Jan. 10, 1939. H. D. GEYER 2,143,108

ICE TRAY

Filed May 10, 1937 2 Sheets-Sheet 1

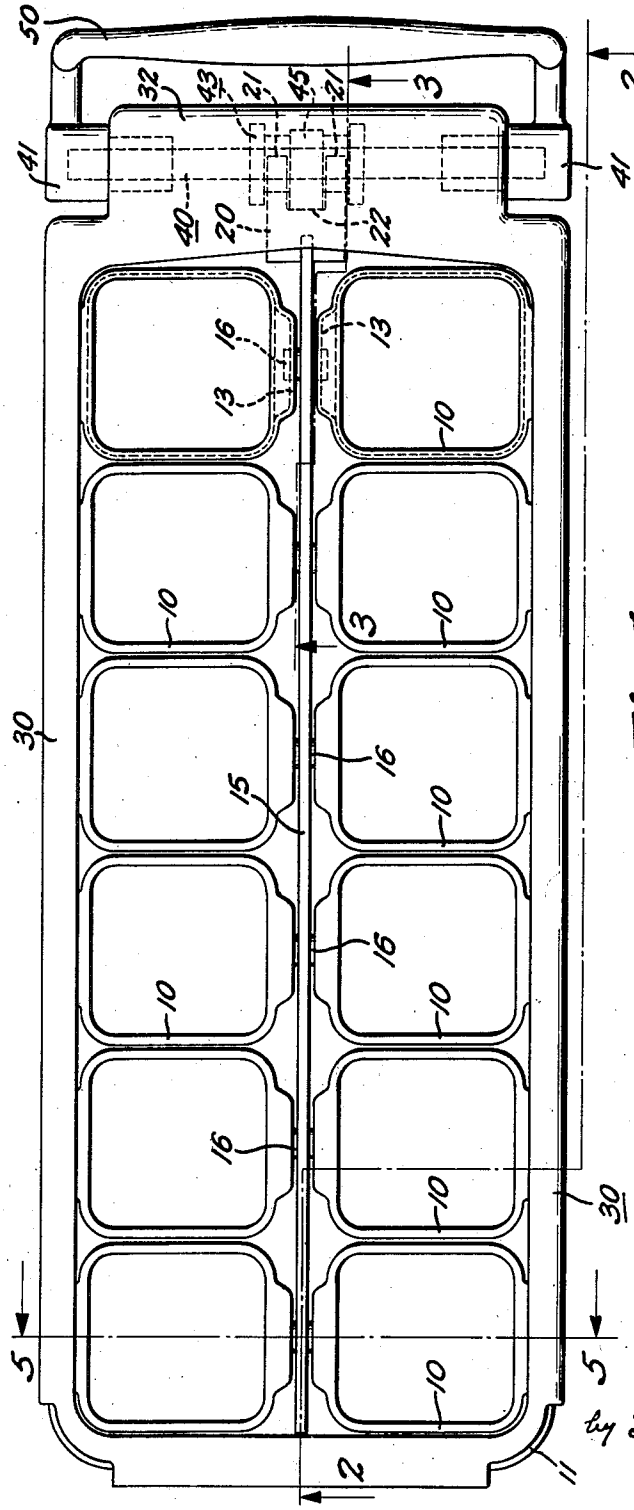


Fig. 1.

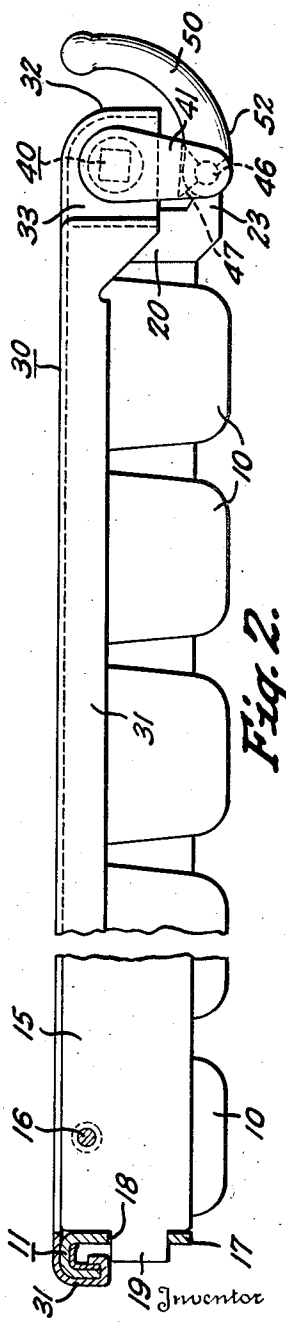


Fig. 2.

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ICE TRAY

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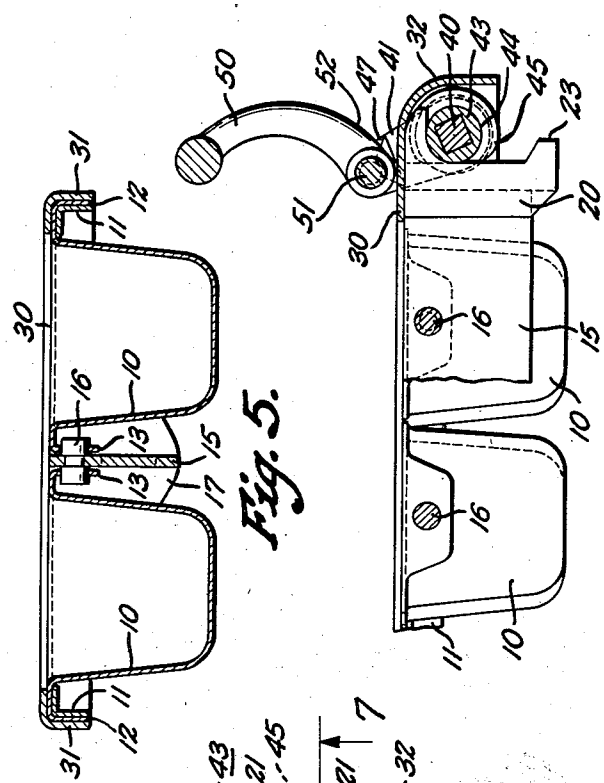


Fig. 5.

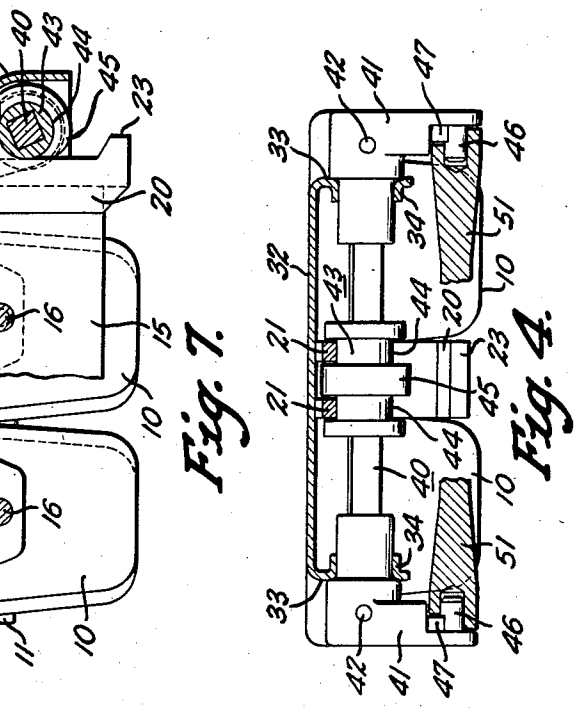


Fig. 4.

Fig. 7.

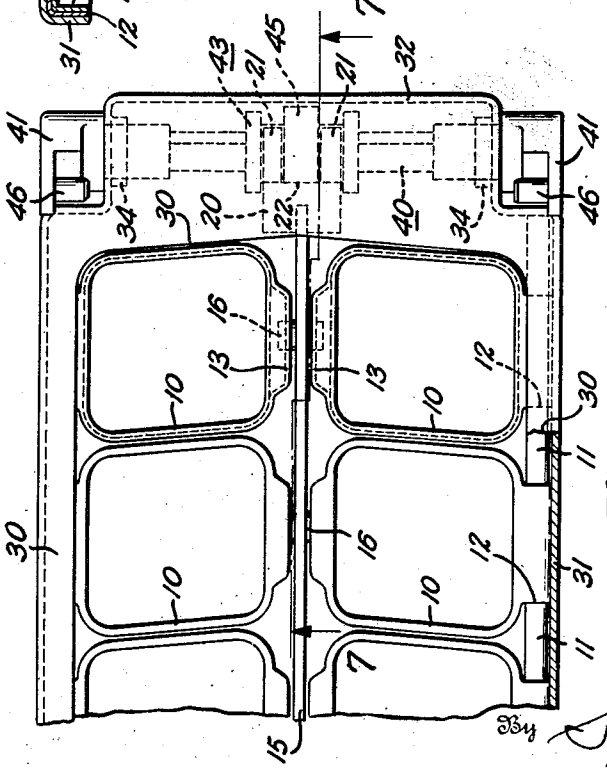


Fig. 6.

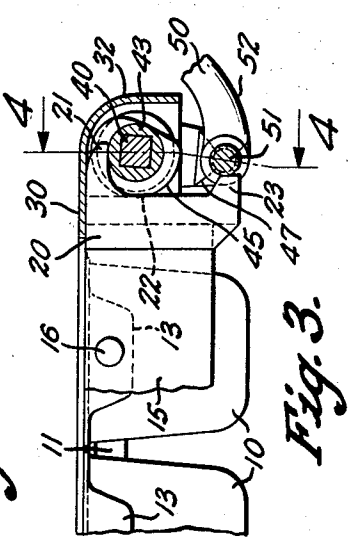


Fig. 3.

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UNITED STATES PATENT OFFICE

2,143,108

ICE TRAY

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Application May 10, 1937, Serial No. 141,607

3 Claims. (Cl. 62—108.5)

This invention relates to freezing trays such as are suitable for use in domestic mechanical refrigerators.

An object of this invention is to provide an ice tray having simple and efficient means for loosening or entirely ejecting the frozen ice blocks from their frozen bond to the metal retaining walls without first thawing the ice free.

Another object is to provide an ice tray having metal partitioning walls which may be cocked into a distorted position and so held until the ice is completely frozen, the cocking means being thereafter releasable to cause said partitioning walls to automatically return to their normal position by a spring action and thereby automatically loosen or release the frozen ice blocks from the tray.

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 an ice tray made according to this invention, the parts being shown cocked in their freezing position.

Fig. 2 is a side view partly in section on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1.

Fig. 4 is a vertical transverse section taken on line 4—4 of Fig. 3.

Fig. 5 is a transverse section taken on line 5—5 of Fig. 1.

Fig. 6 is a partial plan view of the tray with the actuating handle omitted, the parts being shown in their uncocked or ice-releasing position.

Fig. 7 is a vertical section on line 7—7 of Fig. 6 but in addition shows the actuating handle in position to be used as a lever to force the parts into the cocked position of Fig. 1.

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

Reference numeral 10 designates the resilient metal cups which preferably are individually drawn from stainless steel or other non-corrosive or plated metal having substantial springy characteristics. The normal or non-distorted shapes of cups 10 is somewhat skewed in plan view as clearly shown in Fig. 6. These cups 10 are assembled in slightly spaced relation to the surrounding U-shaped metal frame 11 in two parallel rows. Cups 10 each has its outer upper margin fixed to the rigid frame 11 by a small angular flange 12 which fits over and around the angle section of frame 11 and is fixed thereto as by welding (see Figs. 5 and 6).

A flat section actuating bar 15 extends longitudinally between the two rows of cups 10, and the adjacent small flange 13 of each cup 10 is attached to bar 15 by suitable means such as by small pins or rivets 16. The rear end of frame 11 has a depending portion 17 having a slot 18 therein, and bar 15 has a rearwardly projecting tongue 19 which rides within slot 18 and thereby serves as a rear support for bar 15 (see Fig. 2). The front end of bar 15 has a cam-follower fitting 20 fixed thereto which serves as a support for the front end of bar 15 as will be later described.

A frame-cover or housing 30 of sheet metal, preferably stainless steel, fits snugly over the rigid frame 11 and substantially conceals same. Housing 30 has a marginal flange 31 which may be crimped around the depending flange on frame 11 as shown at the left side of Fig. 2 in order to fix these parts together. If desired, housing 30 may be otherwise rigidly fixed to frame 11, as by welding. Housing 30 has a front downwardly-curved projection 32 having depending side flanges 33 thereon which form bearings 34 for a transversely extending rotatable shaft member 40.

This rotatable member comprises two lever arms 41 fixed to the two ends of the square shaft 40 by means of pins 42, and a central cam member 43. This rotatable cam member 43 cooperates with the cam-follower fitting 20 in the following manner. Fitting 20 has two projections 21 which ride within grooves 44 on member 43 (see Fig. 4) and thus positively supports the front end of the actuating bar 15. It will be noted that bar 15 is pivoted to the inner edges of all the flexible metal cups 10 by pins 16, but that this attachment is not a sufficiently positive support for bar 15 due to the flexibility or distortability of the metal cups 10. The central cam lobe 45 of member 43 rides against the cam-follower surface 22 of member 21, when the parts are moved to the position shown in Fig. 3, and thus the actuating bar 15 is forced to the left (as seen in Figs. 1, 2, and 3) against the spring pressure which all the resilient cups 10 exert when they are thus distorted to the shape shown in Fig. 1. In Fig. 3 the point of pressure contact between cam lobe 45 and cam-follower surface 22 is slightly past dead center; this means that after the parts have been forced to this position the combined spring resistance of the cups 10 will retain cam 45 in the position shown in Fig. 3. In other words, the turning force on the rotatable cam 45 may then be released and the parts will remain in the cocked position shown in

Figs. 1, 2, and 3. The lower projection 23 on fitting 20 serves as a stop for the clockwise rotation of cam 45 as seen in Fig. 3, as will appear from the following description of the operating handle.

The operating handle 50 is pivoted to the outer ends of the two lever arms 41 in any suitable manner. In the form shown, handle 50 has an integral transverse base portion 51 which is pivoted upon the two opposed journal pins 46 on lever arms 41 (see Fig. 4). The pivotal movement between handle portion 51 and pins 46 is limited by means of suitable stops 47, so that when handle 50 has been rotated upon pins 46 to the position shown in Fig. 7 the stops prevent any further clockwise pivoting of handle 50 upon arms 41 (as seen in Fig. 7). Hence it will be seen that when the parts are in the position shown in Figs. 6 and 7, the handle 50 may be pulled clockwise (as seen in Fig. 7) by hand and in effect forms an elongation of lever arms 41 by means of which the transverse shaft member 40 and cam 45 may be more easily rotated to force the actuating bar 15 to the left against the combined spring resistance of all the resilient cups 10. Then after cam 45 has been thereby moved to the position shown in Fig. 3 (where the metal cups 10 are cocked into their distorted shape shown in Figs. 1, 2 and 3), the handle 50 may be freely rotated counter-clockwise on pivots 46 to its normal freezing position shown in Figs. 1, 2, and 3. During this free counter-clockwise rotation of handle 50 the handle portion 51 remains in contact with the stop 23 and continues to serve as a stop for the cocking movement of cam 45.

In operation, the metal cups 10 are first cocked into their distorted position as above described and filled with water to the desired level. The tray is then set within a freezing compartment with the handle 50 raised to the position shown in Figs. 1 and 2 and the water frozen solid. When it is desired to remove the frozen ice blocks, the tray is first loosened from its bond to its supporting cold surface by bearing down on handle 50. Portions 52 of handle 50 act as cams and break the tray loose from its supporting cold surface. This movement of handle 50 does not change the position of lever arms 41. Handle 50 is then pulled forward (away from the tray) thus swinging lever arms 41 outwardly until cam lobe 45 is moved slightly beyond its dead center on cam-follower surface 22. This movement unlocks the cocked position of the actuating bar 15 and hence permits all the compressed or distorted flexible metal cups 10 to return to their normal shape shown in Figs. 6 and 7. The only thing which then resists this return to normal shape of the cups 10 is the ice blocks themselves which are frozen in place in said cups. These cups 10 are made with sufficient spring tension when so distorted to automatically return to normal shape when so released or un-cocked and thereby either partially or entirely eject the frozen ice blocks therefrom. It will be noted that the ice blocks are rectangular in plan view when frozen (see Fig. 1) but that cups 10 return to their skewed shape shown in Fig. 6 upon release of the cocking mechanism. This relatively small automatic change in shape of cups 10 has a particularly efficient action in loosening and partially ejecting the frozen ice blocks from cups 10. It is believed this efficient action is due primarily to the fact that each cup 10 upon its release immediately tightly squeezes its contained ice block, which squeezing action together with the taper of the side walls of each cup 10 causes the ice block to loosen and move upwardly out of the cup 10. This action is entirely automatic whether the ice blocks immediately pop up as soon as the cocking mechanism is released or whether a short elapse of time is required for them to do so. For instance when the ice tray is very cold when first removed from its freezing compartment, it may be necessary to uncock the mechanism, then set the tray on a table for a few moments until the automatic release of the cubes as above described takes place. Obviously the principles of this invention may be used with other forms of partitioning members to divide the ice contents into small ice blocks suitable for table use.

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 freezing tray having a series of resilient ice compartments having a contracted normal shape but resiliently distortable to a distorted expanded shape, means for retaining said compartments in their distorted expanded shape during freezing of the ice contents, and means for releasing said retaining means after freezing is completed and permitting said compartments to return by a spring action to their contracted normal shape and thereby contract upon and loosen the frozen contents therefrom.

2. A freezing tray having a series of resilient metal ice pockets having a skewed normal shape but resiliently distortable to a non-skewed shape, means for retaining said metal pockets in said non-skewed shape during freezing of the contents, and means for releasing said retaining means after freezing is completed and permitting said metal pockets to return to their normal skewed shape by a spring action and thereby press upon and at least partially eject the frozen contents therefrom.

3. A freezing tray having an ice compartment, said compartment having resilient metal side walls normally non-rectangular in plan but which is distortable by force into substantially rectangular form, means for forcing said ice compartment into substantially rectangular form and retaining such rectangular form during freezing of the ice contents, and means for releasing said retaining means after freezing is completed and permitting said side walls to return to their normal position by a spring action and thereby loose the frozen contents from said compartment.

HARVEY D. GEYER.