Oct. 25, 1949. F. W. SAMPSON 2,486,064

FREEZING TRAY

Filed Dec. 20, 1947

2 Sheets-Sheet 1

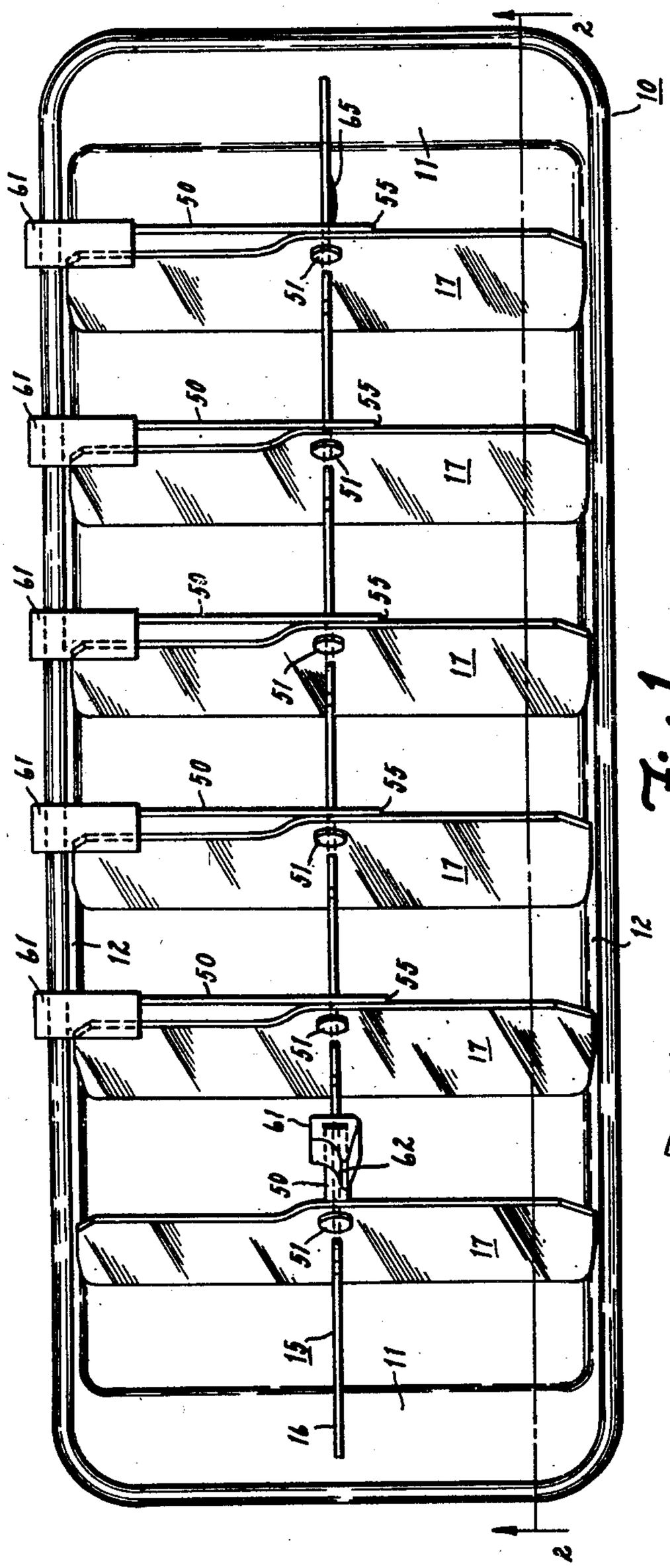

Fig. 1

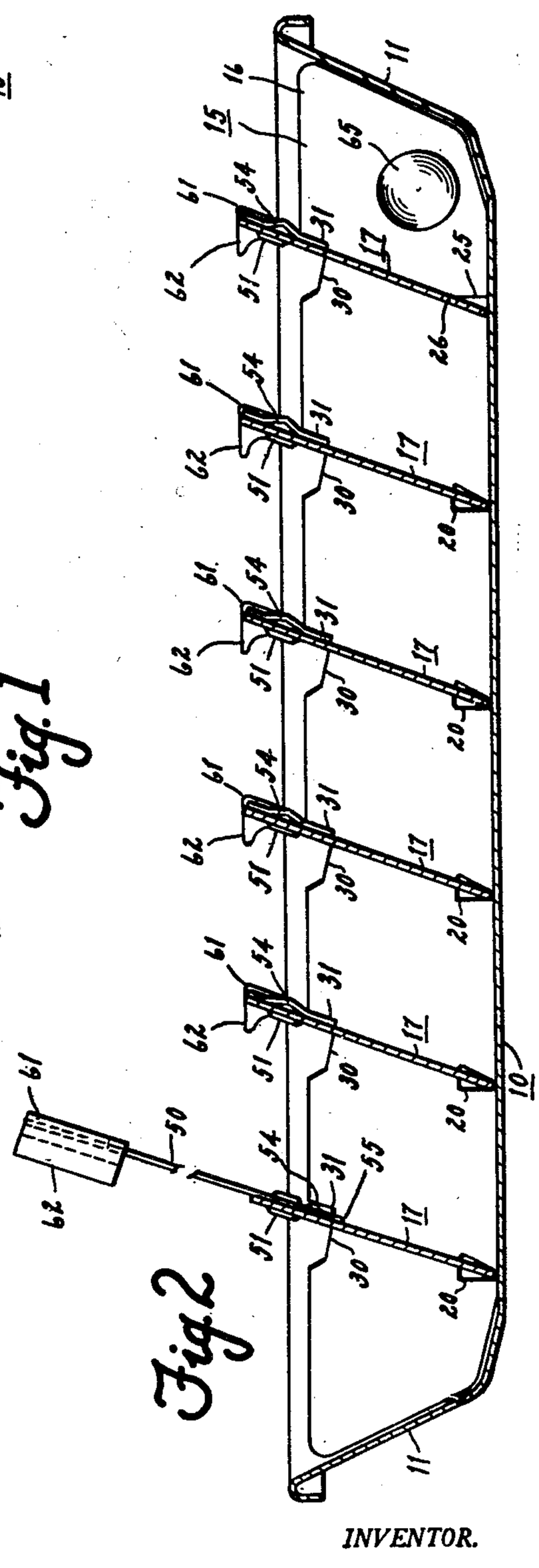

Fig 2

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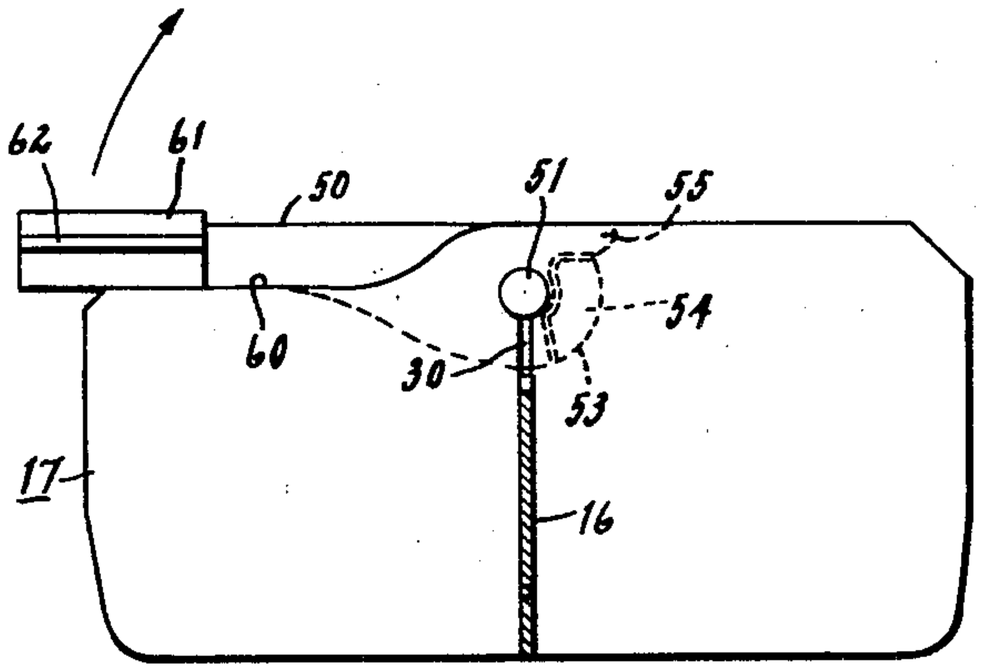

Fig. 4

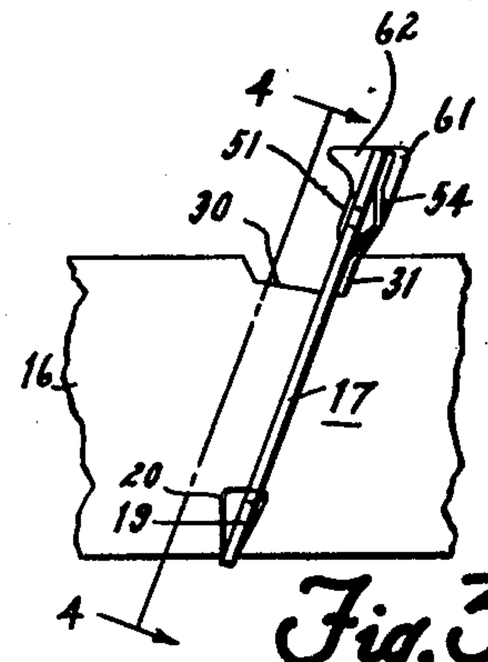

Fig. 3

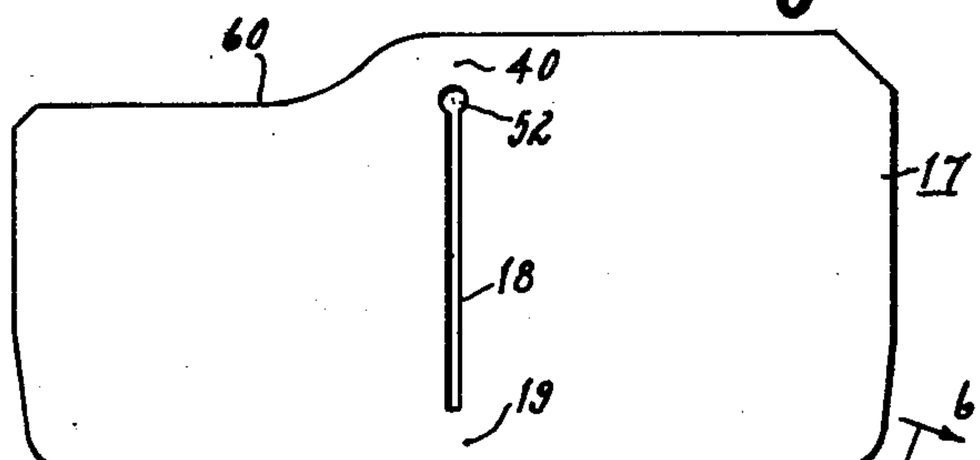

Fig. 7

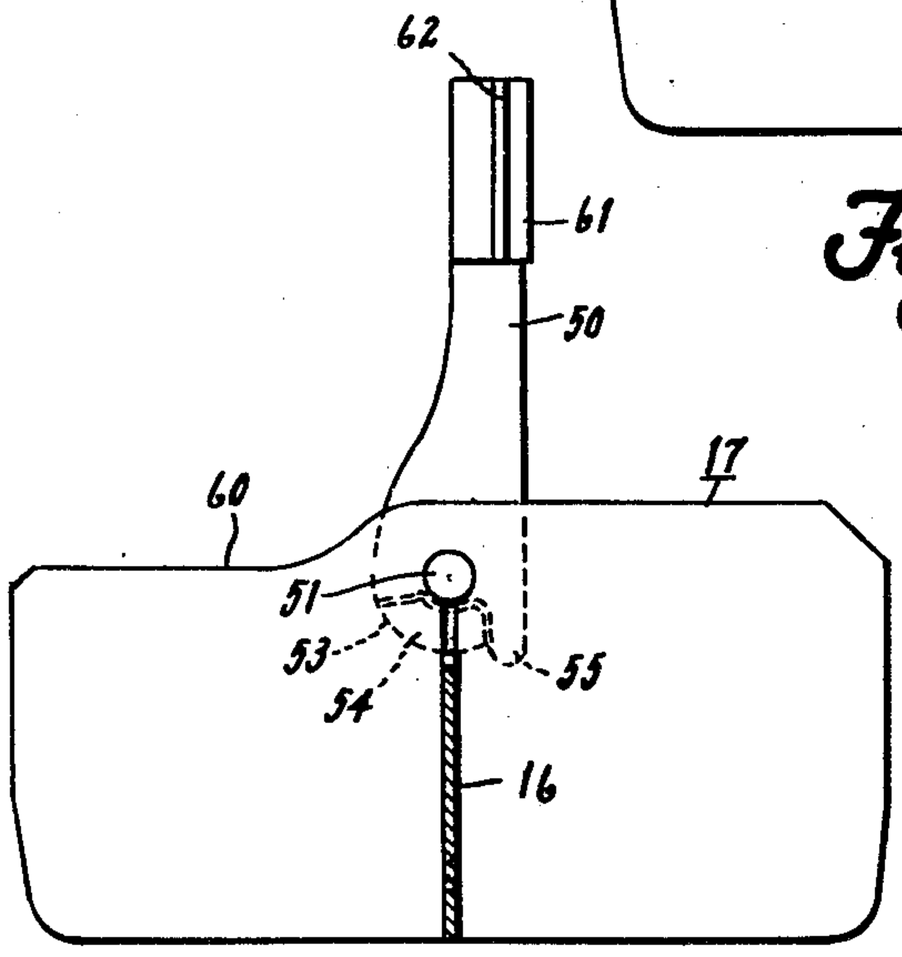

Fig. 6

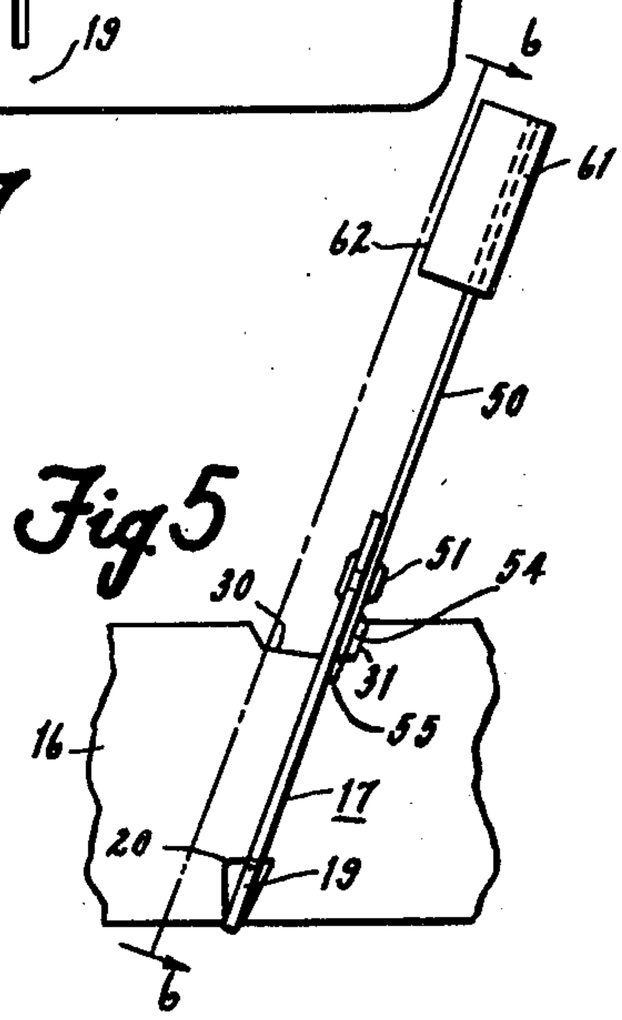

Fig 5

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FREEZING TRAY

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7 Claims. (Cl. 62—108.5)

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This invention relates to mechanically ejecting freezing trays, especially such as are adapted for use in household refrigerators.

An object of this invention is to provide an improved partitioning grid for freezing trays which is very simple and economical to make, and which is very convenient and easy to operate by hand to loosen the frozen ice blocks from their frozen bond to the contacting metal surfaces of both the pan and grid, or from the grid alone in the event the pan has already been loosened from its frozen contents.

Various forms of mechanically ejecting ice trays have been in public use for years, and many additional forms have been patented heretofore. For instance, Carney Patent No. 2,199,740 and Geyer Patent No. 2,251,827 disclose freezing trays wherein the individual rearwardly inclined cross walls of the partitioning grid are pushed forward to loosen the ice blocks from their frozen bond to all contacting metal surfaces. One object of this invention is to improve upon the general type of freezing tray represented by the disclosures of said Carney and Geyer patents, especially in providing an attached camming lever directly to the various cross partitions whereby each cross wall may be moved sufficiently to loosen the frozen bond of the two ice blocks forward of same with a minimum effort, and without any chance of a careless or unknowing operator breaking or otherwise damaging the grid by inserting the detached hand lever in the wrong notches or by prying same in the wrong direction. In other words, a feature of the grid of this invention is that it is substantially fool-proof in the hands of an inexperienced or careless operator, and has no detached hand lever to get misplaced or lost.

Another feature is its extreme simplicity and cheapness to manufacture whereby it may compete in price with ordinary melt-out freezing trays.

A special feature of the grid of this invention is the very simple and efficient method by which the cross walls may be assembled upon the main longitudinal wall without any bending or other deformation of any of the partition walls, and without splitting the cross walls thru either their upper or lower edges. In the prior Carney Patent No. 2,199,740 each cross wall must be split thru its lower edge in order to permit assembling of the cross walls upon the center wall by distorting each cross wall sufficiently to open the split enough for the center wall to be passed therethrough. This severely limits the rigidity of the cross walls useable with this method of assembling, and of necessity permits accidental distortion of even disassembling of the cross walls from the longitudinal wall by careless handling in use. Hence another object of this invention is to overcome such defects.

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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 freezing tray of this invention showing all the parts in freezing position, except the left-most cross wall which is shown tilted forward sufficiently to loosen the frozen bond of the two left-most ice blocks by raising its cam lever to substantially vertical position.

Fig. 2 is a vertical section on line 2—2 of Fig. 1.

Figs. 3 to 7 are detail views of portions of the grid and illustrate the camming movement of any one cross wall from freezing position to ice-loosened position.

Fig. 3 is an edge view of one cross wall and its attached camming lever and a short length of the main center wall of the grid, the parts being in freezing position.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is similar to Fig. 3, but shows the camming lever raised to substantially vertical position and the cross wall thereby cammed toward an upright position sufficiently to loosen the frozen bond of the two ice blocks to the left of same.

Fig. 6 is a section on line 6—6 of Fig. 5.

Fig. 7 is a face view of one of the cross walls.

Similar reference numerals refer to similar parts thruout the several views.

Reference numeral 10 designates the container pan which may be of any suitable type but is preferably a one-piece slightly flexible pressed metal pan having materially inclined end walls 11 and somewhat inclined longitudinal walls 12, as shown in Figs. 1 and 2. Such a pan is disclosed and claimed in Geyer Patent No. 2,122,937, issued July 5, 1938.

The removable partitioning grid 15 comprises a main longitudinal wall 16 and a series of transverse or cross walls 17 loosely mounted upon main wall 16 so that each cross wall may be given an individual forward tilting movement relative to main wall 16. Main wall 16 has a series of small triangular shaped notches 20 cut in its lower marginal edge. Preferably the last or rearmost notch 25 is of somewhat different shape, as shown

in Fig. 2, for purposes hereinafter described. Main wall 16 also has a series of open notches 30 cut in its upper marginal edge, as best shown in Fig. 2.

The cross walls 17 are each provided with a central slot 18 which stops considerably short of both its upper and lower edges. This gives the desired rigidity and strength to the cross wall due to its continuous portion 19 below slot 18 and continuous portion 40 extending across above slot 18. The depth of slots 18 is preferably no greater than to permit main wall 16 to readily pass therethru when assembling the cross walls upon the main wall. Also the width of slots 18 is preferably no greater than to permit an easy relative sliding of the cross walls 17 upon main wall 16, thereby providing a neat fit between these walls and substantially doing away with interconnecting necks of ice extending therebetween which might make the ice-ejecting operation of the grid more difficult.

In assembling the grid parts, center wall 16 is passed thru the slot 18 in each cross wall 17 until said cross walls register with their respective notches 20 or 25 in the lower edge of wall 16, whereupon each cross wall may be moved relatively upwardly so that their continuous portions 19 enter their respective notches. Then each cross wall has its indivadual camming lever 50 rotatably fixed thereto by its rivet pin 51 which passes thru the round hole 52 in the cross wall at the upper end of its slot 18. Thereafter the rounded hub portion 53 of lever 50 in effect reduces the depth of slot 18 so that the cross wall is retained in assembled position in notches 20 and 30 and can no longer drop down due to the edge of said hub portion 53 engaging the upper edge of notch 30, as best shown in Figs. 3 and 6. Hub portion 53 of each lever 50 lies between its cross wall 17 and the rear edge 31 of upper notches 30 of main wall 16 at all times. Now hub portion 53 is provided on its rear surface with a gradually inclined bump which is in effect a raised cam surface 54. When lever 50 is in its horizontal position shown in Fig. 4 this cam surface 54 lies to one side of rear edge 31 of notch 30, and so permits cross wall 17 to rest by gravity in its inclined freezing position (shown in Fig. 3) with only the relatively thin flat portion of hub 53 interposed between it and its supporting rear edge 31 of notch 30. However after lever 50 is rotated thru a small angle in the direction of the arrow in Fig. 4, cam surface 54 smoothly engages rear edge 31 of notch 30. Upon further rotation of lever 50 cam surface 54 is forced between said rear edge 31 and the cross wall 17, and so gradually cams the upper portion of said cross wall forward with an enormous force compared to the force exerted by hand upon lever 50. This forward movement of the cross wall from its freezing position will loosen the frozen bond of the two ice blocks in front of same, first by a slight flexing and resultant peeling of the cross wall from the ice followed by a bodily tilting movement of the cross wall to loosen said ice blocks entirely. When lever 50 has reached its vertical position shown in Fig. 6 the ice blocks will have been sufficiently loosened to permit the lever 50 to be simply pulled directly forward by hand to give the desired further swinging motion of the cross wall.

Preferably the hub portion of lever 50 is provided with a suitable rounded projection 55 which serves as a stop to limit the swing of the lever to a position slightly beyond its vertical

position by said projection 55 engaging the side of main wall 16. When lever 50 is in vertical position its projection 55 is spaced slightly to one side of main wall 16 as shown in Fig. 6 so that it will not scrape against the side of said main wall while the cross wall is being given a wide swinging movement by a direct pull on lever 50 as described above. Projections 55 obviously require that all the levers 50 have their horizontal or initial freezing position on the same side of the grid when the parts are in freezing position. If this feature is not desired, projection 55 may be omitted and levers 50 and their cams 54 so designed as to operate similarly when swung upwardly from a down position on either side of the grid.

As another modification, levers 50 and their cams 54 may be designed to provide for a working swing thereof thru a greater angle than as shown, i. e. any angle from 90° up to almost 180°, and so provide for a correspondingly greater camming movement of the cross walls without increasing the applied force upon said levers. This can be done simply by designing the cams 54 so that each cam will progressively continue its caming action against its cross wall thru the greater angle. In such a modification of course each lever 50 can have only one initial freezing position.

In the form shown in the drawings, cross walls 17 are cut away as at 60 on one side of their upper portions which lie above the water level in order to minimize any tendency of levers 50 to become quite strongly bonded to the upper portions of the cross walls by the freezing of any water held by adhesion between these adjacent parts and thereby obstruct the initial movement of said levers. Also said cut away portions provide proper clearance for the enlarged finger grips 61 fixed to the outer ends of levers 50. Levers 50 may be suitably made by being stamped from sheet metal, and preferably are quite thin in cross section and lie flat against the back side of the cross wall to which each lever is pivotally fixed by its rivet 51. Finger grips 61 may be of any convenient shape, such as illustrated with a projecting ledge 62 thereon, by which they may be more readily grasped with the fingers of one hand to lift same. These grips 61 may be suitably molded from plastic material, and be suitably attached to the metal shank of each lever 50 simply by a tight sliding fit of said shank into a corresponding aperture in the grip 61.

When the removable grid is set within the pan 10, the bottom edges of cross walls 17 contact the pan bottom before the bottom edge of main wall 16 does so, and hence cross walls 17 are lifted upwardly in their notches 20 and 30 slightly since the notch clearances are made to permit this. This slight lifting of each cross wall lifts the bottom edge 53 of the lever hub out of contact with the bottom edge of notch 30 which supports the cross wall when the grid is removed from the pan (see Fig. 3). This lifting of edge 53 out of contact with the edge of notch 30 greatly facilitates the swinging movement of the cross wall in either direction, since there will be no scraping of one metal-edge against another and the cross wall can swing freely by pivoting about its bottom edge. The upper notches 30 are relatively offset from the lower notches 20 so that the cross wall cannot swing to quite a vertical position, this to insure that all the cross walls will fall by gravity to their normal rearwardly inclined freezing positions when the grid is set within the pan 10.

In operation, the grid 15 is simply set loosely

within pan 10 and all the small hand levers 50 are turned down to their horizontal or freezing positions. The pan may be filled with water to the desired level, about one quarter inch below the upper edge of the pan, either before or after the grid is set in the pan. The entire tray is then placed in a freezing compartment until the ice is hard frozen. To remove only two of the frozen ice blocks, in case only two are needed at the time, the first lever 50 may be operated to remove the first two ice blocks without even removing the pan 10 from its frozen bond to its supporting shelf. When more than two ice blocks are wanted at the moment, it is preferable to remove the tray from the freezing compartment and then operate as many individual levers 50 one at a time as may be necessary to loosen the desired number of ice blocks, starting at the left-most lever 50 as seen in Fig. 2.

When the first lever 50 is lifted to vertical position the first cross wall 17 will be cammed forward by its cam 54 with a very high force until the first two ice blocks are loosened from their bond to both the grid partitions and the pan 10. This lever 50 is then simply pulled directly forward by hand until these first two blocks slide up the inclined end wall 11 of the pan where they can be easily removed with the fingers, or the loose ice blocks can be dumped into a dish by inverting the pan. When the second lever 50 is lifted to vertical position the second cross wall 17 is similarly cammed forward to loosen the second pair of ice blocks, since at this time the first cross wall is loose and hence will not restrain the tilting movement of said second pair of ice blocks. The remaining levers 50 are similarly operated in progressive succession to loosen as many ice blocks as desired at the time. Each lever 50 may give each cross wall an increased swing by a direct pull or push after its camming action has been completed. In all cases after the desired number of ice blocks have been loosened the loosened blocks may be readily picked out from above or be dumped out by inverting the pan and grid. However in most cases of normal operation pan 10 becomes so peeled and loosened from its contents after only several cross walls have been operated that the grid 15 together with some ice blocks still bonded thereto may be simply lifted upwardly from pan 10. In such cases the fully loosened ice blocks will readily slide from the grid by gravity and remain in the pan readily available for use. Any ice blocks still bonded to the grid will remain undisturbed in the grid and may be set back in the refrigerator for later use.

The rearmost cross wall 17 is operated by its lever 50 as described above, but as it tilts forward it does not pivot about its bottom edge like the rest of the cross walls but pivots about the point 26 at the top of its triangular notch 25 in main wall 16. Notch 25 is shaped as shown in Fig. 2 for this purpose. As the greater portion of this last cross wall swings forward about its pivot point 26 its bottom portion swings rearwardly or "kicks back" and thereby loosens the last two ice blocks from their frozen bond to main wall 16. When this occurs it is possible for main wall 16 to slide forwardly and still leave these last two blocks remaining stuck to the corners of pan 10. In order to prevent such sticking of said last two blocks, a small cam surface, such as the small bump 65, is impressed in the metal of main wall 16. Hence any relative movement between main wall 16 and the last two ice blocks will cause this camming surface 65 to

spread apart the last two ice blocks sufficiently to slightly flex that end of the pan 10 and so fully loosen these two corner ice blocks.

The grid of this invention can be used with any ordinary type of container pan and is operated substantially as described above in cases where the grid and ice, all bonded together in a solid mass, are first removed from the container pan by any means.

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. In a freezing tray, a partitioning grid comprising: a main partition wall having a series of cross-wall-retaining recesses therein spaced along its length, a series of cross walls loosely retained in said recesses in such manner as to be movable relative to said main wall from their normal freezing positions, a force-multiplying cam member rotatably mounted upon one of said cross walls and arranged upon rotation thereof to be forced between its cross wall and the adjacent edge of the retaining recess in said main wall for its cross wall to move said cross wall longitudinally of said main wall, and means for rotating said cam member.

2. In a freezing tray, a partitioning grid comprising: a main partition wall having a series of cross-wall-retaining recesses therein spaced along its length, a series of cross walls loosely retained in said recesses in such manner as to be movable relative to said main wall from their normal freezing positions, an individual force-multiplying cam member pivoted to each of said cross walls and each arranged to react between said main wall and its cross wall upon rotation of the cam member to move the cross wall relative to said main wall to loosen ice blocks bonded thereto, and manual means for rotating said cam members.

3. In a freezing tray, a partitioning grid comprising: a main partition wall having a series of cross-wall-retaining recesses therein spaced along its length, a series of cross walls loosely retained in said recesses in such manner as to be movable relative to said main wall from their normal freezing positions, and a hand lever pivotally mounted upon one of said cross walls and having a cam thereon arranged upon rotation of said lever to be forced between said one cross wall and one edge of the retaining recess in said main wall for said one cross wall and thereby move said one cross wall to loosen it from the frozen ice blocks bonded thereto.

4. In a freezing tray, a partitioning grid comprising: a main wall having a series of notches therein spaced along its upper and lower edges, a series of cross walls loosely mounted upon said main wall by means of said notches, each cross wall having a closed slot therein of such depth that said main wall may be threaded through said closed slots when assembling said cross walls upon said main wall, each cross wall having a rotatable cam member partially overlapping its closed slot and attached to the cross wall after said cross wall is moved to its assembled position in its retaining notches in said main wall whereby to reduce the effective depth of said closed slot and so prevent removal of the cross wall from its retaining notches, each cam member being arranged upon rotation thereof to react between its cross wall and said main wall to cause

a relative movement therebetween to loosen ice blocks bonded thereto, and means for rotating said cam members.

5. The steps in the method of making a partitioning grid for a freezing tray, comprising: providing a main wall having a series of cross-wall-retaining notches therein spaced along its upper and lower edges, providing a series of cross walls each having a closed slot therein of sufficient dimensions as to permit said main wall to be threaded through said closed slots, threading said main wall through said closed slots and locating said cross walls in raised position in their respective retaining notches in said main wall, then attaching a pivoted hand lever to each cross wall so that a portion of said lever partially overlaps the closed slot and thereby reduces its effective depth to such degree as to prevent removal of the cross wall from its retaining notches.

6. In a freezing tray, a partitioning grid comprising: a main partitioning wall having a notch in its upper edge, a cross partitioning wall transversely mounted upon said main wall and loosely retained in said notch in such manner that said cross wall is movable relative to said main wall, a rotatable wedge pivoted to said cross wall and arranged to be wedged between said cross wall

and the opposing edge of its notch in said main wall to cause a relative movement between said walls to loosen ice blocks bonded thereto, and manual means for rotating said wedge.

7. In a freezing tray, a partitioning grid comprising: a main partition wall having a series of cross-wall-retaining notches therein spaced along its length, a series of cross walls loosely retained in said notches in such manner as to be tiltable relative to said main wall from their normal freezing positions, a force-multiplying wedge pivoted to each of said cross walls and arranged to be individually rotated and thereby be wedged between the cross wall to which it is pivoted and the opposing edge of a notch in said main wall to tilt said cross wall relative to said main wall, and individual manual means for rotating said wedges.

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The following references are of record in the file of this patent:

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