

United States Patent

Pietrzak et al.

[15] 3,638,903

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- [54] **FREEZING CONTAINER WITH SPILLGUARD**
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[73] Assignee: **General Motors Corporation**, Detroit, Mich.

[22] Filed: **Jan. 9, 1970**

[21] Appl. No.: **1,748**

[52] U.S. Cl. **249/69, 249/71, 249/206**

[51] Int. Cl. **F25c 1/24**

[58] Field of Search **249/69-73, 206, 249/127, 129, 131**

[56] **References Cited**

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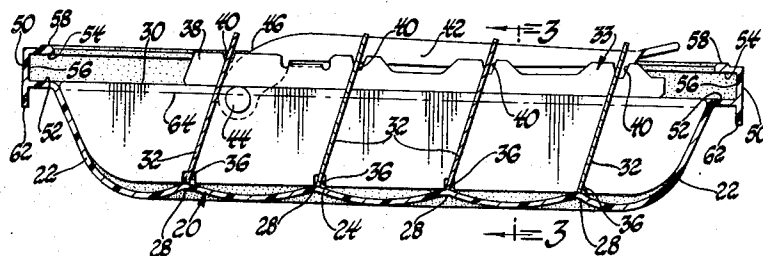
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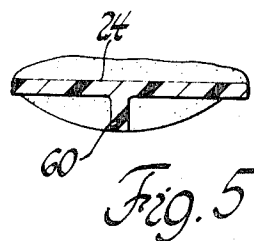
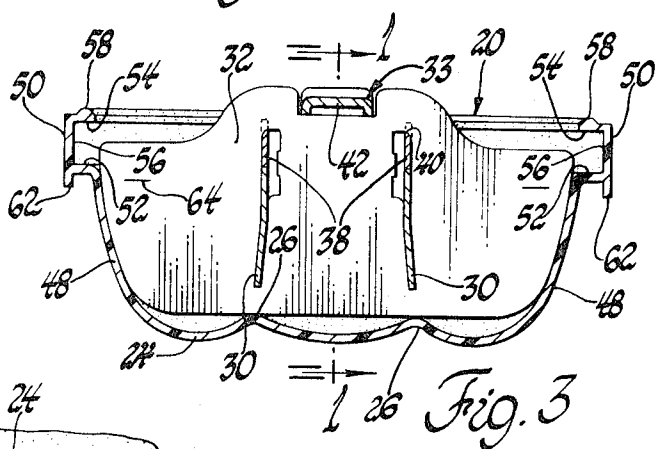
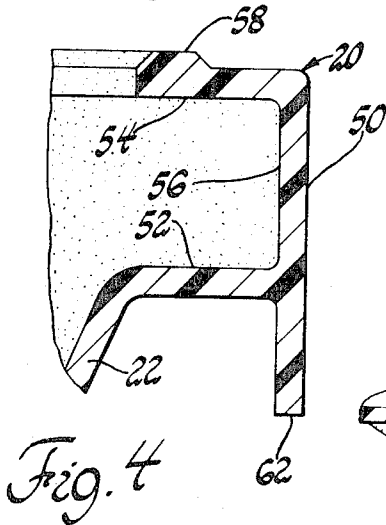
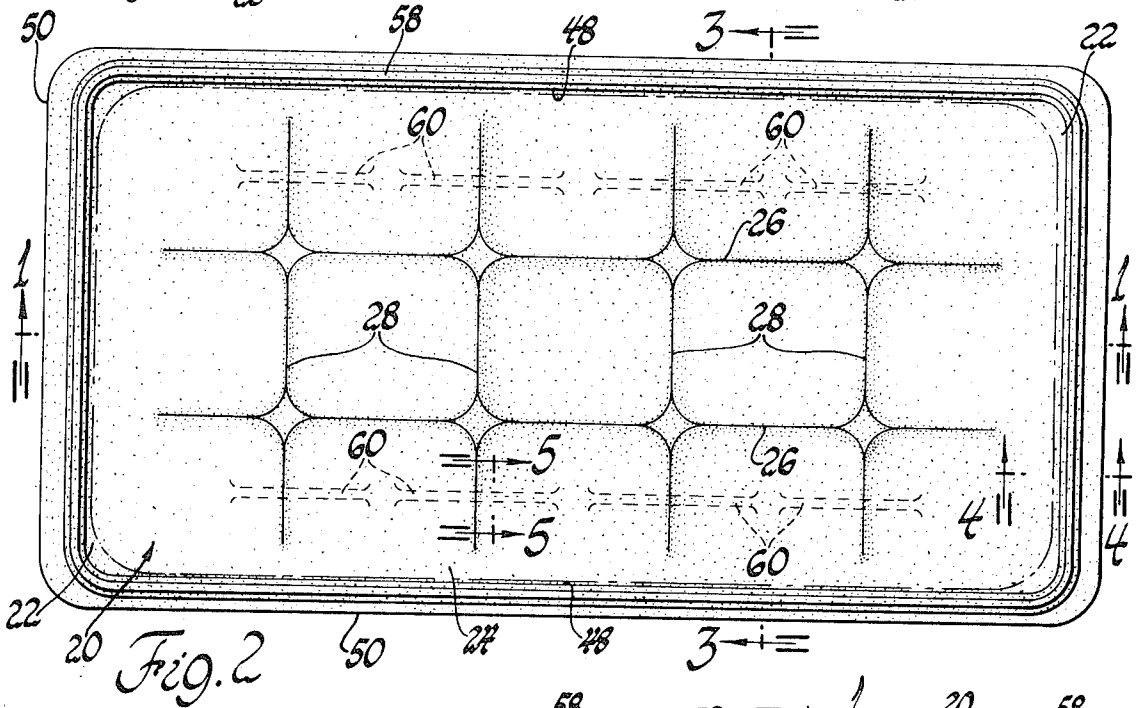
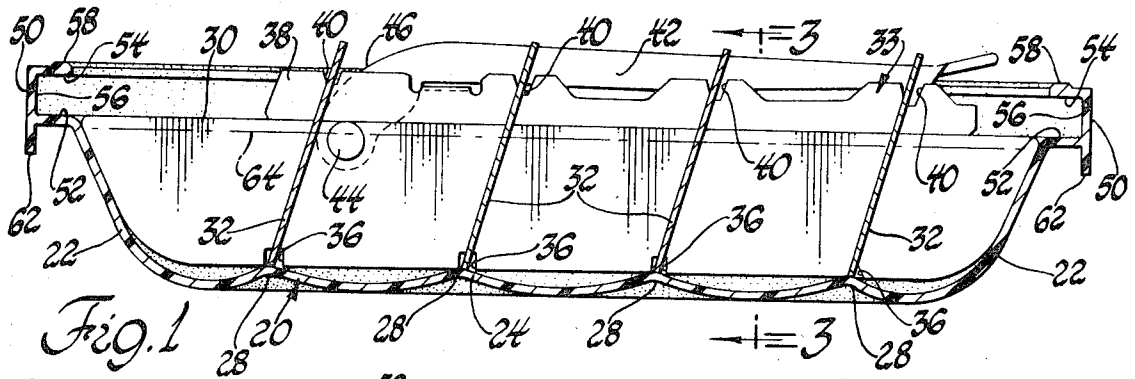
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ABSTRACT

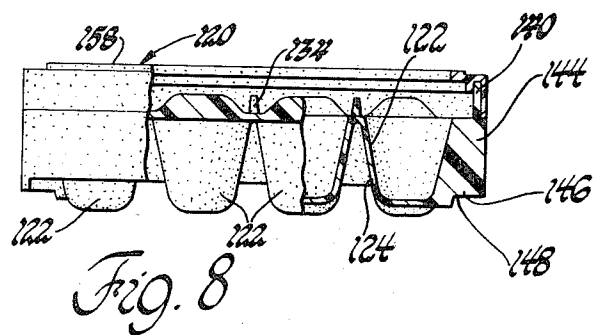
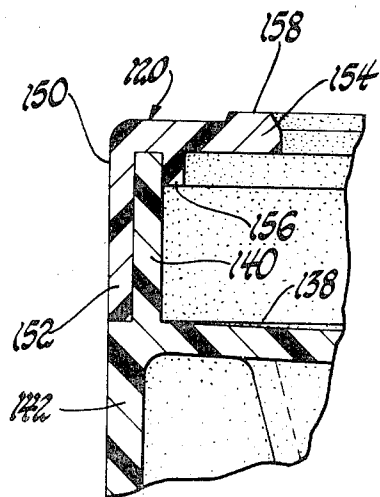
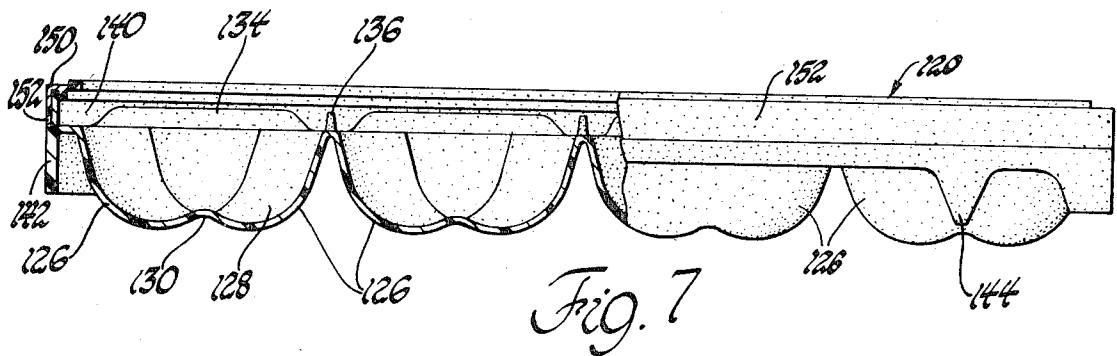
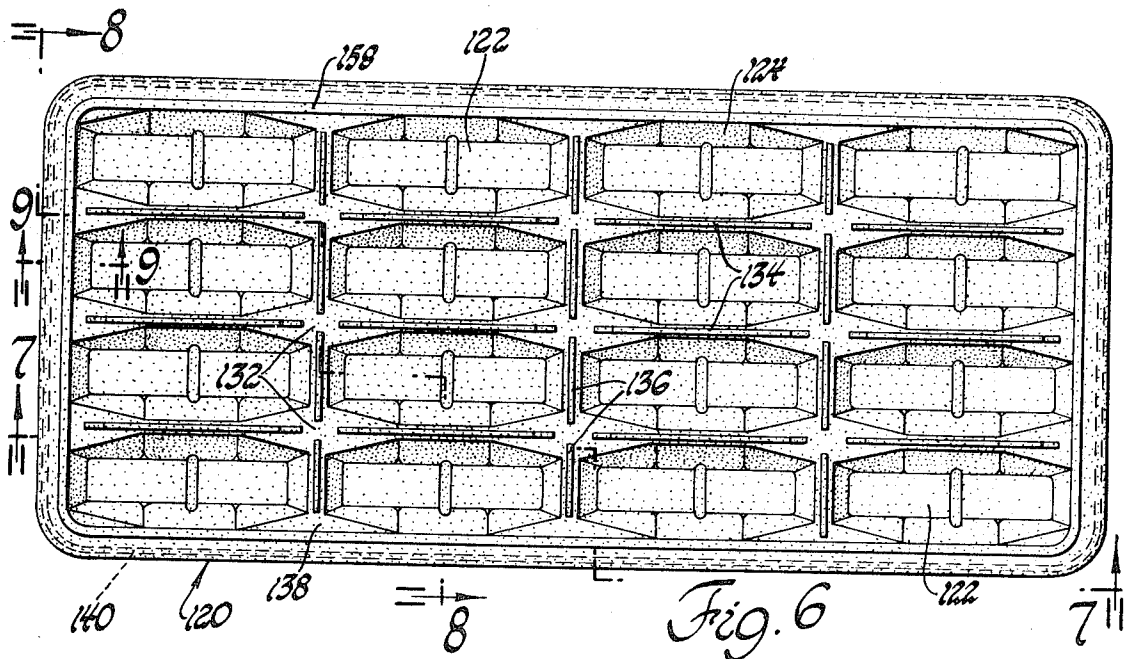
In the preferred form, spilling is diminished in a freezing container by providing sidewalls which are substantially upright at the top and extend downwardly and inwardly therefrom in a circular arc to the bottom wall of the container. The tops of the side and end walls are encircled with a continuous in-turned U-shaped flange containing a large inwardly open groove having a width and height equal to about one-fifth the depth of the container.

3 Claims, 9 Drawing Figures





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FREEZING CONTAINER WITH SPILLGUARD

This invention relates to freezing containers provided with sidewalls contoured to prevent spilling.

One of the most undesirable problems with freezing containers or trays is the difficulty in avoiding spilling some of the contents thereof when carrying them from the faucet where they are filled to the freezing compartment of the refrigerator. U.S. Pat. No. 1,740,919, Dec. 24, 1929; 2,593,106, Apr. 15, 1952; 3,306,567, Feb. 28, 1967 and 3,443,785, May 13, 1969, illustrate attempts to solve this problem. However, all these patents extended the height of the container to an extent greater than can be readily accommodated in the space provided for them in most refrigerators and the first two patents did not provide sufficient ease of removal of the cubes together with sufficient protection against spillage.

It is an object of this invention to provide a freezing container in which spilling is substantially diminished and eliminated and in which ejection of the contents when frozen is not impeded and in which the container is compact and remains substantially within the dimensions of containers previously used and within the dimensions of the space normally provided for such containers in a refrigerator.

It is another object of the invention to provide a freezing container with sides and end walls having contours to minimize spilling of the contents also to provide such walls with a continuous turned flange having an inwardly facing groove of such a size and shape as to provide maximum protection against spillage within a minimum space and with a minimum interference with the normal usage of the freezing container.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein preferred embodiments of the present invention are clearly shown.

IN THE DRAWINGS

FIG. 1 is a vertical longitudinal sectional view of a freezing container and grid embodying one form of our invention taken along the line 1—1 of FIGS. 2 and 3;

FIG. 2 is a top view of the freezing container with the grid omitted;

FIG. 3 is a transverse vertical sectional view taken along the lines 3—3 of FIGS. 1 and 2;

FIG. 4 is a fragmentary enlarged sectional view of the container taken along the lines 4—4 of FIG. 2;

FIG. 5 is a fragmentary enlarged sectional view of the bottom of the container taken along the line 5—5 of FIG. 2;

FIG. 6 is a top view of an all plastic freezing container embodying another form of our invention;

FIG. 7 is a side view partly in section taken along the line 7—7 of the freezing container shown in FIG. 6;

FIG. 8 is a transverse vertical sectional view taken along the line 8—8 of FIG. 6; and

FIG. 9 is an enlarged fragmentary vertical sectional view taken along the line 9—9 of FIG. 6.

Referring now to FIGS. 1 to 5, there is shown a molded plastic rectangular freezing container or tray 20 having sloping end walls 22 extending at an angle of about 25° from the vertical for easy ejection. The bottom wall 24 may be of any desired contour; however, as shown the bottom wall is provided with two longitudinal upwardly extending ribs 26 and four transverse upwardly extending ribs 28 which in conjunction with the twin longitudinal walls 30 and the four transverse walls 32 of the grid 33 divide the interior of the container into fifteen compartments. The portions of the bottom wall between the ribs are arcuate in shape for easy ejection. The longitudinal walls 30 of the grids rest upon the longitudinal ridges 26 and are aligned with them while the transverse walls 32 rest upon the ribs 28 and are aligned with them.

Any form of bottom wall and grid may be used. However, as one specific example, the grid 33 includes lower longitudinal wall members 30 having four widely spaced notches 36 in their lower edges. These lower longitudinal walls 30 extend

through upwardly extending slots in the transverse walls 32 with the bottom of the transverse walls 32 below the slots being received in the notches 36. The top edge of each of the longitudinal walls 30 is provided with a slidable actuating bar 38 provided with four widely spaced notches 40 upon its upper edge for receiving the tops of the transverse walls 32 located above the slots therein. To eject frozen liquid from the compartments of the container there is provided a cam handle 42 pivoted by rivets 44 to the longitudinal walls 30. The handle 42 is provided with a curved surface 46 of increasing radius at the front which acts as a cam against the front transverse wall 32 when the handle is lifted to move the actuating bar 38 and the tops of the transverse walls 32 forwardly relative to the longitudinal wall 30 and the container 20 to eject frozen cubes from the compartments of the grid 33 and the container.

When a freezing container is filled with water or other liquid, it is almost impossible to carry the filled container to the refrigerator and to insert it in the freezing compartment without spilling some of its contents. This is quite objectionable and is particular objectionable when it is spilled inside the refrigerator where it may freeze quickly on the surfaces of the freezing compartment. According to one feature of our invention, to diminish the tendency to spill, the sidewalls 48 are formed upon a curve which is substantially upright at the top and which curves inwardly in an increasing amount as it approaches the bottom 24 of the container. For example, the sidewalls 48 may be formed substantially upon a long radius having a center point just above the top of the wall and a length which is approximately two-thirds the width of the container.

However as a second feature of our invention, the primary means of preventing spills is an turned square U-shaped flange 50 extending continuously along the outer edges of the side and end walls and having an inwardly facing continuous groove and having a flat bottom wall 52, a flat inner top wall 54 and a flat inner sidewall 56. If desired, the top of the flange 50 may be provided with a stiffening bead 58 extending entirely around the inner edge thereof. To stiffen the side and end walls of the container the U-shaped flange 50 may have in alignment with its outer face a continuous downwardly extending rib 62 which may extend downwardly about two-thirds the height of the flange 50 above. The flange 50 is located entirely outside of the side and end walls below so that it does not impede the removal of the frozen cubes from the compartments of the grid and the container. The flange 50 does not extend as high as the top of the grid 33 and its handle 42.

The bottom of the container may be provided with the longitudinal ribs 60 extending beneath the centerline of the two outside rows of compartments upon the bottom of the container providing sled-type runners providing smooth and easy movement onto and off of various supporting surfaces. The ribs 60 also stiffen the container so that no part of the container is overstressed during the ejection of the frozen cubes from the compartments of the container. The ribs 60 also serve to guide the flow of cold air beneath the bottom wall 24. The bottoms of the compartments are substantially frusto-spherical for better airflow and easy release when the handle 42 is operated.

The container should be filled only up to the water line 64 indicated which is slightly below the bottom of the U-shaped flange 50. When so filled the container will contain about 1½ lb. of water. The groove above each sidewall has a capacity of about 0.036 lb. of water or about 2.9 percent of the capacity of the container below the liquid level. As a specific example for a container having a length of about 9 in. and width of about 4.6 in., the distance between the surfaces 52 and 54 should be about one-third of an inch and this groove should be located about 1½ in. above the bottom of the container. The width of the bottom surface 52 should likewise be about one-third of an inch while the width of the upper surface may be slightly less than one-third of an inch.

With a container of such dimensions, the provision of the intumed U-shaped flange increases the amount of side tilt required before spilling from 11° to 19° and increases the permissible amount of endwise tilt from 6° to 10°. That is, the flange 50 provides a 72 percent improvement against spilling in sideways tilting and a 67 percent improvement against spilling in endwise tilting. Furthermore, this flange 50 increases the user's confidence and steadiness and provides a visual indication of undesirable tilting and splashing when liquid flows into its groove before the actual spill point is reached so that the user can correct the movement or the angle before spilling occurs. The freezing container may be molded of a variety of plastics and natural or synthetic rubbers. Specifically, polyethylene or polypropylene and their copolymers are particularly suitable plastics.

The all plastic freezing container 120 shown in FIGS. 6 to 9 is in the form of an elongated rectangular tray which is provided with four longitudinal rows of four longitudinally elongated freezing pockets 122 each having upwardly diverging sidewalls 124 extending substantially from one end of the pocket to the other longitudinally curved bottom walls including symmetrical halves 126 having their longitudinally extending wall surfaces in the form of circular arcs struck from two spaced pivot points 128 located close to the center near the top of the pocket providing an upstanding rounded ridge 130 between the two halves. The halves 120 are substantially straight transversely, but may be curved transversely if desired. This form of pocket is shown in U.S. Pat. No. 3,120,112 issued Feb. 4, 1964. The adjacent walls 124 and 126 of adjacent pockets 122 are separate except at the top to provide improved flexibility. This construction is particularly advantageous since it is suitable for individual removal of individual pieces of ice or frozen liquid from the tray or container and it is also suitable for removal of all the frozen pieces from the container at one time by twisting or other simple forms of flexing. Between the walls of the pockets 122 there are provided substantially flat horizontal walls 132. Extending upwardly from these horizontal walls 132 between the longitudinal rows of pockets 122, there are provided longitudinally extending vertical ribs 134 for restricting the lateral flow of water or liquid out of the pockets when the tray is carried. Also between the transverse rows of pockets there are provided transverse upwardly extending ribs 136 to impede longitudinal flow of water or liquid out of the pockets. These ribs are discontinued at the points at which they would otherwise intersect so as to permit flow over the flat portions 132 from one pocket to another to facilitate the equal filling of all the pockets before freezing.

According to our invention, on the outer side of the pockets 122 there is provided an outwardly extending flange 138 which preferably is at the same level as the connecting portions 132, but if desired may be at a slightly higher level. This horizontal flange 138 at its outer portion is provided with an upwardly extending flange or rib 140 and also a downwardly extending rib or flange 142. The upwardly extending flange 140 preferably extends uniformly completely around the perimeter of the tray or container. The upwardly extending of flange 140 may be indented slightly as compared to the downwardly extending rib of flange 142 as is better shown in FIGS. 7 and 8 and particular in FIG. 9.

The downwardly extending flange 142 may be longer at the ends of the tray where greater stiffness is desired than at the sides of the tray where greater flexing for easier twisting is desired. At the location of the section line 8-8 or at some other suitable point in alignment with the centers of one of the rows of pockets, the downwardly extending flange 142 may be provided with a downwardly extending V-shaped projection 144 which stops short of the bottom of the pockets 122. Between this projection 144 and the adjacent pocket 122 there is provided a stiffening or reinforcing web 146 which is provided with a notch 148 for the purpose of facilitating stacking of the trays one upon another.

In addition, as the principal feature of the invention, the upwardly extending rib or flange 140 is provided with a loop 150 having a cross section generally in the shape of an inverted "L" with one leg 152 fitting directly on the outside of the upstanding rib 140 completely around the tray or container 120 and preferably fastened thereto by an adhesive or any other suitable means such as ultrasonic welding. The other leg 154 of the inverted L-shaped cross section of the loop extends horizontally inwardly substantially to the outer edges of the outermost pockets 122. It is provided with a downwardly extending rib or flange or groove 156 extending tightly against the inner side of the top of the upwardly extending rib 140 as is shown in FIG. 9. This rib 156 prevents the loop 150 from being torn off the top of the container.

As is particularly evident from the cross section shown in FIG. 9, this construction provides an intumed square U-shaped flange 138, 140, 158 of approximately the same dimensions, shape and proportions of the U-shaped flange 50 extending entirely around the container above the level of the freezing pockets 122 which performs the same function of preventing or minimizing spillage as does the form illustrated in FIGS. 1-5. The horizontal portion of this intumed U-shaped construction may be provided with a small bead 158 extending along the top at the inner edge of the leg 154 as shown in FIG. 9. It may be generally similar to the bead 58 shown in FIGS. 2, 3 and 4.

In this form, the the vertical ribs 134 and 136 substantially impede the flow of great volumes of water from one side of the container to the other side or from one end of the container to the other so as to keep the flow within the limits which can be accommodated and completely restrained by the intumed U-shaped construction at the upper edges thereof. These, therefore, serve to perform a flow-restricting function similar to that provided by the upper portions of the longitudinal and transverse members of the grid 30 and 32 of the grid shown in FIGS. 1 and 3. The bottom part of the freezing container may be made of polypropylene or density polyethylene or other suitable plastics. The loop 150 may be made of the same or a different plastic than the bottom part of the container.

While the embodiments of the invention as herein disclosed constitute preferred forms, it is to be understood that other forms might be adopted.

We claim:

1. A rectangular freezing container for use with an ice cube forming grid structure including bottom wall means and side and end wall means wherein the improvement comprises a substantially stiff intumed U-shaped flange adjacent the top of said end and said wall means extending outwardly from said wall means, said U-shaped flange containing a large inwardly open groove formed by substantially horizontal top and bottom wide surfaces and a substantially vertical inwardly facing surface joining said wide top and bottom surfaces, said U-shaped flange extending continuously around the periphery of said container above all of said end and sidewall means, said U-shaped flange having a gap height at its inwardly open end greater than one-fifth the depth of said container and a width measured from said inwardly open end to said inwardly facing surface greater than one-sixth the depth of said container whereby said groove has a defined liquid capacity for receiving liquid from said container when said container is in a tilted condition in any direction with respect to said liquid thereby substantially minimizing the possibility of spillage from said container, said U-shaped flange being located entirely outside the confines of said side and end wall means of the container such that an ice cube formed therein will not be obstructively engaged by said U-shaped flange during the removal of the ice cube from said container.

2. An elongated rectangular freezing container for use with a removable ice cube forming grid structure including bottom wall means and side and end wall means with the sidewall means formed upon a curve which is substantially upright at the top and which curves inwardly in an increasing amount as the sidewall means approaches the bottom wall means

wherein the improvement comprises a substantially stiff int-
turned integral U-shaped flange adjacent the top of said end
and said wall means extending outwardly from said wall
means, said U-shaped flange containing a large inwardly open
groove formed by substantially horizontal top and bottom
wide surfaces and a substantially vertical inwardly facing sur-
face joining said wide top and bottom surfaces, said U-shaped
flange extending continuously around the periphery of said
container above all of said end and sidewall means, said U-
shaped flange having a gap height at its inwardly open end
greater than one-fifth the depth of said container and a width
measured from said inwardly open end to said inwardly facing
surface greater than one-sixth the depth of said container said
groove having a defined liquid capacity of about 3 percent of
the liquid level capacity of said container established slightly
below said wide bottom surface for receiving liquid from said
container when said container is in a tilted condition in any
direction with respect to said liquid thereby substantially
minimizing the possibility of spillage from said container, said
U-shaped flange being located entirely outside the confines
of said side and end walls means of the container such that ice
cubes formed therein will not be obstructingly engaged by said
U-shaped flange during the removal of the ice cubes from said
container.

3. An elongated rectangular freezing container including
bottom wall means and side and end wall means and integral
ice cube separating walls defining longitudinal and transverse
rows of freezing pockets wherein the improvement comprises
a substantially rigid intumed U-shaped flange adjacent the top
of said end and said wall means extending outwardly from said
wall means, said sidewall means being substantially upright
immediately beneath said flange and extending downwardly
and inwardly in an arc to the bottom wall means of said con-

tainer, said U-shaped flange containing a large inwardly open
groove formed by substantially horizontal top and bottom
wide surface and a substantially vertical inwardly facing sur-
face joining said wide top and bottom surfaces, said U-shaped
flange extending continuous around the periphery of said con-
tainer above all of said ends and sidewalls means, said U-
shaped flange having a gap height at its inwardly open end
greater than one-fifth the depth of said container and a width
measured from said inwardly open end to said inwardly facing
surface greater than one-sixth the depth of said container
whereby said groove has a defined liquid capacity for receiv-
ing liquid from said container when said container is in a tilted
condition in any direction with respect to said liquid thereby
substantially minimizing the possibility of spillage from aid
container, said U-shaped flange being located entirely outside
the confines of said side and end wall means of the container
such that the ice cubes formed in said pockets therein will not
obstructingly engage said U-shaped flange during the removal
of the ice cubes from said container, and said integral separat-
ing walls of said pockets having substantially flat horizontal
walls therebetween, said horizontal walls having longitudinally
extending vertical ribs extending upwardly therefrom between
said longitudinal rows of pockets for restricting the lateral
flow of water from said pockets when the tray is carried, said
horizontal walls having transversely extending vertical ribs ex-
tending upwardly therefrom between said transverse rows of
pockets for restricting the longitudinal flow of water from said
pockets, said longitudinal and transverse ribs discontinued at
the points at which they would otherwise intersect so as to per-
mit flow over said horizontal walls from one pocket to another
to facilitate the equal filling of all said pockets prior to freez-
ing.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,638,903 Dated February 1, 1972

Inventor(s) Joe P. Pietrzak, Lewis B. Campbell and Robert M. Strah

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, line 5, "said" (second occurrence) should read -- side --.

Claim 2, line 8, "said" (second occurrence) should read -- side --.

Claim 3, line 6, "said" (second occurrence) should read -- side --.

Signed and sealed this 5th day of November 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents