Oct. 30, 1951 F. W. SAMPSON 2,573,066

FREEZING TRAY

Filed Jan. 7, 1946 2 SHEETS—SHEET 1

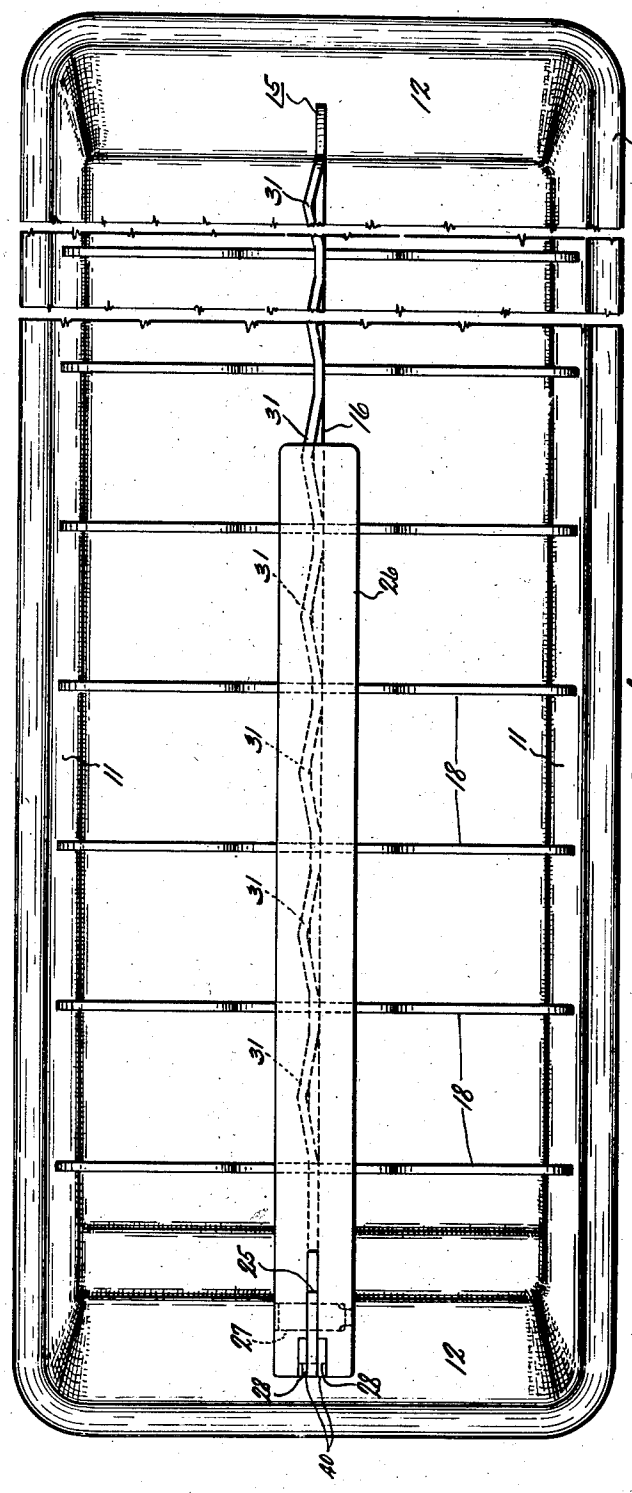

Fig. 1

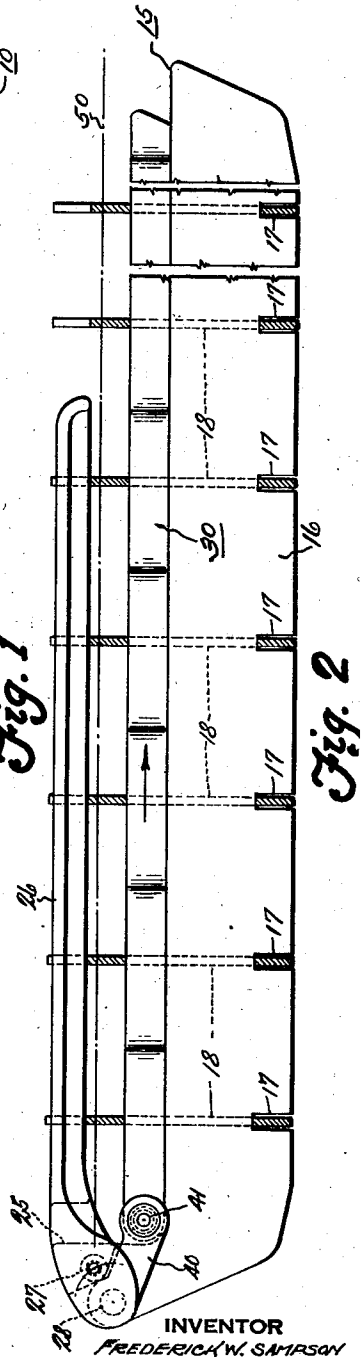

Fig. 2

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FREEZING TRAY

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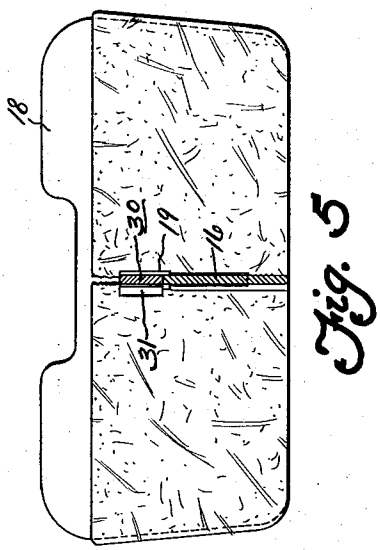

Fig. 5

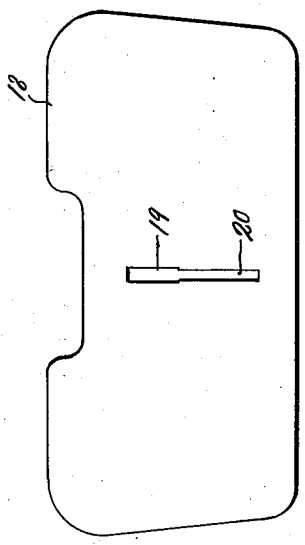

Fig. 6

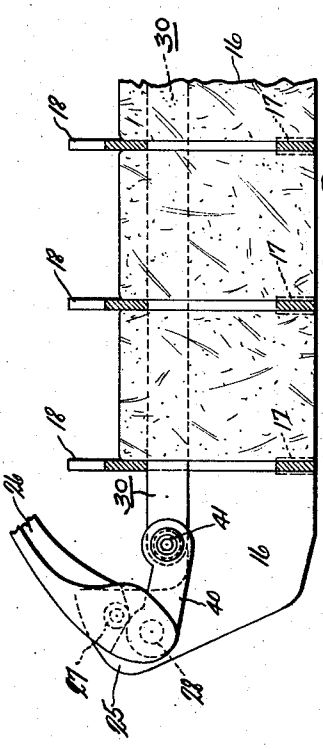

Fig. 3

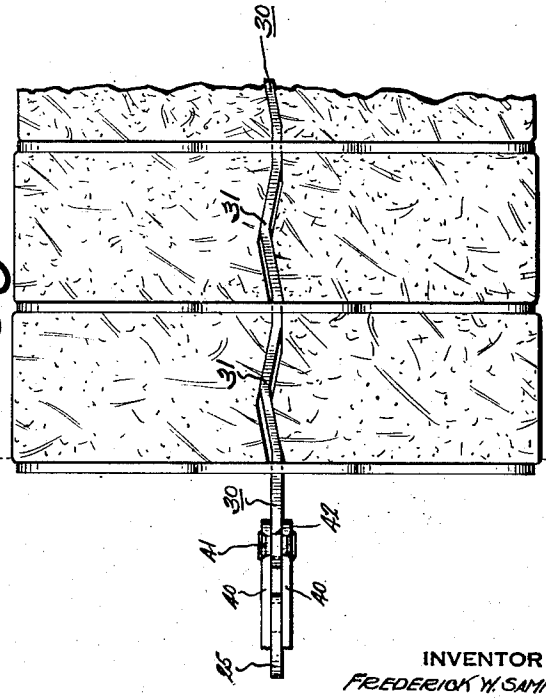

Fig. 4

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FREEZING TRAY

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Application January 7, 1946, Serial No. 639,529

2 Claims. (Cl. 62—108.5)

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This invention relates to mechanically-ejecting freezing trays of a size suitable for use in household refrigerators.

An object of this invention is to provide such a freezing tray having improved mechanism for facilitating the mechanical loosening of the bonded ice blocks from both the container pan and the grid, or from the grid alone if the pan be first removed leaving the ice blocks still bonded to the grid.

A feature of this invention is the provision of an endwise movable and slightly laterally distortible ice-block-loosening member which, when forced to move endwise thru the ice, will slightly distort laterally as a result of the endwise force thereupon and thereby loosen the ice blocks from the grid in a progressive manner along the length thereof starting at the end of said member where the endwise force is applied. This will greatly facilitate the loosening of the ice blocks and reduce the force necessary to move said member endwise thru the ice.

A more specific feature of this invention is the provision of an ice-camming bar of irregular shape in plan view which, when forced to move endwise thru the ice, will have successive portions of its length laterally distorted to such extent that the contacting ice blocks will be loosened therefrom progressively rather than all at one time. This lateral distortion of successive portions of the length of said bar also tends to permit the initially distorted portions of the length of said bar to move endwise a very slight amount relative to other portions thereof which are still held stationary due to being embedded in the solid ice. Since ice is practically non-compressible an extremely small movement of the ice-camming bar against any one ice block will be sufficient to loosen that ice block from the grid, hence the ice blocks will be loosened in a progressive manner along the length of said ice-camming bar rather than all at one time.

Further objects and advantages of this 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 ice tray of this invention, the parts being shown in freezing position.

Fig. 2 is a side elevation of the grid of Fig. 1 removed from the pan, the parts being shown in freezing position.

Fig. 3 is a view illustrating the ice-block loosening operation of the grid, and shows the mechanism moved just far enough to loosen the first three pairs of ice blocks from the grid. The first pair of ice blocks are omitted for the sake of clearness.

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Fig. 4 is a partial plan view of Fig. 3 and illustrates in an exaggerated manner how the ice blocks are forced laterally outward by the ice-camming bar to loosen same from the grid.

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

Fig. 6 is a detail of one of the cross walls.

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

Reference numeral 10 designates the container pan which preferably is a one-piece sheet metal stamping of sheet aluminum or aluminum alloy, and has outwardly inclined side walls 11 and end walls 12. The removable grid 15 comprises a main longitudinal wall 16 having a series of notches 17 in its lower edge to loosely receive the lower continuous portions of the spaced cross walls 18. Cross walls 18 have central slots 20 thru which the continuous portions of main wall 16 loosely extends. These central slots 20 each terminates at the top in a widened aperture 19 whose bottom edge lies only slightly below the top edge of main wall 16 (see Fig. 5). The combined depths of aperture 19 and slot 20 is sufficient to permit main wall 16 to be assembled endwise thru the cross walls 18. After cross walls 18 are so assembled to main wall 16 to the position shown in Fig. 2 a longitudinally movable ice-camming bar 30 is inserted endwise thru all of the apertures 19 in cross walls 18 and serves to retain said cross walls loosely assembled upon main wall 16. Cam bar 30 is shown as having a zig-zag shape when viewed in plan, that is, between each pair of cross walls 18 cam bar 30 is bent to provide the laterally projecting buldges 31 therein. The apertures 19 in cross walls 18 are each sufficiently wide to accommodate these bulges 31 when cam bar 30 is inserted endwise thru said apertures when assembling these parts.

Main wall 16 has an upstanding projection 25 at one end thereof to which the forked end of hand lever 26 is pivoted by pivot pin 27. The projecting forked end of lever 26 has two opposed inwardly-turned journals 28 which serve as pivot pins for the two small connecting links 40 which lie on opposite sides of projection 25 on main wall 16. In assembling these links 40 in place, their outer ends are first slipped into the central slot in the forked end of lever 26 and then laterally over the journals 28 before lever

26 is assembled to main wall 16. Thereafter the central slot in lever 26 is passed downwardly over projection 25 to correct position to insert its pivot pin 27. Thus the outer ends of the two links 40 are retained permanently assembled closely adjacent opposite sides of projection 25. These links 40 have their other ends connected to cam bar 30 by a suitable pivot pin 41. This pin 41 preferably has its central bearing portion 42 for bar 30 slightly greater in diameter than its two end portions and slightly longer than the thickness of main wall 16 so that said central bearing portion will serve as a proper spacer for preventing links 40 from binding against wall 16. Then the two end portions of pin 41 may be conveniently fixed respectively to the two links 40 by riveting as shown in Fig. 4 and still provide a loose pivot connection to bar 30.

The operation of the device may be as follows:

The removable grid 15 is placed loosely in pan 10 as shown in Fig. 1, and the pan 10 filled with water to its normal water level 50 (see Fig. 2) either before or after the grid is placed therein. This assembly is then placed in a freezing compartment and the water is frozen solid and bonded to the contacting metal surfaces. When it is desired to remove some or all of the frozen ice blocks, the tray is removed from its freezing compartment and the hand lever 26 grasped with the hand and lifted, causing it to pivot about its pivot pin 27. The initial movement of lever 26 moves its projecting outer end downwardly together with its journal pins 28 and consequently swings the outer ends of the two links 40 downwardly. Since links 40 are substantially embedded in the ice this downward movement of links 40, as well as the projecting end of lever 26, will directly force the first pair of ice blocks loose from both the grid and the pan. This loosening of the first two ice blocks is facilitated due to the fact that the force against them is almost vertically downward. Normally the entire grid and its ice contents are loosened from the pan when the first two ice blocks are thus forced loose therefrom, due perhaps to the pan being slightly distorted causing it to more readily peel loose from the entire ice cake.

After the first pair of ice blocks are loose from the grid, further movement of lever 26 will force the pivot end of cam bar 30 to the right (as viewed in the drawings). The first effect of such high endwise force upon bar 30 will be to cause the adjacent end thereof to flex laterally and this will force the second pair of ice blocks laterally apart with sufficient force to loosen them from the grid. As soon as the ice bond to bar 30 is freed as far as the first lateral bulge 31, the endwise force upon bar 30 will cause it to bulge out laterally primarily at this bulge 31 and this will definitely cam this second pair of ice blocks laterally apart, as exaggeratedly illustrated in Fig. 4. Thereupon the cam bar 30 becomes free to flex laterally against the third pair of ice blocks and the endwise force thereupon similarly causes a lateral bulging thereof at the second bulge 31 to loosen this third pair of ice blocks from the grid. This action takes place progressively along the length of bar 30 until all of the ice blocks are loosened. Fig. 4 illustrates in an exaggerated degree the stage of progressive action where cam bar 30 has been flexed laterally at only the first two bulges 31 while the remaining length thereof is still solidly embedded in the ice. An almost imperceptible lateral distortion of bar 30 is sufficient to loosen same from the opposed ice blocks at the point of such lateral distortion. As soon as cam bar 30 has thus been loosened from all the ice blocks its further substantial movement of translation to the right (as viewed in the drawings) takes place readily and serves to further cam all the ice blocks laterally outward from the grid center wall 16 where they will either drop out or may be easily picked out with the fingers. Each cross wall 18 is only loosely retained in slots 17 of center wall 16 so as to permit the ice blocks to move quite freely laterally outward therebetween after the ice blocks have been loosened by cam bar 30.

It will be noted that this mechanism provides a desired progressive loosening action along the length of bar 30 with only a very slight actual movement of pivot pin 41. This feature is particularly advantageous because it permits the leverage mechanism to be arranged so that the most advantageous position of the hand lever can be used to cause the initial loosening of all the ice cubes, i. e. when the greatest force is required. In other words, all the ice blocks are initially loosened by pin 41 being forced to the right a very slight loosening travel, normally less than one tenth of an inch. This permits an arrangement of hand lever 26 so that it provides a very high multiplication of force urging this pin 41 to the right thruout said loosening travel of, say, one tenth of an inch. After all the ice blocks are once loosened the endwise force necessary to move bar 30 to the right is greatly reduced, hence no great multiplication of force upon pin 41 is thereafter needed.

It is to be understood of course that cam bar 30 is made sufficiently strong so that it merely springs laterally at the bulges 31 under the endwise compression thereupon but receives no permanent set due to such distortion. If so desired, these bulges 31 may be made much less prominent than as illustrated in the drawings since only a very slight lateral distortion of bar 30 will loosen the opposed ice blocks at the point of such distortion. Also any other irregular shape of cam bar 30 may be used instead of the simple zig-zag shape shown.

It will be obvious to those skilled in the art that the lever mechanism may be arranged to pull the cam bar 30 to the left instead of pushing it to the right as described above. When this is done, the bar 30 will be put under tension and will progressively loosen each pair of opposed ice blocks by a slight straightening out at the bulges 31 in a manner quite similar to that detailed above.

Preferably all metal parts of the grid and pan which come in contact with the ice have their ice-contacting surfaces rendered water repellant in any presently known manner. These metal parts may be suitably made of anodized aluminum or aluminum alloy and then treated with a hard wax or other water repellant coating which will strongly adhere to such anodized surfaces.

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 for dividing the frozen contents into ice blocks of suitable size for table use, said grid having a central partition and a series of cross partitions mounted thereupon, and a laterally distortible longitudinally movable block-loosening member overlying said central partition and arranged so

as to be solidly embedded in the ice, and force-multiplying means for forcing said member to move endwise through the ice and to distort laterally as a result of the endwise force thereupon whereby to progressively loosen at least some of the ice blocks from said grid.

2. A partitioning grid for a freezing tray for dividing the frozen contents into ice blocks of suitable size for table use, said grid comprising: a main partition, a series of cross walls loosely mounted upon said main partition and spaced apart along its length, a movable resiliently laterally deformable block-loosening bar extending adjacent to said main partition and arranged so as to be solidly embedded in the frozen contents, a force-multiplying means for forcing said resilient bar to move endwise thru the ice, said bar being adapted to be laterally deformed by the endwise force thereupon progressively along its length from the point of application of said force whereby to progressively loosen the ice blocks contacting opposite sides of said bar.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
2,037,364	Brownstein	Apr. 14, 1936
2,112,027	Kaufman	Mar. 22, 1938
2,143,977	Crosley, Jr.	Jan. 17, 1939
2,173,696	Saler	Sept. 19, 1939
2,285,605	Miner	June 9, 1942
2,345,799	Dodson	Apr. 4, 1944
2,496,133	Sampson	Jan. 31, 1950