Jan. 17, 1933. G. L. TINKHAM 1,894,897

ICE TRAY

Filed June 29, 1931

Fig. 1

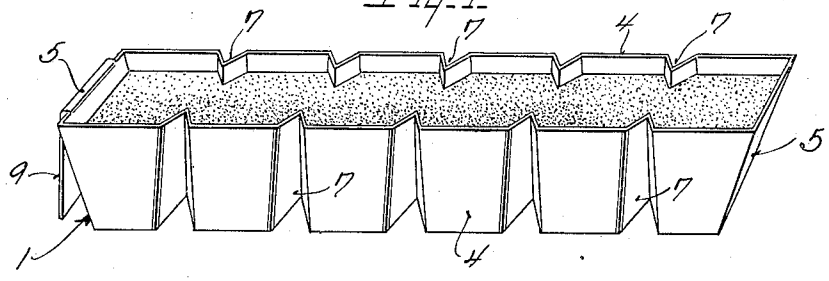


Fig. 2

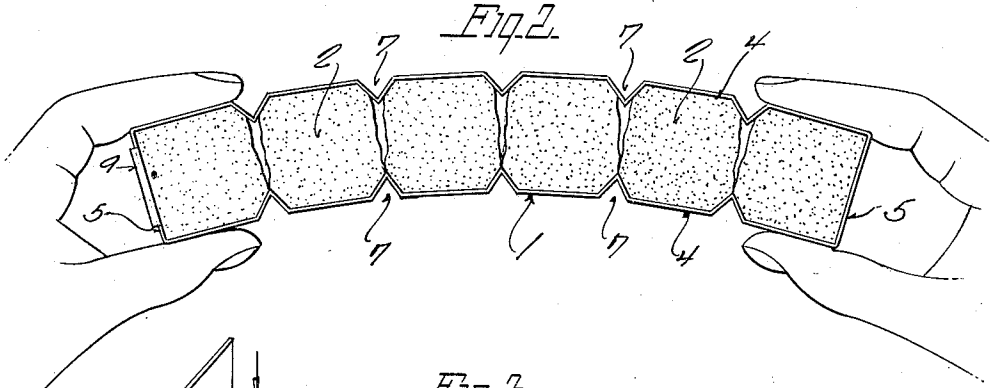


Fig. 3

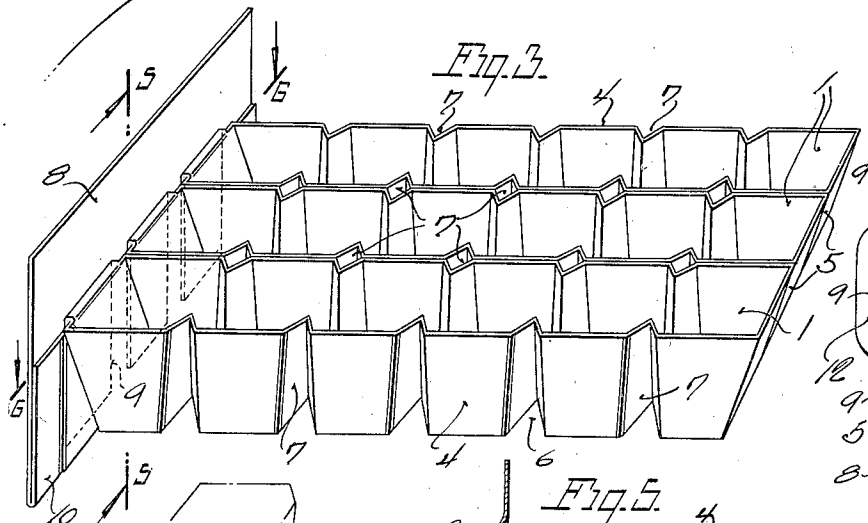


Fig. 6

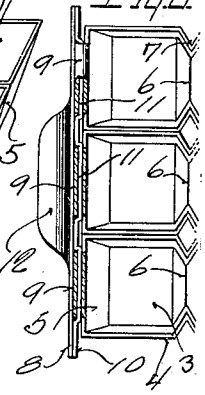


Fig. 4

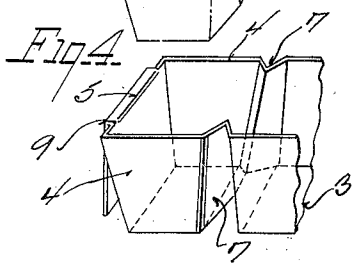
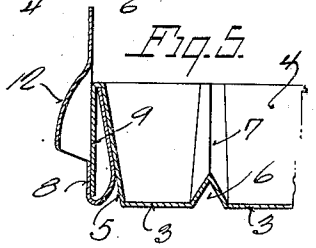


Fig. 5



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UNITED STATES PATENT OFFICE

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ICE TRAY

Application filed June 29, 1931. Serial No. 547,473.

This invention relates to ice-trays or similar containers for use in refrigerating machines for the production of the so-called "cubes" or other small units of ice or other fluid material frozen in the trays.

The main object of the invention is to provide an ice-tray or mold of such a construction that the frozen mass or contents of the tray may be readily and easily severed or fractured into the small cube or unit form for discharge from the tray by merely flexing or bending the tray.

Another object of the invention is to provide the tray or container with means for scoring the contents of the tray during the freezing of the mass to facilitate fracture of the mass into the small unit or cube form on flexing the tray.

A further object of the invention is to provide the scoring means in the form of V-shape ribs pressed into the tray walls at the lines of division between the cubes or units to facilitate bending or flexing of the tray to fracture the frozen content thereof.

A further object of the invention is to make the cells or compartments formed in the tray by the ribs or scoring means tapered from top to bottom with the largest dimension at the top of the tray to facilitate the discharge of the cubes or units from the tray on inverting it or placing the tray in a position for the cubes to slide or drop out of the same.

A further object of the invention is to make the tray in relatively narrow form of a width equal to that of the individual cubes or units produced in the tray so that the tray may be readily and easily flexed or bent in the hands of the manipulator.

A further object of the invention is to provide a tray which may be made from sheet metal or other sheet material of a character which will support itself and contents yet permit flexing or bending of the tray for the purpose aforesaid.

Other and further objects of the invention will appear from the following specification, taken in connection with the accompanying drawing, in which—

Fig. 1 is a perspective view of my improved ice-tray or container;

Fig. 2 shows the container flexed to fracture the frozen contents thereof into cubes or units;

Fig. 3 is a perspective view showing a number of the containers or trays connected in side by side relation;

Fig. 4 shows the taper or draft given to the cells or compartments of the tray to facilitate the discharge of the units therefrom;

Fig. 5 is a vertical section on line 5—5 of Fig. 3; and

Fig. 6 is a horizontal sectional view taken on line 6—6 of Fig. 3.

As shown in the drawing, the container of my invention is in the form of a relatively narrow tray 1 having a width equal to that of the individual cubes or units 2, 2 to be produced in the tray. The latter has a length sufficient to include a number of said units. The length of the tray is usually determined by the depth of the freezing chamber in which the tray is inserted in a refrigerating machine.

The tray is preferably made of sheet material, such as sheet metal, having the strength necessary to make the tray self supporting and also enabling the tray to be formed in one piece by a stamping or drawing process.

The tray is formed with a bottom wall 3 and upstanding marginal walls forming the side walls 4, 4 and the end walls 5, 5 of the tray. Portions of the side and bottom walls of the tray are folded or pressed inward at predetermined points along the length of the tray to provide inwardly extending ribs 6, 7, the former being in the bottom wall, and the latter in the side walls. The ribs on the bottom wall join the correspondingly located ribs

on the side walls, and thus provide said walls with means for scoring or indenting the ice or other material frozen in the tray at the lines of division for the units or cubes to be produced in the tray.

The ribs 6, 7 are preferably in the form of relatively wide V's so that the tray, being made of sheet metal, may be readily flexed or bent in the direction of its length to fracture the frozen contents into units at the scoring made by the ribs, as shown in Fig. 2. In addition to severing the units, the flexing of the tray also serves to break or disrupt the bond or adhesion between the tray walls and the cubes, and permits them to be readily and easily discharged or emptied from the tray on inverting it or placing the tray in such other position that the cubes or units will slide or drop out of the tray. To render the discharge of the cubes or units from the tray as easy as possible, the compartments or cells in which the units are formed are made tapered or given the necessary draft from top to bottom. This makes the cells widest at the top. The ribs 6 on the side walls vary in depth and width from top to bottom, with the lesser dimensions at the top, to provide the required draft at the scoring, as shown in Fig. 4.

The ribs 6, 7 by reason of their divergent form provide expansion joints in the tray walls between the compartments or cells into which the tray is divided by the ribs, and extending completely across the tray walls and through the upper edges of the side walls, permit the tray when grasped at its opposite ends between the hands of the operator to be bent or flexed laterally or in the direction of its width to fracture the frozen mass into the cubes at the scoring as provided by the ribs by shortening the tray along one side wall and lengthening it along the other side wall, as shown in Fig. 2. Thus the stress to which the frozen mass is subjected in so bending or flexing the tray will fracture the mass into cubes at the scoring and also break the slight bond or adhesion of the mass with the tray walls to free the severed cubes for instant discharge from the tray. The term "cubes" is used herein and in the claims in a sense to denote the small units or sections into which the frozen mass is fractured in flexing the tray at the joints regardless of the true geometrical shape these sections may have by reason of the form of the cells in which they are produced.

The material from which the tray is made, in addition to being rigid enough to support itself and contents, has sufficient resiliency to return to its normal shape after being flexed, as shown in Fig. 1. In other words, the tray will not be set on being flexed, and thus may be used repeatedly. With the tray merely as wide as the cubes or units produced therein, very little flexing of the tray is required to separate the cubes for the reason that the frozen mass in the tray is in relatively narrow block form, which can be more easily fractured than a wider mass. Moreover, the side and bottom walls of the tray may be more easily flexed with the tray no wider than the width of the cubes, and thus the fracture or separation of the cubes is positively assured with a relatively small amount of bending strain on the walls of the tray. With the scoring of the frozen mass relatively deep, the fracture may be easily made without so straining the tray as to distort it or prevent the tray returning to its original shape after each bending of action.

In Fig. 3, I have shown a plurality of trays of my invention grouped in side by side relation and connected at one end for handling in unison as when being inserted into and being removed from the freezing chamber or compartment of a refrigerating machine. The connection is preferably made at the front ends of the trays and comprises a plate 8 of sheet metal of a size to fit over and close the entrance opening of the compartment into which the trays are inserted. Each tray has a tongue or flange 9 at its front end to releasably connect the tray with the plate 8. The latter has a turned up rear wall portion or flange 10 providing an upwardly opening channel to receive the flanges or tongues of all of the trays 1. The rear wall portion 10 of the connector 8 is shaped to fill the space between the connector and the adjacent end wall 5 of each tray, as shown in Fig. 5, so as to take care of the inclination or slant given to such wall by reason of the draft required for the tray and thus take the strain off of the tongues 9 when the trays are handled and lifted through the connector 8.

As shown in Fig. 6, the flange 10 is offset at a plurality of points in its length to provide vertical slots or channels 11, 11 for the tongues 9, and thus prevent lateral displacement of the trays when connected, as in Fig. 3. The tongues are integrally connected with the adjacent end walls, 5, 5 of the trays and are inserted into the slots 11 through their open upper ends. To facilitate grasping the plate 8 for sliding the trays into and out of the freezing compartment and also for lifting the trays in unison, the plate 8 is provided on its front with a handle 12 of the type pressed out from the metal of the plate, as shown in Fig. 5.

In addition to scoring the frozen contents or mass in the tray, the ribs 6, 7 permit the tray to be flexed when held at its ends between the hands of the munipulator, as shown in Fig. 2. This enables the tray to be made of sheet metal with the advantage of having a tray rigid and stiff enough to support itself and contents. The tray being capable of being flexed to sever the units or cubes and break their connection with the tray walls

enables the cubes to be easily and quickly discharged from the tray without the necessity of warming the tray either by setting it in the room or running water over it before the cubes can be discharged, as heretofore. With my improved tray, the cubes are ready the instant desired, and no preliminary treatment is required to free the cubes from the tray prior to their discharge therefrom, except bending or flexing the tray to break the mass into the cube or unit form as heretofore described.

The details of construction shown and described may be variously changed and modified without departing from the spirit and scope of my invention, except as pointed out in the appended claims.

I claim as my invention:

1. The method of producing ice or like cubes or units, consisting in freezing the cubes in connected mass form in a container having a width equal to that of the individual cubes, causing the mass to be scored while freezing at the lines for severance of the cubes, and then fracturing the mass into the cubes at the scoring by flexing the container at the scoring.

2. A tray for the production of ice or like cubes or units in a mechanical refrigerator, said tray being in elongated form and having a width equal to that of the individual cubes to be produced in the tray, and means embodied in the structure of the tray to score the mass frozen therein at the lines for severance of the cubes, and permitting the tray to be flexed to fracture the mass into the cubes at the scoring.

3. A tray for the production of ice or like cubes or units in a mechanical refrigerator, said tray having bottom and marginal walls and being of a width equal to that of the individual cubes to be produced in the tray, certain of the walls of the tray having inwardly folded portions forming ribs to score the mass frozen in the tray at the lines for severance of the cubes and providing expansion joints permitting the tray to be flexed at the scoring to fracture the mass into the cubes at the scoring.

4. A tray for the production of ice or like cubes or units in a mechanical refrigerator, said tray having a bottom wall and inclined side and end walls to taper the tray to facilitate the discharge of cubes therefrom, the bottom and the side walls of the tray having inwardly folded portions forming ribs to score the mass frozen in the tray at the lines for severance of the cubes and providing expansion joints to permit flexing of the tray at the scoring to fracture the mass into the cubes at the scoring, the joints in the side walls increasing in depth from top to bottom of the tray in accordance with the taper thereof.

5. An ice tray assembly for use in refrigerating machines, comprising a plurality of individual ice trays, each being constructed to be individually flexed to fracture the mass frozen therein into smaller units or cubes, and means for connecting the trays together in side by side relation for handling as a group when inserting the same in and removing them from the freezing chamber of a refrigerator.

6. An ice tray assembly for use in refrigerating machines, comprising a plurality of individual ice trays, each being formed to permit individual flexing for fracturing the mass frozen therein into smaller units or cubes, and a connector for said trays for holding them in side by side relation, said connector having a channel to receive co-operating parts therefrom on the respective trays.

7. An ice tray assembly for use in refrigerating machines, comprising a plurality of individual ice trays, each being formed to permit flexing for fracturing the mass frozen therein into smaller units or cubes, each tray having a flange at one end thereof, and a connector for said trays for holding them together in side by side relation, said connector having a channel to receive the flanges at the ends of the trays.

8. An ice tray assembly for refrigerating machines, comprising a plurality of individual ice trays, each being formed to be flexed for fracturing the mass frozen therein into smaller units or cubes, each tray having a flange at one end, and a connector for said trays for holding them together in side by side relation, said connector having a front wall and a rear wall, the latter being spaced from the rear wall to provide a channel to receive the flanges at the ends of the trays.

9. An ice tray assembly for use in refrigerating machines, comprising a plurality of individual ice trays, each being formed to be flexed for fracturing the mass frozen therein into smaller units or cubes, said trays each having a bottom wall and inclined side and end walls and a flange at one end of the tray, and a connector for said trays for holding them together in side by side relation, said connector having a front wall and a rear wall to provide a channel to receive the flanges on the trays, the rear wall of the connector being disposed to engage against the adjacent inclined end walls of the respective trays to support the weight of the trays and their contents when handled through the connector.

10. The method of producing ice or like cubes or units, consisting in freezing the cubes in connected mass form in a container of a width equal to that of the individual cubes and having connected bottom, side and end walls, causing the mass to be scored while freezing at the lines for severance of the cubes, and then fracturing the mass into the cubes at the scoring and freeing the cubes from the container walls by flexing the con-

tainer in a manner to shorten it along one side wall and elongate it along the other side wall.

11. A tray for the production of ice or like cubes or units in a mechanical refrigerator, said tray having connected bottom, side and end walls and being of a width equal to that of the individual cubes to be produced in the tray, said bottom and side walls having inwardly folded portions forming expansion joints to score the mass frozen in the tray at the lines for severance of the cubes, said joints extending through the upper edges of the side walls to permit flexing of the tray in a manner to shorten it along one side wall and lengthen it along the other side wall to fracture the frozen mass into the cubes at the scoring.

12. An ice tray for use in a mechanical refrigerator, comprising a series of cube forming compartments, and means connecting the compartments, said means extending into the tray between the compartments for scoring the ice mass frozen in the tray and providing expansion joints permitting the tray to be flexed to fracture the ice mass at the scoring.

13. An ice tray for use in a mechanical refrigerator, comprising a series of cube forming compartments, and means connecting the compartments, said means extending into the tray between the compartments for scoring the ice mass frozen in the tray and having divergent walls providing expansion joints permitting the tray to be flexed for fracturing the ice mass at the scoring.

14. A metal ice tray having connected bottom, side and end walls, said tray having folded portions in its bottom and side walls to divide the tray into a series of cube forming compartments, said folded portions extending across said walls and through the upper edges of the side walls to provide expansion joints permitting the tray to be flexed for fracturing the ice mass into cubes at said joints.

15. A metal ice tray having connected bottom, side and end walls, said tray having inwardly folded portions in its bottom and side walls to divide the tray into a series of cube forming compartments, said inwardly folded portions extending across said walls and through the upper edges of the side walls to score the ice mass frozen in the tray and to provide expansion joints permitting the tray to be flexed for fracturing the ice mass at the scoring.

16. A metal ice tray having connected bottom, side and end walls and having a width no greater than the width of the individual cubes or units to be produced in the tray, said tray having inwardly folded portions in its bottom and side walls to divide the tray into cube forming compartments, said folded portions extending across said walls and through the upper edges of the side walls to score the ice mass frozen in the tray and to provide expansion joints permitting the tray to be flexed for fracturing the ice mass at the scoring.

In testimony whereof I affix my signature.

GUY L. TINKHAM.