinal wall.

4. A refrigerator ice mold of the character described in claim 3 wherein said force-carrying member is adapted to rotate a cam, a force transmitting member movable by said cam, said force-transmitting member being provided with portions so constructed and arranged as to engage and move said transverse walls, upon being moved by said cam.

5. A refrigerator ice tray having a cover and a partitioning grid structure, said grid structure cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, an opening in an exterior wall of said covered tray through which a force-carrying member snugly extends into the interior of said covered tray, said force-carrying member being rotatable in said opening and being part of a mechanism used to loosen said ice blocks from said tray and grid structure, a lever attached to said force-carrying member on the exterior of said covered tray by means of a hub, said hub being so constructed and arranged as to substantially overlay said opening so as to aid in rendering said covered tray substantially air-tight and water-tight at said opening.

6. A refrigerator ice mold of the character described in claim 5 wherein said lever is pivotally mounted on said hub so that said lever can be laid flat on said exterior wall.

7. A refrigerator ice tray having a partitioning grid structure, said grid structure cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, means to support a pair of diametrically opposed cams in the middle portion of said tray, means to rotate said cams, a force-transmitting member movable by each of said cams, said force-transmitting members having portions so constructed and arranged as to engage and move dividing members of said grid structure relative to said tray and other dividing members of said grid structure, upon said force-transmitting members being moved by said cams.

8. A refrigerator ice mold of the character described in claim 7 wherein said grid structure comprises a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall and individually interlocked therewith for limited movement relative thereto, said force-transmitting members being adapted to engage and move said transverse walls, on op-

posite sides of said cams, relative to said longitudinal wall.

9. A refrigerator ice tray having a partitioning grid structure, said grid structure cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, means to support impelling and retrieving cams, said impelling cam being used to impel dividing members of said grid structure so as to loosen said ice blocks from said tray and grid structure, said retrieving cam being used to return said dividing members to the position they occupied prior to being impelled.

10. A refrigerator ice mold of the character described in claim 9 wherein the bearing surfaces of said cams are in substantially confronting and parallel relationship, a force-transmitting member so constructed and arranged as to be movable by either of said cams, said force-transmitting member being provided with portions adapted to engage and impel said dividing members relative to said tray and other dividing members of said grid structure, upon rotation of said cams in one direction, said force-transmitting member also being provided with portions adapted to engage said dividing members and return them to the position they occupied prior to being impelled, upon rotation of said cams in the opposite direction.

11. A refrigerator ice mold of the character described in claim 10 wherein said grid structure comprises a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall and individually interlocked therewith for limited movement relative thereto, the said portions on said force-transmitting member being adapted to impel and retrieve said transverse walls relative to said longitudinal wall.

12. A refrigerator ice tray having a cover and a partitioning grid structure, said grid structure comprising a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall and individually interlocked therewith for movement within fixed limits thereupon, said walls cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, a force-carrying member extending into the interior of said covered tray from the exterior thereof, said force-carrying member being operable by a force applied external to said covered tray, a force-transmitting member within said covered tray movable by said force-carrying member, said force-transmitting member being provided with portions so constructed and arranged so as to move said transverse walls in a successive manner relative to both said longitudinal wall and said tray, upon being moved by said force-carrying member.



13. A refrigerator ice tray having a cover and a partitioning grid structure, said grid structure comprising a longitudinal wall and a plurality of spaced apart walls extending transversely to said longitudinal wall and individually interlocked therewith for movement within fixed limits thereupon, said walls cooperating with said tray to form compartments in which a liquid is frozen into ice blocks, a force-carrying member extending into the interior of said covered tray from the exterior thereof, said force-carrying member being operable by a force applied external to said covered tray and being adapted to rotate a cam, a force-transmitting member movable by said cam, said cam and said force-transmitting member being within said covered tray, said force-transmitting member being provided with portions so constructed and arranged so as to engage and move said transverse walls upon being moved by said cam, said portions being so located on said force-transmitting member so as to move said transverse walls in sequence, starting with the one most distant from said cam.

EUGENE F. CHASE.


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