Nov. 2, 1948. F. W. SAMPSON 2,452,686

ICE TRAY

Filed April 24, 1946

2 Sheets-Sheet 1

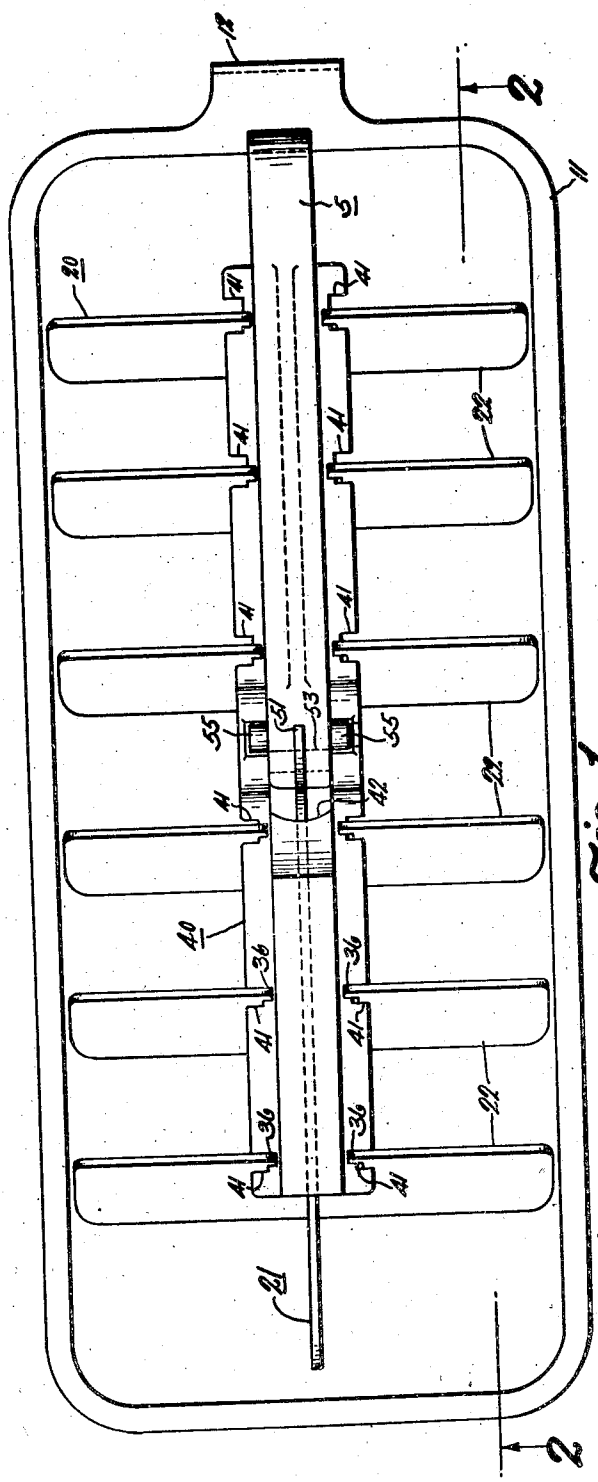


Fig. 1

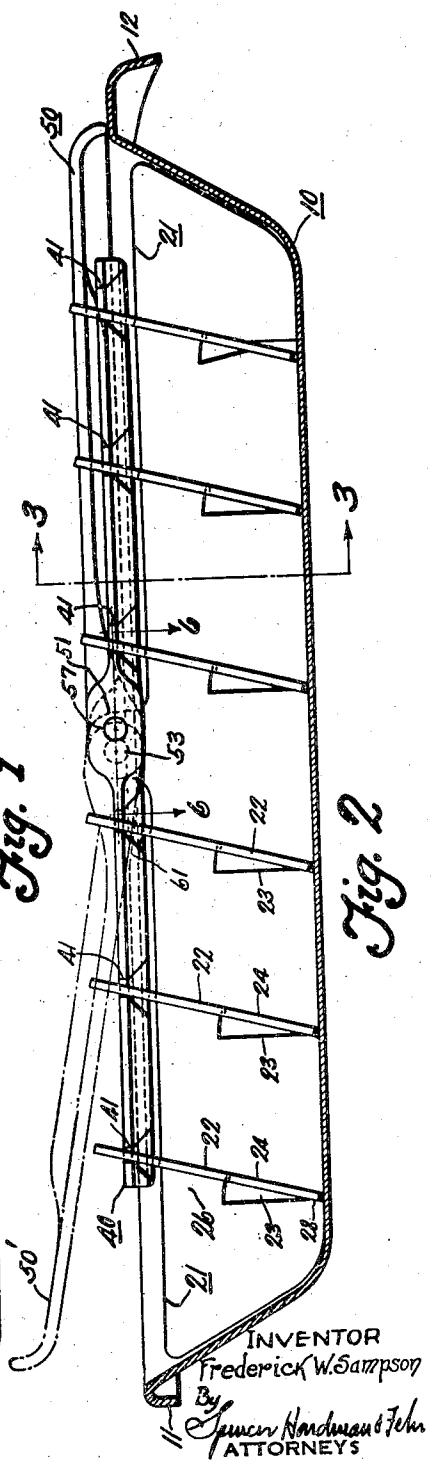


Fig. 2

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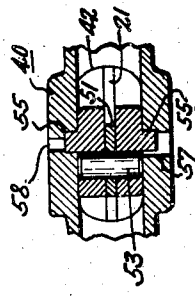


Fig. 6



Fig. 7



Fig. 8

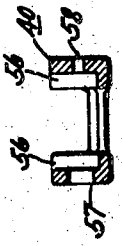


Fig. 9

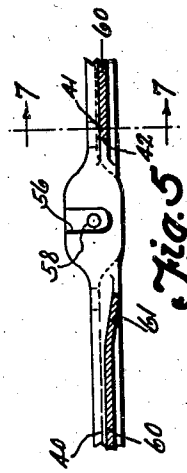


Fig. 5

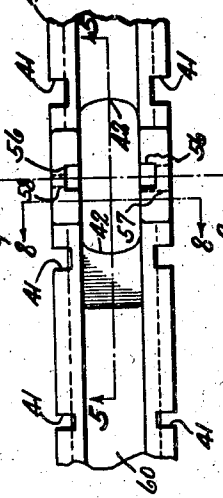


Fig. 4

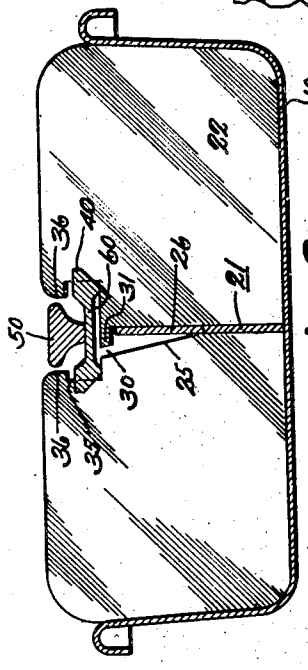


Fig. 3



Fig. 10



Fig. 11

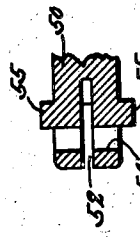


Fig. 13



Fig. 12

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UNITED STATES PATENT OFFICE

2,452,686

ICE TRAY

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Application April 24, 1946, Serial No. 664,557

4 Claims. (Cl. 62—108.5)

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This invention relates to freezing trays adapted for use in household refrigerators.

An object of this invention is to provide an improved form of mechanically operated freezing tray from which the frozen ice blocks may be readily removed without melting the ice loose from the pan or grid.

This invention provides several important improvements over the device disclosed in Patent No. 2,305,687, issued December 22, 1942, to H. D. Geyer and myself as joint inventors.

In the grid of said prior patent the complete actuating bar for tilting the cross walls must be made in two separate pieces in order to permit assembling of the parts. One feature of this present invention is the one-piece construction of the actuating bar which is so designed as to greatly simplify assembling of the parts together and materially reduce the cost of manufacture.

In the grid of said prior patent the actuating bar is necessarily raised and lowered by the swinging motion of the hand lever, hence the notches in the cross walls thru which said bar extends must be of sufficient extra depth to accommodate such raising and lowering of said actuating bar as shown in Figs. 2, 3, and 4 of said patent. This permits an undesirable haphazard teetering motion of said actuating bar and results in an excessively loose fit between said bar and the cross walls. A feature of this present invention is the elimination of such teetering of the actuating bar and causing said bar to move directly longitudinally with no raising or lowering thereof during the ice-ejecting operation. By so eliminating all teetering motion of the actuating bar I obviously obtain greater accuracy in the progressive engagement of said bar with the cross walls and hence obtain more uniform operation of the device.

A further feature of this invention is the cross section shape of the actuating bar and the partial internesting relation between said bar and the hand lever as shown in Fig. 3 herein. This readily permits the hand lever to lie below the plane of the upper edges of the cross walls and thereby provide a suitable flat plane for stacking two or more filled trays one upon the other.

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 embodiment of the present invention is clearly shown.

In the drawings:

Fig. 1 is a plan view of the grid and pan of this invention, all the parts being in freezing position.

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Fig. 2 is a section on line 2—2 of Fig. 1, the hand lever being also shown in dotted lines near its position of maximum swing.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a plan view of the central portion of the actuating bar.

Fig. 5 is a vertical section on line 5—5 of Fig. 4.

Fig. 6 is a horizontal section taken on line 6—6 of Fig. 2 thru the axis of the pivot pin for the hand lever.

Fig. 7 is a section on line 7—7 of Fig. 5.

Fig. 8 is a section on line 8—8 of Fig. 4.

Fig. 9 is a section on line 9—9 of Fig. 4.

Fig. 10 is a partial plan view of the hand lever.

Fig. 11 is a side elevation of Fig. 10.

Fig. 12 is a section on line 12—12 of Fig. 11.

Fig. 13 is a section on line 13—13 of Fig. 11.

Similar reference characters refer to similar parts throughout the several views.

The container pan 10 is preferably drawn in one piece from flat sheet aluminum and is preferably slightly flexible so that it may be more easily loosened from its frozen contents. A marginal flange 11 may have an extension 12 which serves as a handle for pan 10.

The removable partitioning grid 20 comprises a main longitudinal wall 21 and a series of spaced cross walls 22 loosely mounted thereon so as to be tiltable relative thereto to loosen the frozen ice blocks from the grid and pan. Main wall 21 has a series of generally triangular shaped slots 23 extending upwardly thru its bottom edge to loosely receive the container portions 24 of cross walls 22, while cross walls 22 each has a slot 25 to loosely receive the continuous portions 26 of main wall 21 above its slots 23. Fig. 2 shows the cross walls 22 inclined rearwardly in their freezing position against the rear edge of slots 23 while the bottom edge of each cross wall abuts the forward edge 28 of its slot 23 and thereby limits the rearward tilting movement thereof.

The slots 25 in cross walls 22 are shaped as shown in Fig. 3. To assemble the main and cross walls together, main wall 21 is tilted laterally and passed down thru the narrow opening 30 into the slots 25 in the cross walls, after which said main wall is tilted back to its vertical position, as shown in Fig. 3, where the small laterally projecting tongue 31 on each cross wall can rest upon the top edge of main wall 21 and so prevent each cross wall from dropping due to gravity. Each cross wall 22 has a relatively wide central notch 35 therein and two opposed marginal tongues 36 partially overlying central notch 35.

The longitudinally extending actuating bar 40

is shown as a die casting having the general cross sectional shape shown in Figs. 3 and 7 and a series of pairs of notches 41 therein, so that said bar 40 may be first tilted laterally and inserted past the tongues 36 into the wide central notches 35 of the cross walls and then be turned to its flat horizontal position shown in Fig. 3. When in this assembled position the tongues 36 on all the cross walls overlie said bar 40 and thus the main wall 21, the cross walls 22 and the actuating bar 40 are all mutually retained against disassembling so long as said bar 40 is held in its flat horizontal position. When actuating bar 40 is moved horizontally to the left from its position shown in Fig. 2, the cross walls 22 will be tilted forward about their bottom edges as pivots by the notches 41 in said bar 40. Preferably, but not necessarily, the notches 41 are progressively wider in a longitudinal direction from the left end to the right end of bar 40 (as seen in Figs. 1 and 2) so that the full actuating force of bar 40 is first applied to tilt the leftmost cross wall to the left, then applied successively to all the remaining cross walls to similarly tilt same to the left one after the other.

The central portion of the die-cast actuating bar 40 is shaped as shown in Figs. 4 to 9. Said bar 40 has a quite large central hole 42 of proper shape and size to accommodate the pivoting of the hand lever 50 onto the upstanding projection 51 on main wall 21. Hand lever 50 has a slot 52 at its pivoted end which receives the upstanding projection 51 and is pivoted thereto by pivot pin 53 which extends thru hole 54 in said lever. Lever 50 has two aligned laterally projecting lugs 55, preferably cast integral therewith, and located slightly eccentric to pivot pin 53. The actuating bar 40 has two opposed open-top sockets 56, preferably cast therein, within which the two lugs 55 may be inserted from above when lever 50 is held in a vertical position and set down over upstanding projection 51 and pivotally mounted thereupon by the insertion of pivot pin 53. An assembling hole 57 thru one side of actuating bar 40 is provided to permit the lateral insertion and staking in place of pin 53 in its hole 54 in lever 50. The final assembling operation of inserting and fixing pin 53 in place holds actuating bar 40 in its flat horizontal position due to the engagement of the two lugs 55 in the two sockets 56 in said bar 40. Thus the final insertion of pin 53 retains all the grid parts against disassembling. Preferably a small hole 58 is provided in the opposite side of actuating bar 40 from the assembling hole 57 so that the pin 53 may be knocked out by means of a punch extending thru hole 58, in the event it is desired to disassemble the grid.

The cross sectional shape of the main portion of the actuating bar 40, excluding the central portion thereof, is made as best shown in Figs. 3 and 7. The central or web portion 60 of said bar 40 is depressed materially below the upper edges of the marginal portions thereof. An important advantage of so depressing said web portion 60 is to provide an internesting relation between said bar 40 and hand lever 50 when in its down position shown in Figs. 2 and 3. This permits lever 50 to have sufficient vertical thickness for necessary bending strength and yet not project above the plane of the top edges of cross walls 22, whereby to provide a flat plane at the top surface of the grid which will permit stacking of two or more trays on top of one another. The point of engagement of actuating bar 40 with

each of cross walls 22 preferably is near the top edges of said cross walls for the purpose of giving greater leverage for tilting said cross walls, hence the construction clearly shown in Fig. 3 gives both of the above-mentioned advantages. Since the actuating bar 40 is moved only horizontally by the camming action of lugs 55 in sockets 56 it is not necessary for the wide central notches 35 to have any such large vertical depth as is necessary with the construction disclosed in above-mentioned prior Patent No. 2,305,687. The web portion 60 of bar 40 is further inclined downwardly, as shown at 61 in Figs. 2 and 5, in order to permit a wider swing of hand lever 50 during the ice-ejection operation. This downwardly inclined surface 61 permits lever 50 to swing down into a materially internesting relation with actuating bar 40 when said lever is swung to its limit of travel. Inclined surface 61 serves as a suitable stop to limit the swing of lever 50 after said lever swings somewhat beyond its position shown in dotted lines in Fig. 2. Thus the chance of an unskilled person breaking the hand lever, or its pivot connection, by attempting to force it beyond its limit of travel is greatly reduced.

The operation of the tray and grid is as follows: The grid is set loosely in pan 10 with the lever 50 and all other grid parts in the position shown in Figs. 1 and 2, where all the cross walls 22 are held tilted backward by the forward edges of notches 41 in actuating bar 40 against the rear edges of slots 23 in main wall 21. Thus all the cross walls will be tilted back to a positively predetermined freezing position. Pan 10 may be filled with water, preferably at or slightly above the upper edge of main wall 21, and then inserted into a freezing chamber until the ice is hard frozen.

To remove the frozen ice blocks, the entire tray is removed from its freezing chamber and hand lever 50 simply swung counterclockwise (as seen in Fig. 2) to such position as will release the desired number of ice blocks. The two lugs 55 on lever 50 will move in an arc about pin 53 as a center and cam against the sides of sockets 56 in actuating bar 40 and thus force bar 40 horizontally to the left with a greatly multiplied force. The left-most cross wall 22 will first be engaged by the rear edge of its notch 41 in bar 40 and be tilted forward, about its lower edge as a pivot, against the two ice blocks at the front end of pan 10 and cause these two blocks to loosen and slide upwardly along the inclined end wall of the pan. After said first cross wall 22 has been slightly tilted forward, the second cross wall 22 is engaged by the rear edge of its notch 41 in bar 40 and similarly tilted forward to release the second two ice blocks. As actuating bar 40 is further moved forward by a continued swinging of hand lever 50 all the remaining cross walls 22 will be successively engaged by the rear edges of their notches 41 and similarly tilted forward to successively release all the ice blocks. In order for this successive action to be precisely uniform and accurate it is clear that not only should the notches 41 in bar 40 be uniformly progressively wider from left to right (as seen in Fig. 2) but also actuating bar 40 should be moved directly horizontally without any lifting or teetering thereof about its pivot pin 53. The structure described above so moves said actuating bar directly horizontally without lifting same at all.

The wide total angular travel of lever 50, as described above, permits a high multiplication of

force between hand lever 50 and actuating bar 40 (which necessarily reduces the rate of movement of bar 40) and also sufficient total movement of bar 40 to move all the cross walls 22 to almost a vertical position to facilitate the ice-ejecting operation.

Preferably all the ice contacting surfaces of both pan 10 and grid 20 are of anodized aluminum and impregnated or coated with a strongly adhering water-repellant wax or resin, such as are now well known.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. A partitioning grid for a freezing tray, comprising a main longitudinal wall having an upstanding bearing projection on its upper edge, a series of cross walls loosely mounted upon said main wall so as to be tiltable longitudinally thereof, said cross walls having aligned open notches cut thru their upper edges, a longitudinally movable actuating bar for tilting said cross walls, said bar lying within said aligned notches and having a hole therein thru which said upstanding bearing projection extends, a hand lever having a forked end pivotally mounted upon said upstanding projection and having laterally extending opposed eccentric lugs on said forked end, said actuating bar having integral open-top sockets within which said eccentric lugs project laterally for moving said actuating bar horizontally upon swinging said hand lever about its pivot mounting, said hand lever being insertable to its assembled position upon the grid after said actuating bar and cross walls have been fully assembled upon said main wall.

2. A partitioning grid for a freezing tray, comprising a main longitudinal wall having an upstanding bearing projection on its upper edge, a series of cross walls loosely mounted upon said main wall so as to be tiltable longitudinally thereof, a longitudinally movable actuating bar for tilting said cross walls, a hand lever having a forked end pivotally mounted upon said upstanding projection and having two opposed laterally projecting eccentric lugs on said forked end, said actuating bar having two open-top sockets within which said eccentric lugs are insertable from above during assembling of said hand lever to the grid after said actuating bar has been assembled thereupon, said eccentric lugs serving to engage the opposed surfaces of said sockets for moving said actuating bar horizontally when said hand lever is swung about its pivot mounting.

3. A partitioning grid for a freezing tray, comprising a main longitudinal wall having an upstanding bearing projection on its upper edge, a series of cross walls loosely mounted upon said main wall so as to be tiltable longitudinally thereof, a longitudinally movable actuating bar for engaging and tilting said cross walls, said bar overlying said main wall and having a hole therein thru which said upstanding bearing projection extends, a hand lever pivoted upon said upstanding projection and having two laterally projecting lugs thereon located eccentric to its pivot axis, said actuating bar having two open-top sockets within which said laterally projecting lugs are insertable from above during assembling of said hand lever to the grid, said lugs serving to cam upon the surfaces of said sockets to move said actuating bar directly horizontally without lifting the same.

4. A partitioning grid for a freezing tray, comprising a longitudinal main wall and a series of cross walls loosely mounted thereupon so as to be tiltable relative to said longitudinal wall, a longitudinally movable actuating bar for tilting said cross walls, a hand lever pivoted upon said main wall in close proximity to said actuating bar, said lever having a laterally projecting cam located eccentric to but closely adjacent its pivot axis, said actuating bar having an open top socket thereon engaged by said laterally projecting cam for moving said actuating bar longitudinally when said hand lever is swung about its pivot axis, said hand lever being insertable to its assembled position upon the grid after said actuating bar and cross walls have been fully assembled upon said main wall.

FREDERICK W. SAMPSON.

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