May 19, 1959 A. J. FREI 2,886,958

FREEZING DEVICE

Filed Jan. 3, 1957

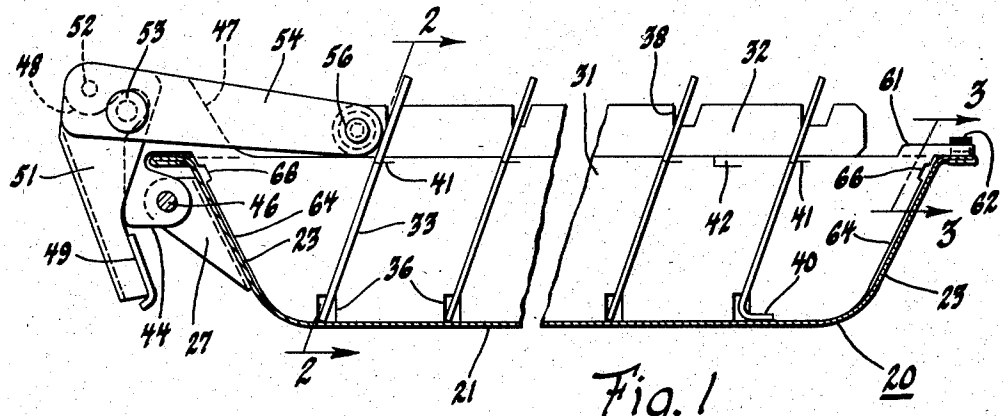

Fig. 1

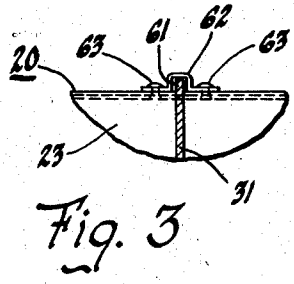

Fig. 3

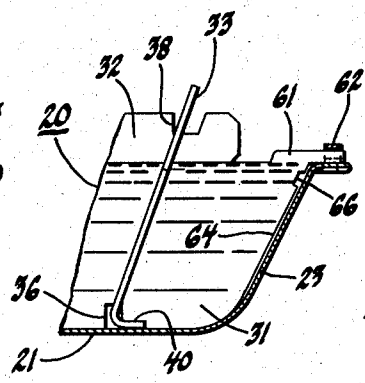

Fig. 4

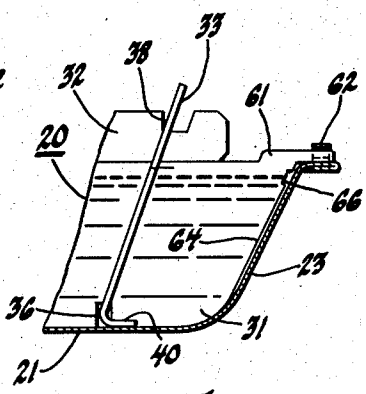

Fig. 5

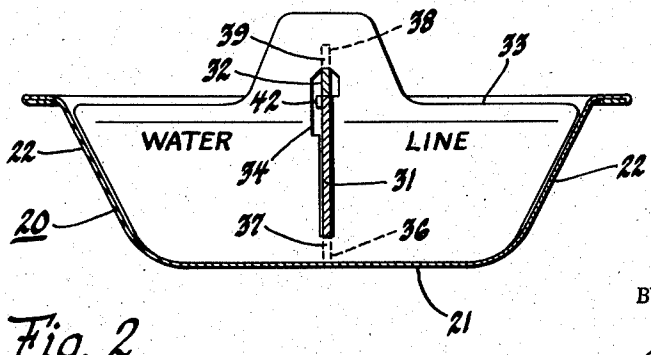

Fig. 2

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FREEZING DEVICE

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1 Claim. (Cl. 62—359)

This invention relates to refrigeration and particularly to freezing devices of the tray and grid type employed in household refrigerators.

With the advent of unitary freezing devices of the type including a water repellent coated tray and grid walls interlocked together and secured in the tray against detachment therefrom certain problems have arisen. In such freezing devices the ends of one or more grid walls are either extended through an opening in an upright side of a tray or the ends of a longitudinal wall of a grid are projected upwardly over the top of a tray and secured to the tray beyond inner surfaces thereof in order to lock a grid in the tray against detachment therefrom. In these constructions it is desirable to have the end edge portions of the longitudinal wall disposed in the tray substantially contiguous and in substantially full abutment with the upright end walls of the tray. However due to manufacturing tolerances, necessary in volume production of articles of this character, the end edge portions of the longitudinal grid wall seldom fully abuts the tray. A few thousandths of an inch clearance is usually present between the ends of a longitudinal wall and upright ends of a tray and this forms a crack or passage at one or both ends of the grid wall at the point where the wall approaches the tray. Furthermore, even if this clearance is not originally present in a freezing device, distortions of the tray during ice block releasing operations generally create such a clearance. In any event, trays of the character described have clearance of small dimension between the end of a longitudinal wall and the tray. This clearance approaches a capillary sized crack, space or passage and thereby creates an undesirable leakage condition not present in the type of freezing device wherein the longitudinal grid wall does not extend above and over the top of an upright tray wall. One of these problems concerns the capillary flow of water, placed in the tray of a freezing device, upwardly along the capillary sized crack, space or passage and over the top edge of the tray which causes a puddle of water to accumulate on the freezing compartment surface and is very undesirable. Of course as soon as the water in the tray commences to freeze the leakage is stopped but this condition is already existent and repeated use of the freezing device aggravates the situation. The puddles of water freeze and build up on the freezing surface of the compartment to such an extent that even automatically initiated defrosting periods of an evaporator associated with the freezing compartment will not remove all the ice which must eventually be manually scraped and removed from the freezing compartment surface.

I have discovered that the problem above described can be completely eliminated by the use of a relief means or clearance in excess of the aforementioned small clearance between the end of a longitudinal grid wall and an upright tray wall and located below the top of the tray. This relief means or clearance must be of a sufficient

size to enlarge a part of the crack or passage at a point below the top of a tray to a size above the capillary size of such crack or passage so that the surface tension effect of water in the tray is broken and the water does not flow upwardly therein above the enlargement. It is to be understood that the added clearance or enlargement of the capillary crack or passage should not be present along the entire height of the end of the grid wall adjacent a tray wall since this will permit a bridge of ice to form from one side of the wall to the other which would then tend to create ice shedding problems. Therefore the relief means or clearance to which I refer hereinafter should be present only adjacent the top of the end of the grid wall and should have a rather limited extent at a point below the top of the tray in the vicinity of a desired water level to be established therein.

It is an object of my invention to eliminate any possibility of water in a tray of the type described overflowing the top of the tray after the freezing device is placed on a support in a freezing compartment of a refrigerator.

In carrying out the foregoing object it is another object of my invention to provide means in a tray and grid type freezing device that will limit the extent of capillary sized cracks, spaces or passages between ends of grid walls in the tray and upright tray walls.

Also in carrying out the foregoing objects it is a further object of my invention to provide an enlargement in a capillarily sized passage between an end of a grid wall disposed in a tray of a freezing device and which grid wall has an extension projecting over the top of the tray and locked thereto so that a column of water in such passage and tending to flow upwardly over the tray by a siphoning action will be broken at a predetermined level of water in the tray of the freezing device.

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 form of the present invention is clearly shown.

In the drawings:

Figure 1 is a view of a unitary tray and grid freezing device with the tray in section showing the grid locked in the tray and having my invention incorporated therein;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1 showing transverse walls of the grid of the unitary freezing device movably interlocked with a two-part longitudinal partition;

Figure 3 is a fragmentary sectional view taken on the line 3—3 of Figure 1 showing the grid locking means at one end of the freezing device;

Figure 4 is a fragmentary sectional view of the rear end of the freezing device illustrating same filled to overflowing with water; and

Figure 5 is a view similar to Figure 4 showing a predetermined water level in the freezing device established by my present invention.

Referring to the drawings I show in Figure 1 thereof a unitary freezing device of a character substantially corresponding to the device disclosed and fully described in my Patent No. 2,809,499 entitled Ice Block Ejecting Device dated October 15, 1957. The elements of construction, except those used herein for describing the locking of the grid in the tray, and the movement of grid walls in the present freezing device correspond to and are indicated by reference numbers like those employed in the patent and for a more detailed description of the freezing device herein disclosed reference should be made to said patent. The present freezing device differs from the device disclosed in my patent referred to in that the rigid longitudinal wall 31 within the tray, interlockingly and movably carrying the spaced-apart substantially inflexible transverse walls 33, has a portion of its ends projecting above the top of the tray and extend-

ing over its upper edge or rim so as to be secured to the tray beyond inner surfaces thereof in order to lock the grid in the tray against detachment therefrom. Such is the type of freezing device to which my invention especially pertains. It has been found that it is better and more desirable to lock a grid in a tray of a freezing device against detachment therefrom in a manner different from that disclosed in my patent to eliminate the necessity of slotting or cutting away portions of the thin metal tray. Thus in the present disclosure I provide the rear end of longitudinal grid wall **31** of freezing device **20** with an upwardly projecting portion **61** extending above other portions thereof and over the top edge or rim of the back wall **23** of tray **21**. This projection **61** rests on tray **21** and is secured thereto by a strap-like metal piece **62** fastened or secured to tray **21** by rivets **63** (see Figure 3). I also provide the front end of longitudinal grid wall **31** of device **20** with the upstanding portion **47** which extends over the top of tray **21** and around a rim thereon and terminates in the upper hook-like part **48** and a lower ear **44**. The ear **44** on longitudinal grid wall **31** fits under the tray rim and is secured to the brackets **27**, spot welded to the front end of tray **21**, by the rivet **46**. It is desirable to have the ends of longitudinal grid wall **31** fitting snugly against or to be in contiguous relationship with the inner surface of the ends **23** of tray **21** of the freezing device **20** as is shown in my said patent No. 2,809,499. However such is not possible in all freezing devices produced in mass production as has hereinbefore been explained and consequently there will be in most of the devices **20** a crack, space or passage indicated at **64** present between one or more ends of longitudinal grid wall **31** and upright ends **23** of tray **21**. This crack or passage **64** is usually of capillary size and creates a problem which my present invention overcomes or eliminates.

While the freezing device **20** may be provided with a mark or marks to indicate a level of water to be run or placed therein many users of such devices will disregard such indication and fill the tray thereof to overflowing. When this occurs and after placing a freezing device in a freezing compartment of a refrigerator cabinet water is siphoned out of the tray and runs or drips therefrom onto its freezing support to create the difficulty or problem hereinbefore stated. The coated walls of the tray and inflexible walls of the grid of a device **20** renders these walls so water repellent that the surface tension of molecules of water in the freezing device is increased to a degree where the molecules are difficult to separate and they strongly cling together. Under such condition water tending to flow over the top of tray **21** travels along the projection **61** and runs out of the tray. This initiates a siphoning action in the relatively capillary sized crack or passage **64** and causes water to rise upwardly therein in the form of a thin column and to continue to seep out of tray **21** onto its freezing support in a freezing chamber. Such siphoning action must be stopped if puddles of water on the freezing device support are to be eliminated. Therefore I provide the freezing device with a relief means which in the present disclosure is in the form of a clearance or cut out notch **66** that enlarges a part of the crack or passage **64** above its capillary size.

Assume that the freezing device herein disclosed is filled with water to overflowing as shown in Figure 4 of the drawings, placed on a support in a freezing chamber of a refrigerator cabinet and the siphoning action above described is initiated or begins. Water will flow along the projection **61** over the top of tray **21** and create a venturi-like siphoning action in the capillary passage **64**. This action draws water upwardly in the form of a narrow column in the capillary crack or passage **64** between the end of longitudinal grid wall **31** and the inner surface of end **23** of the tray. The upwardly flow of water in the capillary passage **64** having been once started will continue even after the level of water in tray **21** falls below the top edge thereof. However when the level of the body of water in tray **21** of the present unitary freezing device **20** is lowered to a level equal to or slightly below the top of notch **66** in an end edge of longitudinal grid wall **31** this enlarging means or notch for a part of the capillary passage **64** causes separation of the molecules of water at this point and provides a break in the upwardly flowing column of water in the capillary passage. By breaking the upwardly flowing column of water in this manner the siphoning action is stopped and a body of water within tray **21** is established at a desired or predetermined freezing level in the device **20** as shown in Figure 5 of the drawings. It is to be understood that this may take place quickly such, for example, as shortly after filling tray **21** with water and prior to or during the time a freezing device is being transferred from the locality where it is filled into a supported position within a freezing chamber of a refrigerator cabinet so that no water can thereafter flow out of the tray **21** onto its freezing support.

From the foregoing it should be apparent that I have provided an improved unitary freezing device of the type having grid walls locked in the tray thereof and extending over its top while at the same time eliminating a troublesome problem created by such a structure. By stopping the siphoning action of water out of a tray of a freezing device of the character herein disclosed the accumulation of puddles of water and subsequent formation of ice in stalagmite fashion on the freezing support in a freezing chamber of a refrigerator cabinet is prevented. My improvement eliminates in a novel and inexpensive way a difficulty which has caused numerous complaints and which has been rather embarrassing to manufacturers of such freezing devices and hard to solve.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claim which follows.

What is claimed is as follows:

A freezing device comprising in combination, a tray adapted to contain a body of water to be frozen provided with a rim and having a grid structure disposed therein, said grid structure including a longitudinal wall and a plurality of spaced apart transverse walls interlocked therewith dividing the interior of said tray into rows of ice block forming compartments, said longitudinal wall having an integral stationary projection at one end thereof extended over the top of the rim on said tray, the edge portion of said longitudinal wall at said one end thereof below said projection being disposed along a straight flat inner wall surface of said tray in slightly spaced relation thereto and forming a passage therebetween of substantially capillary size extending continuously from a low point in said device up to said top of the tray rim and the underside of said grid wall projection, the continuity and size of said passage together with its association with the projection on said grid wall rendering the passage capable of siphoning water out of said device over the rim of said tray thereof by capillary action, and said edge portion of said longitudinal grid wall having a notch therein enlarging that part of said continuous passage at the extension of said wall projection over the top of the rim of said tray above its said capillary size for preventing the passage from siphoning water out of the freezing device.

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