

FIG. 1

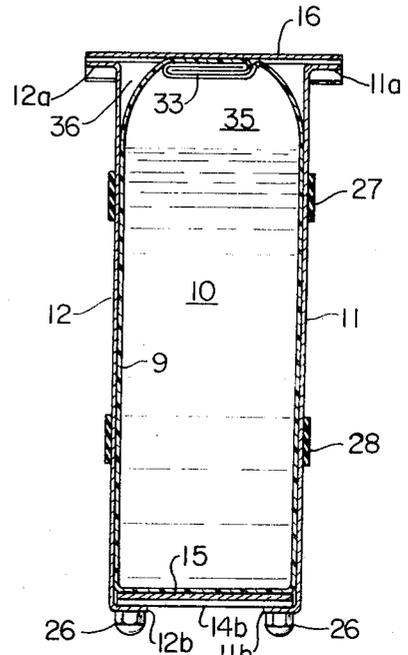


FIG. 3

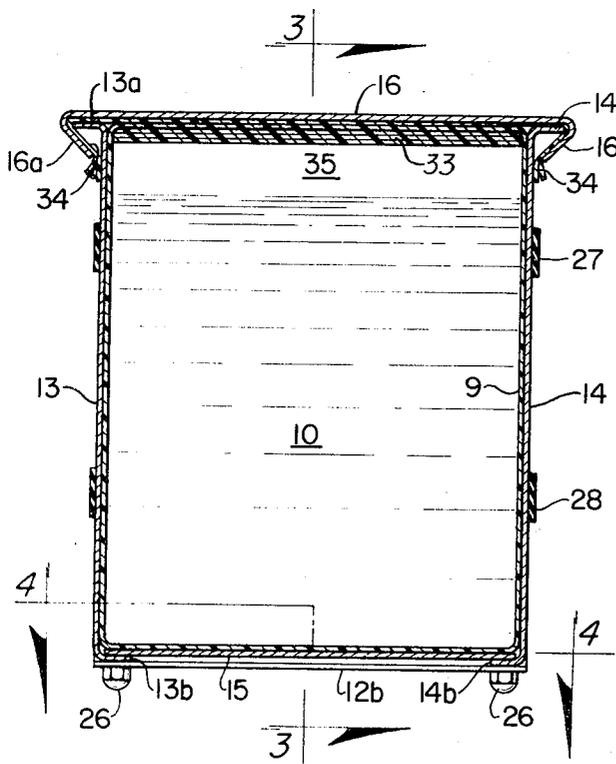


FIG. 2

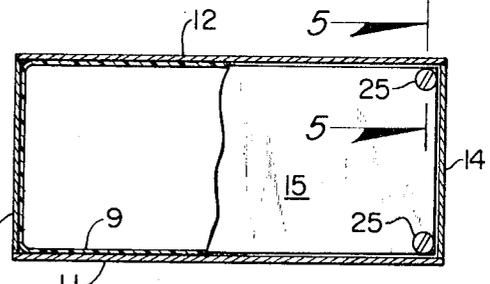


FIG. 4

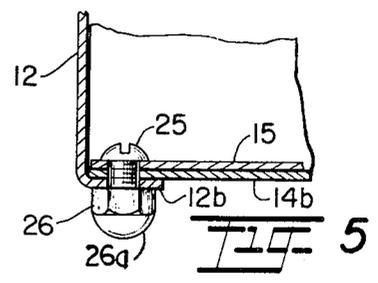


FIG. 5

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EXPANDABLE ICE FORM

This invention relates to forms suitable for use at freezing temperatures and more particularly to a novel and improved expandable ice form which is particularly suitable for use in making a body of ice of a commercially usable size and shape.

Portable ice chests and insulated ice boxes are commonly used items by outdoor campers, tourists and the like to refrigerate foods and beverages. Suppliers of blocks of ice for such portable chests have heretofore been the commercial ice houses and more recently smaller commercial block ice making machines have been available. The novel form of the present invention is particularly suitable for making ice in a block or cubical shape for portable ice chests where a freezing unit is available to provide the necessary cooling, such as in the home freezer, or in relatively small freezers in service stations and the like. The ordinary receptacle is usually unsatisfactory due to its inability to flex outwardly along the side walls to permit the separating of the receptacle from the formed body of ice. Accordingly, it is an object of this invention to provide a novel and improved expandable form for use in making block ice and the like which is reusable many times.

Another object of this invention is to provide a novel and improved form characterized by flexible or expandable side wall sections which will hold a pliable bag or pliable package of water or like freezable material in a desired shape and will flex or expand sufficiently along the sides to facilitate easy removal of the formed ice by pulling it through the top of the form.

Another object of this invention is to provide an expandable form which can be stacked one on another to make efficient use of the available freezing space.

Still a further object of this invention is to provide a block ice form for supporting a pliable bag containing water which can be readily assembled into its usable shape.

In accordance with the present invention in a preferred embodiment, an expandable form has flexibly movable side wall sections attached to a bottom wall section to define a cavity; the side wall sections being resiliently held in place by flexible bands which encompass them to hold the bottoms and sides of a pliable bag containing water in a desired shape during freezing and yet flex or expand away from the formed body of ice to facilitate the pulling of the frozen contents in the bag through the top of the form. The wall sections are made of a relatively stiff, heat-conductive material, preferably flat sheet metal, and the side sections are bent into an essentially Z-shaped cross-section. The top edge of the bag is folded to close it across the top which is held between the top edges of the side wall sections and the lid to form an essentially dead air space in the top of the bag and between the bag and the side wall sections. The form is constructed to be readily assembled and disassembled and may be readily stacked one on another.

Other objects, advantages and capabilities of the present invention will become more apparent as the description proceeds taken in conjunction with the accompanying drawings in which:

FIG. 1 is a perspective view of a block ice form supporting a bag containing water in a suitable position ready for freezing;

FIG. 2 is a vertical cross-sectional view of the assembly shown in FIG. 3;

FIG. 3 is a cross-sectional view taken along lines 3—3 of FIG. 2;

FIG. 4 is a cross-sectional view taken along lines 4—4 of FIG. 2; and

FIG. 5 is a fragmentary sectional view taken along lines 5—5 of FIG. 4.

Referring now to the drawings, the flexible form 8 suitable for forming a block or cube-shaped body of ice is shown with a pliable bag 9 containing a quantity of water 10 held in the proper place in the form to be frozen while being subjected to freezing temperatures. Form 8 has separate front and rear side wall sections or sides 11 and 12 and separate left and right side wall sections or ends 13 and 14 mounted in an upright position on a flat bottom section 15 which together define an open, rectangular shaped freezing cavity. A removable lid or cover 16 closes the top of the form after the bag of water has been inserted.

Each upright wall section is a separate part and made of a flat sheet of material which is shaped into a generally Z-shaped cross-section each having a flat upright intermediate portion and a similar shaped out-turned upper flange identified with a corresponding number and a suffix letter *a* as 11*a*, 12*a*, 13*a* and 14*a* and an inturned lower flange identified with a corresponding number and a suffix letter *b* as 11*b*, 12*b*, 13*b* and 14*b*, the upper flange of each providing a seating surface for the lid 16 and the lower flange of each providing a seating surface for the bottom section 15. The lid 16 is approximately as wide as the extremities of flanges 11*a* and 12*a* and the upper flanges also facilitate lifting of the loaded form. In the assembly two adjacent lower flanges overlap at the corners and the bottom section 15 is seated on top of the lower flanges as best shown in FIG. 5. The lid has downturned and inwardly inclined flanges 16*a* and 16*b* at opposite ends which are spaced apart to permit it to slide over the upper flanges of the left and right side wall sections. The wall sections, bottom section, and lid are made of a relatively stiff, heat conductive material, preferably sheet metal, having sufficient ductility to permit it to be readily stamped or rollformed from smooth, flat, sheet material.

Each side wall section of the receptacle is removably mounted on the bottom section to be flexibly movable or expandable outwardly and to this end each is fastened only along its bottom edge leaving both vertical side edges of each side wall section unattached to one another at the corners. The fasteners for securing the side wall sections to the bottom section are located in each corner and comprise a bolt 25 which extends downwardly through aligned apertures in the overlapping lower flanges adjacent side walls and the bottom section and a nut 26 threads on the bolt below the flanges. The nut is preferably given a rounded end portion 26*a* to also serve as a leg at each corner of the form to dispose the bottom section above the support surface when stacked one on another. A set of upper and lower flexible bands 27 and 28, preferably made of rubber or a rubber-like material, encompass the four side wall sections at pre-selected distances from the top and bottom and provide sufficient inward forces to withstand the loading forces resulting from substantially filling the form with a container of water as described more fully hereinafter.

Bag 9 is provided in the usual shape of a bag with a top opening. Bag 9 is made of a specially treated plastic film material which stays pliable at below freezing temperatures. These bags are usually of a generally tubular shaped stock and heat sealed across one or more of the sides to close same. A bag of this type does not entirely fill or conform to the shape of the corners of the form 8 as best shown in FIG. 4 thus making removal more easily accomplished.

The upper end of the bag is folded in a double fold 33 across the top to form a closed container for the water and the end portions 34 of the double fold are held between the lid 16 and the top flanges of the left and right side walls 13 and 14. The bag is not entirely filled with water to leave an air space 35 in the top of the bag and the bag tapers inwardly above the water level to the top fold so as to provide an air space 36 between the side front and rear wall sections or sides 11 and 12 and the bag in the top of the form. The placement of the end portions of the folded bag between the lid and end flanges normally holds the ends of the bag in close proximity to the inner surfaces of the left and right side wall sections or ends 13 and 14 as best shown in FIG. 2. The air spaces 35 and 36 have been found to provide an insulation effect for the top surface of the water so that the water will freeze initially from the sides and bottom, as opposed to freezing from the top. This will prevent a build-up of pressure in the center of the block which might otherwise result from freezing the water inwardly from the top and bottom and cause a rupture of one of the side walls of the formed walls of the formed block of ice.

In the assembly and usage of the above described apparatus, the bottom section 15 and side wall sections 11-14 of the form are made as separate parts which are advantageously assembled at the time of usage to provide a more compact shipping unit. The form 8 is assembled by overlapping adjacent of the bottom flanges at the corners, placing the flat bottom section 15 in position and then inserting the bolts 25 into the aligned apertures and threading each nut 26 on at the bottom of the associated screw-bolt. The flexible bands 27 and 28 are then placed in position around the side wall sections. The bag is partially filled with water preferably according to a water level marking on the inside wall of the form, not shown. The top edges of the bag are then double-folded and placed over the flat top flanges 18 and the lid 16 is slid over the folded edges so as to clamp the top of the bag into a firmly held position so that it remains closed during the freezing process.

This assembled apparatus is then placed in a suitable freezing unit having a below freezing atmosphere to freeze the water in the bag into a solid block. During the freezing process the side walls are held in position and heat transfer from the water takes place along the bottom and sides of the block through bottom section 15 and the side wall sections 11-14 inclusive. During the freezing the ice expands and is pushed upwardly into a portion of the air space in the top of the bag. After the ice is formed the apparatus is removed from the freezer unit and the lid 16 is slidably removed by the application of a pulling force applied to the top of the bag. This upward pulling force causes a flexing of the side walls which readily releases the bag. While it is appreciated that blocks of a variety of shapes and sizes

may be made in the manner as above described, the approximate dimension of a form suitable for block ice for camping chests is $4\frac{1}{2} \times 9 \times 11$ inches.

Although the present invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and that changes in details of structure may be made without departing from the spirit and scope thereof.

I claim:

1. In block ice form apparatus adapted to be subjected to freezing temperatures, the combination comprising;

a pliable bag for retaining a selected quantity of water, said bag being filled to a preselected level and folded across the top to close the bag and form an enclosed air space in the top of the bag to insulate the top surface of the water and allow an upward expansion of the contained water during the freezing thereof, and

a block-shaped form for holding said bag in the shape of a block during the freezing of the water, said form including a flat-sided bottom wall section and upright flat-sided side wall sections arranged to form a rectangular cavity to receive the bag, said side wall sections being secured to the bottom wall section at their lower ends and unattached to one another along each vertical side at the corners, said bottom and side wall sections being made of imperforate heat-conductive sheet metal to effect freezing via the bottom and sides of the block being formed and having vertically spaced flexible bands encompassing said side wall sections to flexibly hold the side wall sections in place during freezing and allow the side wall sections to expand outwardly to facilitate the removal of the bag and frozen block of ice from said form without disassembly of the frame, and a removable cover made of sheet metal arranged for holding the folded top of the bag closed against the upper edges of the side wall sections during the freezing process.

2. In block ice form apparatus adapted to be subjected to freezing temperatures, the combination comprising:

a pliable bag for retaining a selected quantity of water, said bag being filled to a preselected level and closed at the upper end to form an enclosed air space in the top of the bag to insulate the top surface of the water and allow an upward expansion of the contained water during the freezing thereof, and

a form for holding said bag in the shape of a block during the freezing of the water, said form including a bottom wall section and upright side wall sections arranged to form a block-shaped cavity to receive said bag, said side wall sections being secured to the bottom wall section at their lower ends and movable outwardly relative to one another along each vertical side edge at the corners, said bottom and side wall sections being made of a relatively stiff heat-conductive material with smooth flat inner surfaces to effect freezing via the bottom and sides of the block being formed and having flexible means encompassing said side wall sections to flexibly hold the side wall sections

in place during freezing and allow the side wall sections to expand outwardly to facilitate the removal of the bag and frozen block of ice from said form without disassembly of said form, a removable cover extending across the top of said side wall sections to close said cavity, said removable cover includes inturned flange portions spaced to slide over a pair of spaced outturned flange portions formed at the upper ends of two opposed sides of the side wall sections.

3. In cold form apparatus as set forth in claim 1 wherein said side wall sections and bottom section are made of a flat-surfaced sheet metal.

4. In cold form apparatus as set forth in claim 1 wherein each of said side wall sections are detachably secured to said bottom section.

5. In cold form apparatus as set forth in claim 1 wherein each of said side wall sections include an outturned upper flange portion and an inturned lower

flange portion.

6. In cold form apparatus as set forth in claim 1 including means to support the bottom section in spaced proximity to a support surface for the form.

5 7. In block ice form apparatus as set forth in claim 1 wherein said flexible means includes an upper flexible rubber band disposed a selected distance from the top of and encompassing the side wall sections and a lower flexible rubber band disposed a selected distance from the bottom of and encompassing the side wall sections.

10 8. Apparatus as set forth in claim 1 including an air space between the upper portion of the bag and the cover and adjacent upper side wall sections for providing an insulation effect for the top surface of the water.

15 9. Apparatus as set forth in claim 1 wherein said bag is made of a plastic material which remains pliable at below freezing temperatures.

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