Dec. 12, 1933. G. C. HENNE 1,939,445

FREEZING TRAY FOR REFRIGERATORS

Filed Sept. 30, 1930

Fig. 1

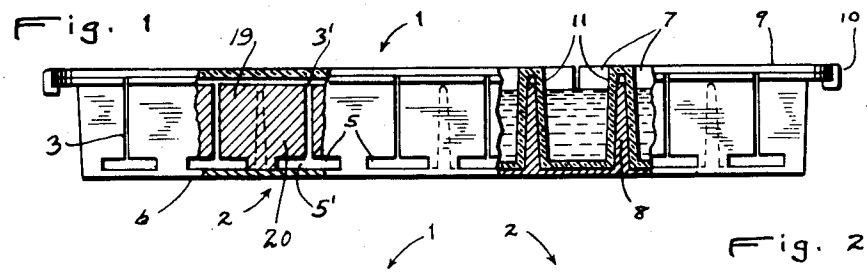


Fig. 2

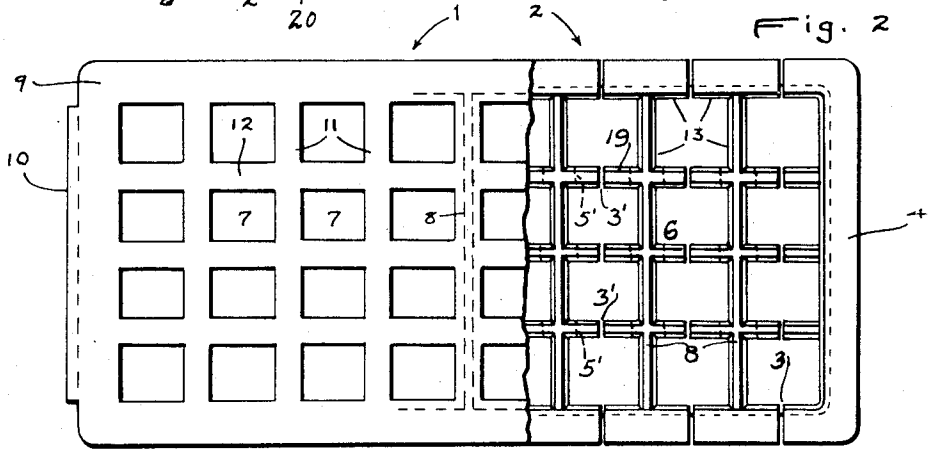


Fig. 3

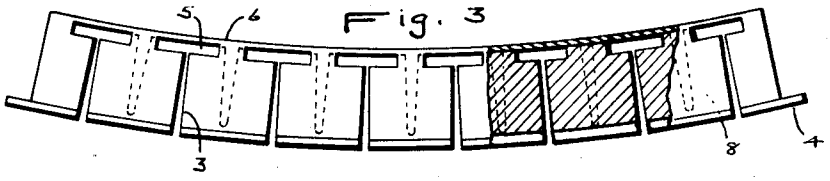


Fig. 4

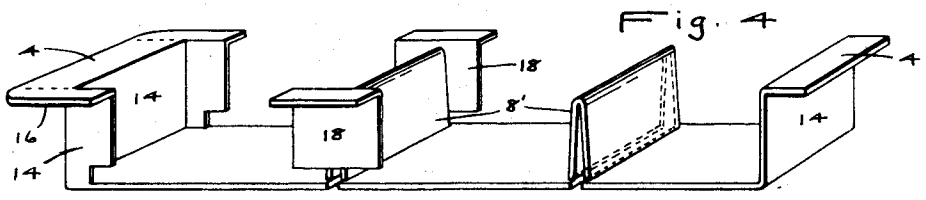
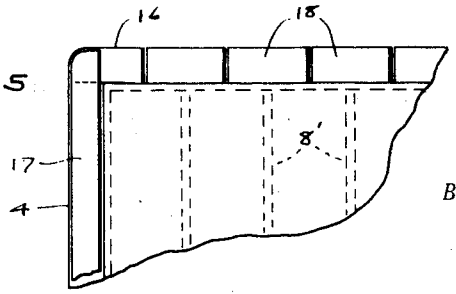


Fig. 5



INVENTOR.

G. C. Henne

BY

Mason Fenwick & Lawrence

ATTORNEY.

Patented Dec. 12, 1933 1,939,445

UNITED STATES PATENT OFFICE

1,939,445

FREEZING TRAY FOR REFRIGERATORS

George Calvin Henne, Herrin, Ill., assignor to Inland Manufacturing Company, Dayton, Ohio, a corporation of Delaware

Application September 30, 1930
Serial No. 485,495

13 Claims. (Cl. 62—108.5)

This invention relates to refrigeration and more particularly to trays for making ice cubes in domestic automatic refrigerators.

An object of the invention is to provide an improved rubber tray in which all the cubicles are integral in one complete tray, while providing for greater freezing velocity than has been obtained before with all the cubicles integral.

Another object is to provide an improved metal tray for supporting the rubber tray, having heat conducting surfaces in contact with the walls of the cubicles.

Another object is to provide such a metal tray which is bendable in one direction to stretch the rubber cubicles and unbendable in the other direction to form a rigid support for the rubber tray.

In the accompanying drawing, which shows an embodiment of the invention,

Figure 1 is a side elevation of the metal tray, containing the rubber tray, partly shown in section.

Figure 2 is a top view of the same, with the rubber tray partly broken away to show a top view of the metal tray beneath.

Figure 3 is a side view of the metal tray, inverted to show its flexibility in the inverted position.

Figure 4 is a perspective view of the metal tray, showing a slight modification in the method of construction, with some of the parts omitted for better illustration; and

Figure 5 is a bottom view of a corner of the metal tray, in one modification.

The same numerals refer to corresponding parts in the different figures of the drawing.

In its preferred form my freezing tray comprises a water pan 1, of rubber or other suitable stretchable material, separated into cubicles by partitions which are hollow for reasons described below, supported by a metal pan 2. The metal supporting pan has slits 3 through its top flange 4 and down its sides, as shown, to the elongated openings 5 adjacent the bottom plate 6. When inverted, then, the metal pan has no support of its weight but its bottom plate and so is free to bend as in Figure 3, the slits gaping open. When upright, as in Figure 1, the weight closes the slits and renders the pan rigid.

In the drawing the slits are shown rather wide for clearness of illustration. Preferably these may be narrow cuts, so that their edges butt together and prevent any material bending of the structure upward, forming a rigid tray when in upright position for carrying the rubber tray and the water in its cubicles 7.

Attached to the bottom plate and sides of the metal pan are metal partitions 8, which extend up into the hollow rubber partitions 9 of the rubber pan, as seen in section in Figure 1. When ice is formed in the cubicles, inverting of the tray causes the metal pan to bend and move the partitions 8 wider apart, as understood from Figure 3, so that the rubber cubicles are stretched to free the ice cubes in them.

The flange 9 of the rubber pan may have lips 10 overhanging flange 4 of the metal pan, so that when the metal pan is bent, the end cubicles are stretched the same as the inner cubicles.

The metal partitions 8 have another important function in serving as heat conductors. Rubber is a desirable material from which to form freezing pans, because of its flexibility, facilitating the removal of the ice cubes. But rubber is a very poor heat conductor so that in pans heretofore in use, having solid walled rubber partitions, no assistance to the freezing is obtained from the rubber partitions. But in my invention the hollow rubber partitions 11 are formed to fit snugly over the metal partitions 8, which are good heat conductors.

The metal partitions may be integral with bottom plate 6, or soldered or otherwise intimately attached to the bottom plate to provide for heat conduction. And since the metal pan completely surrounds and supports the rubber pan, the walls of the latter may be made so thin that they are pressed into intimate contact with the metal surfaces by the weight of the water contained in the cubicles.

The heat of the water is then conducted rapidly through the thin rubber walls into the metal partitions and by the metal partitions is conducted to the metal bottom and sides of the pan, which are exposed to the chilling action of the freezing unit in which the tray is normally contained. It is important that the partitions should be of metal of high heat conductivity.

In this manner my improved tray provides for more rapid freezing of the water in the cubicles of the rubber pan than has hitherto been possible in rubber pans and provides for stretching of the rubber cubicles to release the ice cubes when the tray is inverted.

The invention is consummated by the provision of the transverse metal partitions 8, alone, the cubic chambers being defined by the rubber longitudinal partitions 12. It is preferred however, in order to provide the maximum rate of heat

exchange between the refrigerator chamber and the walls of the cubicles to construct the metal pan with longitudinal partitions 19, flexibility of which is obtained in the same manner as in the sides of the metal pan, that is to say, the longitudinal partitions are longitudinally slotted at the bottom as at 5', intermediate the transverse partitions, and slotted vertically as at 3' intermediate the partitions, the vertical slots communicating with the longitudinal slots. The webs 20 which remain, are unitary with the transverse partitions 8 and therefore in good thermal contact with said partitions. The longitudinal rubber partitions 12 will of course be recessed to receive the longitudinal partitions of the metal pan.

It is of course, important that the metal surfaces against which the rubber cubicles contact shall be smooth, both to facilitate the removal of the rubber pan and to permit intimate contact between rubber and metal for heat conduction. The metal partitions as described may be cast integral, but the working of their surfaces to render them smooth would be difficult. A satisfactory construction is provided, however, by parts separately fabricated and suitably attached together, as by soldering.

In Figure 4, is shown a slight modification for facilitating the manufacture of the bendable metal pan. A sheet of metal forming bottom plate 6 has ends 14 bent up and flanges 4, bent outward. Inverted L-shaped corners are attached, one leg of the L forming a continuation 16 of flange 4 around the corner, the dotted line indicating the joint of part 16 to part 4 of the flange. The same parts and dotted line joint are seen in Figure 5, which is a bottom view showing a reinforcing strip 17 attached under the flange across the dotted line joint. This end structure is repeated at the other end of plate 6, but is shown only at one end.

Intermediate of the ends are attached inverted V-shaped partitions 8', only two of these being shown. To the ends of each partition 8' are attached the inverted L-shaped slabs 18. When all the partitions with their slabs are attached, it will be seen that the same pan described above will be formed, with sides and top flange and inverted T-shaped slits between the slabs and under-cutting the slabs.

This manner of constructing the pan permits the use of smooth sheet metal in forming the bottom, ends, partitions and slabs. The whole may be formed of a good heat conducting metal, soldered or otherwise held together and then tinned or otherwise treated.

While I have described one manner of carrying out my invention, it is not intended to be limited to the form or any of the details shown or described.

What is claimed is:

1. A freezing tray, comprising a stretchable water pan; hollow partitions separating the water pan into compartments; a bendable supporting pan; and rigid partitions fixed in the supporting pan, adapted to enter the hollow partitions to stretch the compartments when the supporting pan is bent.

2. A freezing tray, comprising a bendable supporting pan; rigid partitions attached in the bendable pan; a stretchable water pan adapted to be supported in the bendable pan; hollow partitions separating the stretchable pan into compartments, adapted to engage the rigid partitions; and gripping members adapted to engage the margin of the stretchable pan with the bendable pan, so that each compartment shall be stretched when the supporting pan is bent.

3. A freezing tray, comprising a supporting pan having its sides slit to render it bendable; rigid partitions attached in the bendable pan; a stretchable water pan; and hollow partitions separating the stretchable pan into compartments, adapted to engage the rigid partitions to stretch the compartments when the supporting pan is bent.

4. A freezing tray, comprising a rubber pan; hollow rubber partitions separating the rubber pan into compartments; a metal pan having slits cutting its sides into a plurality of slabs, rendering the pan bendable; and metal partitions spanning the pan, each attached to a pair of opposite slabs, adapted to enter the hollow rubber partitions, to stretch the rubber compartments when the metal pan is bent.

5. A freezing tray, comprising a supporting pan having inverted T-shaped slits cutting its sides into a plurality of slabs, with the T crossbar part of the slit adjacent the bottom of the pan and undercutting the slab to render the pan bendable; spanning partitions attached to opposite slabs; and a stretchable water pan having hollow partitions, adapted to engage the spanning partitions to stretch the water pan when the supporting pan is bent.

6. A freezing tray, comprising a bendable supporting pan with sides, having slits through said sides, the adjacent edges of the slit sides abutting to prevent bending of the pan in one direction, but opening to permit bending in the other direction; and a flexible water pan adapted to rest in and to engage the supporting pan, so as to be stretched when the supporting pan is bent.

7. A carrier for mold trays formed of flexible nonmetallic material and provided with hollow walls, said carrier comprising a flexible bottom plate formed of a metal composition with end members adapted to engage the ends of said tray and with upstanding members intermediate its ends to engage within said hollow walls.

8. A freezing tray comprising; an inverted T-shaped holder; and a one piece flexible nonmetallic container divided in compartments having adjacent walls joined by a fold at their upper edges, said fold overhanging the upper edge of the stem of said T-shaped holder.

9. A freezing tray comprising; a one-piece molded rubber flexible container having a plurality of compartments, said compartments having spaced adjacent walls joined together at the top forming a fold; and an inverted T-shaped support engaging the fold and supporting said flexible container.

10. A freezing tray adapted to be inserted within a freezing compartment comprising; an inverted T-shaped metal support and a removable one piece molded rubber flexible container having a double-walled closed-top partition dividing said container into separate sections with walls and bottoms, said container having the closed-top partition thereof and its adjacent walls and bottoms engaging the central stem of said T-shaped support.

11. A freezing tray comprising; an inverted T-shaped metal support and a moldable flexible container having a plurality of individual rows of ice pockets, a pair of said rows having a longitudinal open-bottom groove therebetween, and said T-shaped member having its stem portion inserted within the groove and supporting the

dividing walls and its arm portions supporting the bottoms of said rows of pockets.

12. A unitary portable freezing tray comprising: a flexible non-metallic container having a hollow non-metallic partition therein, a metallic carrier fitting snugly upon said non-metallic container and forming therewith a unitary portable device, said carrier having a heat-conducting metal plate fitting within said hollow non-metallic partition and facilitating the withdrawal of heat therefrom.

13. A unitary portable freezing tray comprising: a flexible non-metallic container having a plurality of hollow non-metallic partitions therein, a portable metallic carrier for said flexible container, said carrier comprising a metal bottom plate and upstanding metal plates having good heat-conductivity and fitting within said non-metallic partitions.

GEORGE CALVIN HENNE.