March 10, 1942. H. D. GEYER 2,275,522

ICE TRAY

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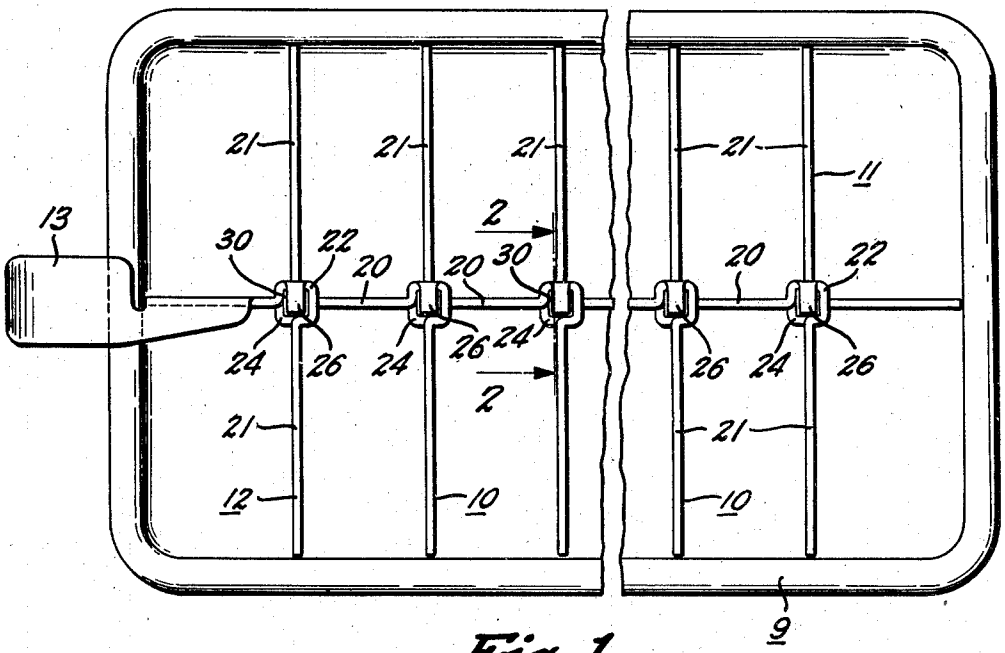


Fig. 1.

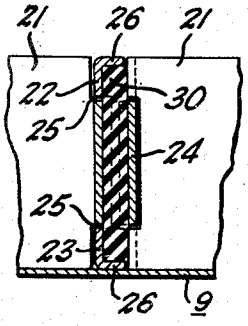


Fig. 2.

Fig. 3.

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ICE TRAY

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7 Claims. (Cl. 62—108.5)

This invention relates to ice trays or other freezing containers suitable for use with household refrigerators.

An object of this invention is to provide an improved form of grid unit having relatively movable interconnected sections which may be readily relatively moved by a bending flexure or by twisting or by a stretching distortion of the grid unit as a whole to facilitate the removal of the contained ice blocks or other frozen contents.

An important feature of the grid of this invention is the yielding interconnection between the relative rigid sections thereof which permits both a relative hinge movement and a relative translation movement between two interconnected sections. The preferred form of connection permits the grid unit to be stretched as a whole, or to be readily twisted as a whole, or to be flexed or bent as a whole in any direction, whereby to facilitate the removal of the frozen contents thereof.

Another object is to provide a grid unit having at least two relative rigid grid sections normally retained in their relative freezing positions by means of a resilient rubber connector which by distortion thereof permits relative movement between the interconnected sections to facilitate the removal of the frozen contents of the grid.

A more specific object is to provide a grid unit having at least two grid sections interconnected by means of a resilient rubber hinge pin which permits both relative hinge movement and relative translation movement between the connected sections by distortion of the resilient rubber pin.

One important feature of the use of the resilient rubber connector is the function of the resilient rubber connector to urge the connected sections to return to their normal or non-distorted relative positions after having been distorted to remove the ice blocks.

Another important feature of the use of the resilient rubber connector is the ready internal twisting distortability of the resilient rubber connector even though it be solidly embedded in ice. Also since such a resilient rubber connector may be distorted in any desired manner and hence does not require a clearance gap for its movement to permit relative translation movement between the two grid sections connected thereby, it will readily perform its functions even tho solidly embedded in the ice.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of the present invention is clearly shown.

In the drawing:

Fig. 1 is a plan view of a freezing tray having a grid therein made according to this invention. Fig. 2 is a section on line 2—2 of Fig. 1, showing the preferred form of connection between the separate metal grid sections.

Fig. 3 is an exploded view which illustrates how the separate grid sections may be assembled together by the resilient rubber pins to form a flexible unitary grid.

Similar reference characters refer to similar parts thruout the drawing.

Reference numeral 10 designates the intermediate metal grid sections, 11 designates one end grid section having no handle thereon, and 12 designates the other end grid section having a handle 13 thereon. All these grid sections are illustrated as metal stampings from flat sheet metal. Each section 10 is of approximate Z-shape having a central longitudinal wall 20 and two transverse walls 21. Upper and lower hinge pin sockets 22 and 23 are formed at one corner and a central hinge pin socket 24 is formed at the other corner of each section 10. The sockets 24 of one section 10 mate with the sockets 22 and 23 of the next adjacent section 10, as will be readily understood from the drawing. Likewise end section 11 is provided with a central hinge pin socket 24 at its single corner, and end section 12 is provided with upper and lower hinge pin sockets 22 and 23. Obviously both end sections 11 and 12 will mate with the hinge sockets of the adjoining sections 10 in the same manner that any two sections 10 mate together.

Preferably there is provided a small vertical clearance gap 25 between the upper and lower ends of the sockets 24 and their mating sockets 22 and 23 respectively, as illustrated in Fig. 2. These clearance gaps 25 permit the various grid sections 10, 11 and 12 to be readily relatively pivoted either up or down or laterally, that is out of their normal horizontal plane, by distortion of the resilient rubber hinge pins 30. In other words clearance gaps 25 together with the distortable pins 30 permit the grid as a whole to be readily flexed by bending same vertically in either direction, or by twisting same by giving it a torsional flexure about a longitudinal axis thereof or about any other axis thereof. All these various relative movements between the individual grid sections is readily permitted even tho said sections may be relatively rigid per se,

but obviously if desired the individual grid sections may also be made slightly flexible or very flexible per se simply by using thinner or more resilient metal sheets from which these stampings may be made.

The resilient rubber hinge pins **30** are illustrated as made square in section and fit tightly within the correspondingly shaped hinge sockets **22, 23,** and **24.** To assemble the parts of the grid, the various hinge sockets of the grid sections are nested together so as to register properly and then the pins **30** are pulled or otherwise forced into final position as shown in Fig. 2. Preferably pins **30** are positively retained in their final position by small metal lugs **26** which are formed integral with the various grid sections (as shown in Fig. 3) and are bent to a horizontal position after pins **30** are inserted in place, as clearly illustrated in Fig. 2. It will now be clear that each resilient pin **30** will permit a relative hinging movement about the axis of the pin between its two connected grid sections by an internal twist in the resilient rubber, and that when the twisting force ceases the resiliency of the rubber pins will urge the grid sections to return to their normal relative positions as shown in Fig. 1. This same automatic return of the grid sections to normal position may be obtained by making pins **30** and their sockets of some other non-round cross section (such as oval or elongated rectangle in section), or pins **30** may even be made round in section if they are given such a tight fit within the metal sockets as to substantially prevent rotary slipping in their sockets.

Due to the vertical clearance gaps **25** at the joints between the various grid sections, each grid section is permitted a substantial universal movement relative to its connected section or sections simply by a distortion of the rubber pins **30,** as mentioned above. In all cases when the grid is twisted, flexed, or otherwise distorted as a whole, the resiliency of the pins **30** urges the grid to return to its normal flat aligned shape shown in Fig. 1 as soon as the distorting forces thereon are removed.

Furthermore the grid as a whole may be readily stretched or elongated in length by applying tension thereto, since the metal hinge sockets are made so as to slide laterally apart and since the resilient rubber pins **30** may be distorted by a bending or shear distortion thereof to permit of a substantial sliding apart of the mated hinge sockets. In other words each grid section may have a translation movement relative to its connected section or sections, and in all cases the resilient pins **30** will urge the grid back to its normal shape and dimensions as soon as the distorting forces thereon are removed. It is thus seen that this invention provides a universally flexible metal grid which may be easily highly distorted to facilitate the removal of its frozen contents, and one which nevertheless returns to its normal shape and dimensions after such high distortion thereof and with a minimum probability of being given a permanent set in its distorted form.

In operation, the grid as a whole is simply set within its pan **9,** which preferably is drawn from flat sheet metal or made according to my copending application S. N. 88,559 filed July 2, 1936, the pan is then filled with water to the desired level, and the ice allowed to freeze and solidly embed the grid in the ice. If the pan **10** be only slightly flexible, the grid and its ice contents may be removed as a unit from the pan **9** by pulling up on handle **13** with one hand and holding one corner of pan **9** down upon a table or other support with the other hand. Or the grid and its ice contents may be removed as a unit from its container pan by any presently known device or method. After removal from the pan the grid and ice unit may be grasped with both hands and readily twisted, or bent up or down, or elongated, or given any combination of these distortions, to loosen the frozen bond between the ice blocks and the grid. When so distorted the ice blocks will either fall out or may be readily picked out with the fingers.

The grid sections **10, 11,** and **12** are preferably made either from smooth stainless steel or from sheet aluminum which is subsequently given the well-known anodizing treatment in an electrolyte bath to provide a hard stain-proof surface coating of aluminum oxide on all surfaces thereof.

When anodized aluminum grid sections are used they are preferably coated with a high melting point wax which will greatly facilitate the separation of the solid ice blocks from the metal surfaces and hence facilitate the above described operation of removing the ice blocks from the grid.

Such waxing treatment may be given by immersing the separate grid sections, after being anodized in a known manner with the important exception of omitting the usual water-sealing operation, in the molten wax (preferably consisting of 50% paraffin wax and 50% carnauba wax or other wax having a similarly high melting point) for about 15 minutes and/or under such conditions as will permit the molten wax to thoroughly impregnate or be firmly bound by the highly activated aluminum oxide coating obtained by the anodizing treatment. The waxing treatment is preferably performed very shortly after the completion of the anodizing treatment, since when the usual water-sealing treatment after anodization is omitted as here recommended, the anodic coating of aluminum oxide is so highly activated that it will readily become permanently stained or blemished by handling with the hands or by coming into contact with any discoloring substance containing moisture and will even absorb moisture from the air upon standing and so partially water-seal itself. It has been found that when the usual water-sealing treatment after anodization is omitted and the highly activated anodic coating subjected directly to the waxing treatment above described, that the wax is substantially permanently incorporated in the anodic coating by some peculiar affinity between the two. This peculiar affinity between the wax film and the anodic coating may be due to the molten wax thoroughly impregnating sub-microscopic pores in the anodic coating or it may be due to some kind of chemical action which may be described as "occlusion" of the molten wax by the activated anodic coating. I do not wish to be bound by any theories I may advance in explanation of this peculiar affinity. My discovery teaches that if the waxing process is carried out shortly after the well-known anodizing treatment is completed with the important exception of omitting the water-sealing step, that the resultant wax film in or on the anodic coating will be more strongly adherent or more permanent than it would be if the usual water-sealing step had not been omitted. Expressed in other words, my discovery teaches that the above described wax-

ing treatment may be substituted for the usual water-sealing step following the anodizing treatment to produce a very permanent wax film upon or wax impregnation of an aluminum surface. This wax application or impregnation then performs the function of the customary water-sealing step in rendering the anodic coating stainproof from the usual discoloring substances containing moisture.

The above described method of providing a long-lasting water-repellent surface on aluminum or aluminum alloys obviously may be used to great advantage on the container pan 9 or on any form of grid structure other than that here disclosed, or in fact on any aluminum surface where water-repellent properties are desired.

While the embodiment of the present invention as herein disclosed, constitutes a preferred form or forms, 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 grid for an ice-freezing container, comprising: two metallic sections each embodying at least one partition wall, said sections having a hinge connection normally embedded in the solid ice after the freezing of the container contents, said hinge connection having a snugly fitting resilient rubber hinge pin which permits easy relative hinge movement by torsional distortion thereof even though embedded in hard-frozen ice, said resilient hinge pin also serving to urge said sections to return to their normal relative position after distortion thereof.

2. A grid for an ice-freezing container, comprising: two relatively movable substantially rigid metallic partition units, and a resilient rubber hinge pin for retaining said units in their normal relative freezing positions, said rubber pin being normally embedded in the solid ice after the contents are frozen and serving to readily permit both relative hinge movement and relative separating movement between said rigid units by a compound twisting and shearing distortion of said pin while embedded in the solid ice, whereby to facilitate removal of the frozen contents of said grid.

3. A grid for an ice-freezing container, comprising: two relatively movable substantially rigid metallic partition units, and a resilient rubber hinge pin normally retaining said partition units in their relative freezing positions and normally embedded in the solid ice after the freezing of the contents, said rubber hinge pin being readily distortable even though embedded in the solid ice to permit relative separating movement between said rigid partition units.

4. A grid for a freezing container, comprising: a plurality of substantially rigid relatively movable metal sections forming partition walls of the grid, said rigid sections having interfitting portions and being yieldingly retained in their normal freezing relative positions by resilient rubber members passing through said interfitting portions, said rubber members being normally embedded in the solid ice after the contents are frozen and permitting universal relative movement between said rigid sections by distortion of said rubber members.

5. A grid for a freezing container, comprising: a plurality of substantially rigid relatively movable metal sections forming partition walls of the grid, said rigid sections having interfitting portions and being yieldingly retained in their normal freezing relative positions by resilient rubber pins so associated with said interfitting portions as to permit relative movement between said rigid sections only by distortion of said pins, whereby said rubber pins also serve to urge said rigid sections to return to their normal relative position after distortion thereof.

6. A grid for a freezing container, comprising: a series of relatively movable substantially rigid metal sections each having a cross partition portion and a longitudinal partition portion thereon, said sections having interfitting portions and being yieldably retained in their normal assembled relationship by resilient rubber members associated with said interfitting portions in such manner as to readily permit a relative separating movement between said rigid sections by distortion of said rubber members.

7. A grid for a freezing container, comprising: a series of relatively movable substantially rigid metal sections each being generally Z-shaped, said sections having interfitting corner portions and resilient rubber members associated with said interfitting portions in such manner as to retain said sections in assembled relationship and to permit a relative movement between said sections by distortion of said rubber members.

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