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Rankow et al.

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[45] May 22, 1973

[54] THERMALLY INSULATED PORTABLE CHEST

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[52] **U.S. Cl.** .....**220/21,** 206/4, 220/9 F, 220/94 R

[51] **Int. Cl.** **B65d 1/24**

[58] **Field of Search** .....220/102, 9 F, 16, 220/38.5, 94 R, 103, 21; 206/46 FC, 4; 217/25.5; 62/457

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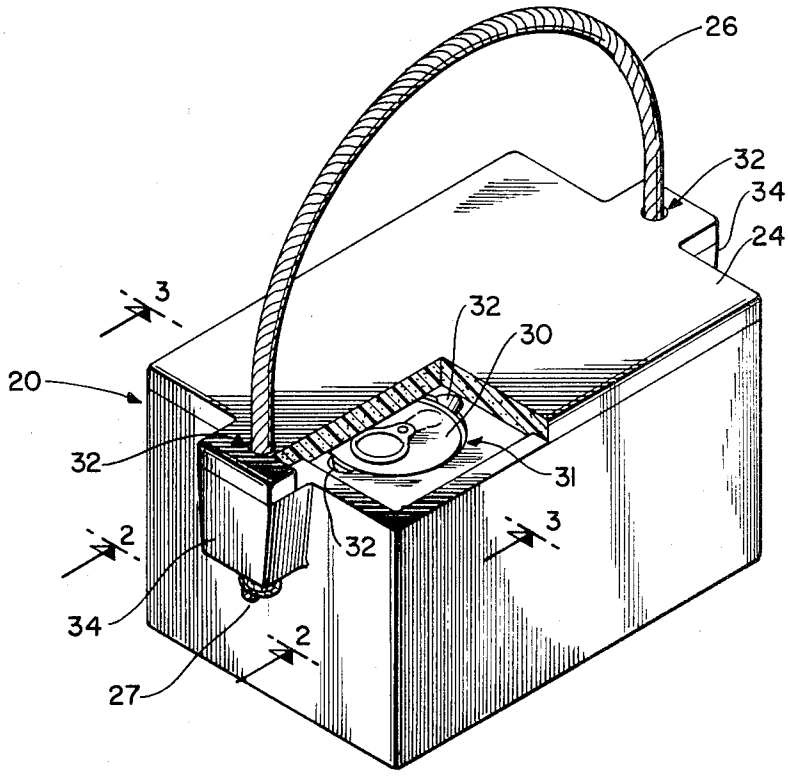
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[57] **ABSTRACT**

A thermally insulated portable chest made from a rigid plastic foam and designed to hold a plurality of containers in the thermally insulated environment. The chest has a base member provided with a plurality of cavities defining compartments for snugly accommodating the several containers. A removable cover is adapted to fit over the compartments and containers therein to thus provide a thermally insulating seal. A handle member passing through the cover, is attached to the base member and is used as a carrying support for the portable chest.

6 Claims, 11 Drawing Figures



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2 Sheets-Sheet 1

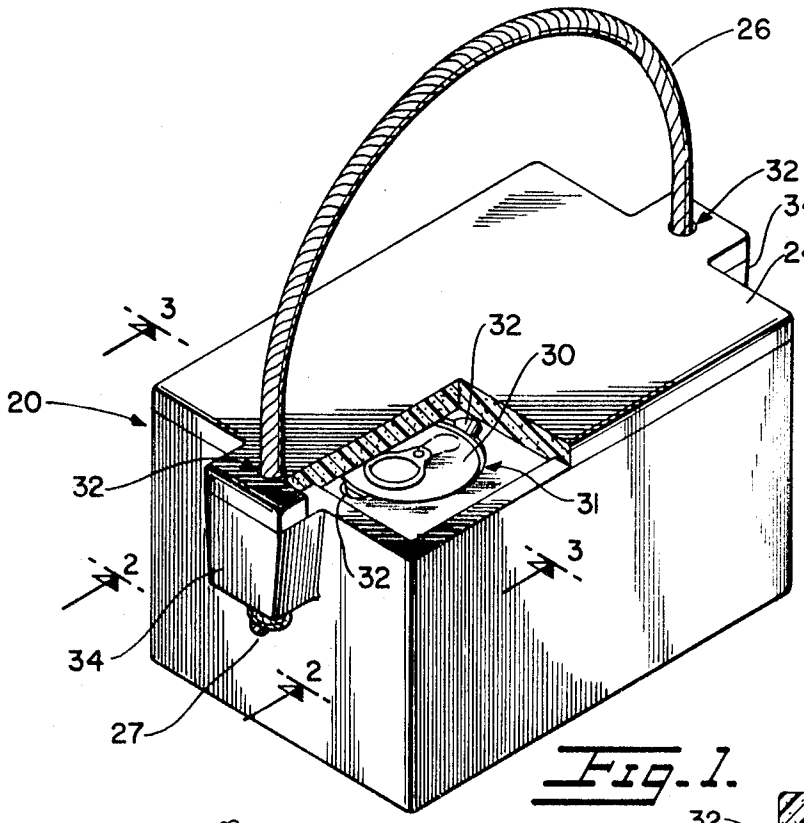


Fig. 1.

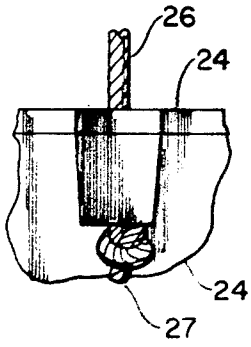


Fig. 2.

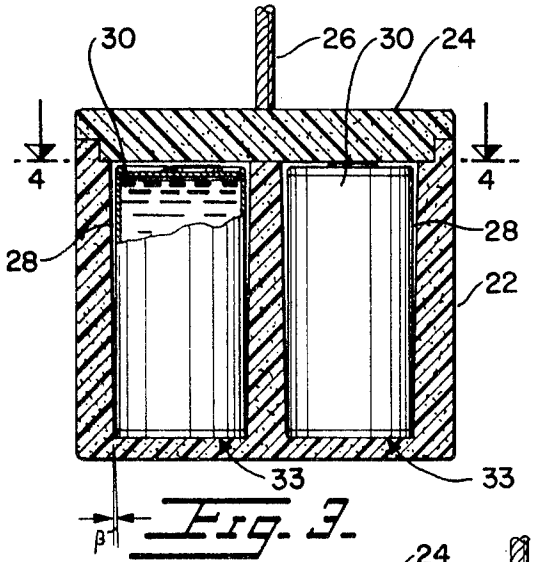


Fig. 3.

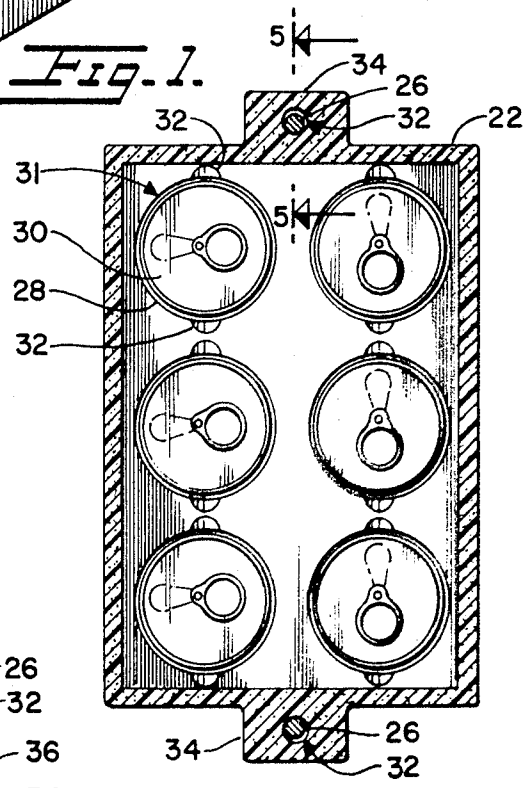


Fig. 4.

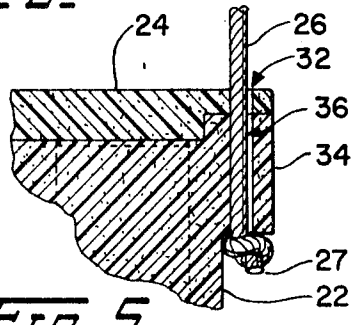


Fig. 5.

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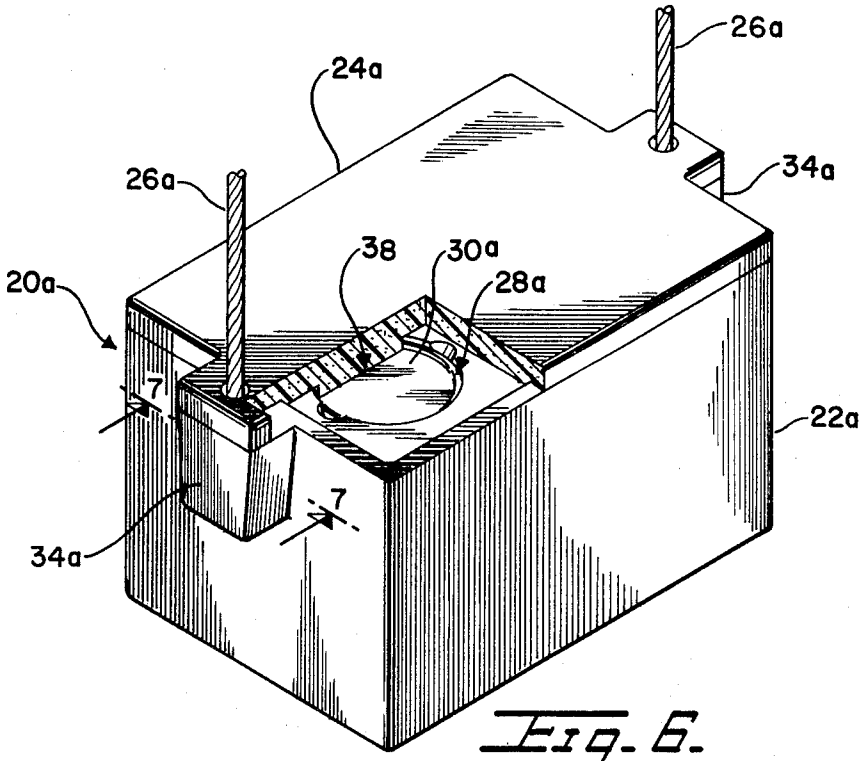


Fig. 6.

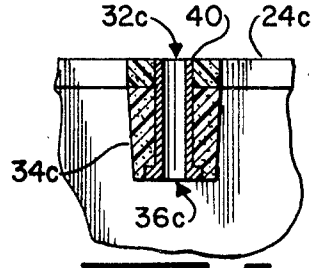


Fig. 8.

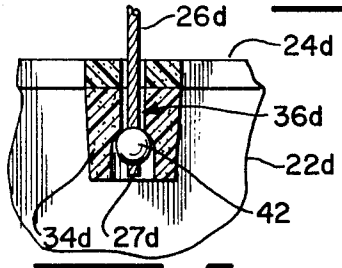


Fig. 9.

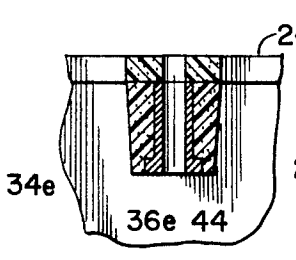


Fig. 10.

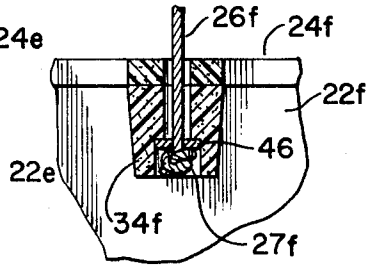


Fig. 11.

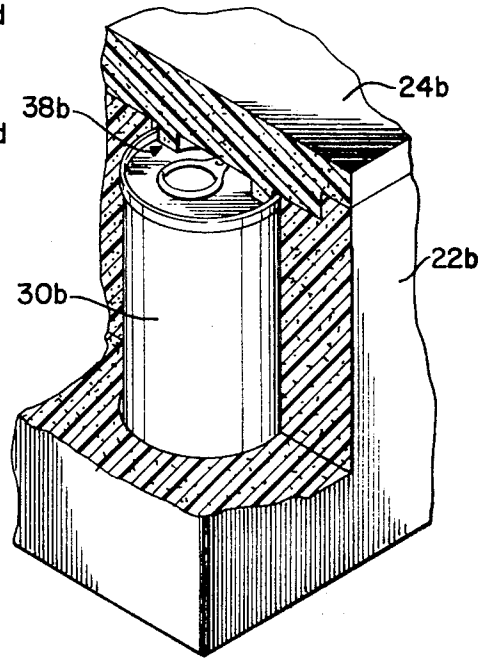


Fig. 7.

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THERMALLY INSULATED PORTABLE CHEST

This invention relates to thermally insulated portable chests, and in particular to a chest adapted for the carrying or storage of containers containing cold or hot liquids. The chest of this invention comprises substantially a block of rigid plastic foam, which has been molded so as to define a plurality of cavities defining compartments for snugly accommodating containers or cans of cold soft drinks, beer, etc.

The present invention was developed to satisfy the need for an economical, light weight, compact, and portable chest which will supply a thermally insulated environment, and maintain the temperature of the fluid within the containers without the need for temperature modifying means such as ice, dry ice, or heating elements. Specifically, this chest provides a simple yet effective means for transporting and storing a plurality of containers such as soft drink cans, beer cans or other containers of liquid refreshment including those containers holding hot beverages such as coffee or tea.

The need often arises when one wishes to bring containerized liquid refreshments to a picnic, beach, or for general traveling purposes, for a light weight compact carrying chest which will provide a thermally insulated environment. The conventional carrying case or chest provides an enclosed chamber or area into which the particular containers may be placed along with an appropriate temperature modifying means. However, the air space present within the chest serves as a medium for thermal transfer which will when the cover member is opened, tend to equalize the temperature within the chest to that of the surrounding outside environment. In order to prevent this thermal loss, especially when it is desired to maintain the containers at a reduced temperature, dry ice or ice cubes are placed in the chest and around the containers. However, this dry ice will eventually evaporate or the ice cubes eventually will melt with a resultant pool of water being formed at the bottom of the chest; this has therefore proven not to be a most efficacious method of thermally insulating a chest.

The chest of this invention endeavors to improve upon the disadvantages of the prior art devices and in particular reduces the amount of air space present within the chest with the resultant effect of reducing the medium for thermal transfer from the containers stored within the chest. The reduction of air space within the containers is accomplished by molding the chest substantially in a block of rigid plastic foam material and providing therein compartments conforming to the general shape and size of the individual containers to be stored therein. A close fitting cover frictionally engages chest and overlies these compartments to provide a thermal seal. A handle member is provided for facilitating the carrying of the portable chest.

It is, therefore, an object of the present invention to provide a thermally insulated portable chest of the general character described herein which is not subject to the aforementioned disadvantages.

Specifically, it is an object of the instant invention to provide a thermally insulated portable chest which is light in weight and molded from a rigid plastic foam.

It is a further object of the present invention to provide a thermally insulated portable chest having a plurality of compartments generally conforming to the size

and shape of and adapted to snugly accommodate containers holding a liquid.

Another object of this invention is to provide a thermally insulated portable chest which will retain the containers therein within a prescribed temperature range without the use of a temperature modifying means.

The above and other objects, features and advantages of the present invention will be apparent in the following description of the preferred embodiments considered in connection with the accompanying drawings.

In the accompanying drawings in which are shown some of the various possible embodiments of the invention:

FIG. **1** is a perspective view of the thermally insulated portable chest of this invention having a portion of the cover member cut away to expose the cavity forming a compartment and showing a container within the compartment.

FIG. **2** is an auxiliary view taken along line **2—2** of FIG. **1** and shows a flange portion extending from the base member and the handle anchored thereto.

FIG. **3** is a cross-sectional view taken along line **3—3** of FIG. **1** showing two typical compartments containing cans of liquid therein.

FIG. **4** is a sectional view taken along line **4—4** of FIG. **3** showing six cans, in this illustrative embodiment, placed within corresponding compartments, each compartment having finger holes on opposed sides thereof to facilitate removal of the cans.

FIG. **5** is a partial auxiliary sectional view taken along line **5—5** of FIG. **4** showing the anchoring of the handle member.

FIG. **6** is a perspective view of a modified embodiment of the thermally insulated portable chest, cover portion being cut away to expose the depending circular portion of the cover member which overlies the compartment opening.

FIG. **7** is a partial perspective view having a portion of the base member and cover removed, for illustrating the depending circular shaped ring portion of the cover member which overlies the compartment opening and is adapted to fit around a self-opening tab in the top of the can.

FIG. **8** shows the flange portion of the base member wherein a bushing sleeve insert is placed within the flange portion and extends upwardly through the cover member, said sleeve insert serving to align the cover member with the flange portion.

FIG. **9** illustrates a means for anchoring the handle member wherein a ball is crimped around the end of the handle member to securely position same within the flange portion of the base member.

FIG. **10** shows an alternate arrangement wherein a bushing sleeve insert extends through the flange portion of the base member but does not extend into the cover member.

FIG. **11** is a further embodiment of the anchoring means for the handle member wherein a circular washer is placed above the knotted end of the handle member to prevent same from being pulled out of the flange portion of the base member.

Referring now in detail to the drawings, the reference numeral **20** denotes generally the thermally insulated portable chest of this invention. The chest **20** is formed basically from a molded rigid plastic foam material and

is comprised of a base member 22, a cover member 24, and a handle member 26. The handle member 26 is preferably made from a smooth fiberous rope, strap, braided strands of synthetic fibers, or similar material which will provide flexibility and strength yet will be comfortable to hold in one's hand. The base member 22 and cover member 24 are preferably molded from a rigid plastic foam having a base of polystyrene and preferably molded from polystyrene foam beads formed into a myriad of noninterconnected cells. The polystyrene foam cellular structure advantageously has very low thermal conductivity, good resistance to water vapor transmission and a high resistance to static forces without considerable deformation. This cellular material is also light in weight and provides ideal packaging for the containers because of its cushioning or energy absorbing property and is therefore particularly suitable for the portable chest.

A plurality of cavities defining compartments 28 are formed within the base member 22. These compartments 28 preferably conform generally in size and shape to the dimensions of an article such as can or container 30 to be stored within the chest. In this particular embodiment six of said compartments 28 have been provided for accommodating a like number of cans 30 conventionally used for soft drinks or beer. The cans 30, are typically approximately 2 ⅝ inches in diameter and approximately 4 ¾ inches in length and accordingly the compartments 28 are designed to snugly accommodate said cans 30 with a small clearance space surrounding said cans 30. This snug packaging will prevent thermal losses conducted through the air medium; and since the thermal conductivity through the polystyrene foam will be very low, it is, therefore, advantageous to have the foam in close contact with the surface of the cans 30. However, in order to facilitate the entry and removal of the cans 30 into and out of compartments 28 and the diameter of an open end 31 of the compartment 28 has been intentionally made slightly larger than the diameter at the closed end 33 of the compartment 28 with the resultant effect that an annular air space will separate the cans 30 from the compartment 28. This annular space being defined by the angle B as shown in FIG. 3.

Additionally, two depressions 32 have been placed on diametrically opposed sides of the compartment opening 31 and serve as "finger holes" by which the top edge of the cans 30 may be gripped and pulled out of the compartment 28. The cover member 24 is adapted to be placed over the openings 31 of the compartments 28 and will interlockingly and frictionally engage the base member 22 thereby providing a thermal seal (see FIG. 3). The handle member 26 preferably made from a flexible and smooth cord, has two ends 27 which pass through apertures 32 on opposed ends of the cover member 24. The aperture 32 and cover member 24 are designed to overlie a flange portion 34 of the base member 24, said flange portion 34 further defines a hold 36 aligned with aperture 32. The ends 27 of the handle member 26 are passed through aperture 32 and hole 36 and anchored to the flange portion 34 by being knotted or otherwise affixed thereto.

It should be evident that handle member 26 will permit removal of the cover member 24 and allow one or several of the cans 30 to be withdrawn from compartments 28. The cover member 24 cannot be permanently separated from the base member 22 rather only displaced a sufficient distance away from the base member 22 to permit removal of the cans 30. Thus the cover member 24 can be quickly and easily replaced without much intervening thermal loss. Furthermore, the handle member 26 the ends 27 anchored to the flange portion 34 of the base member 22 and this will provide sufficient support for carrying and complete portability to the chest 20.

The FIG. 6 illustrates a modified embodiment wherein like numerals have been used to represent like parts and the suffix letter *a* is used to designate like parts in this particular embodiment. The thermally insulated portable chest 20*a* as shown herein is comprised of a base member 22*a*, a cover member 24*a* and is supported by a handle member 26*a*. The chest 20*a* has compartments 28*a* for the storage of cans 30*a* similar to the chest 20 described with reference to FIGS. 1–5. The embodiment in FIG. 6 is especially adapted for use with cans 30*a* having a flush upper surface, i.e. those cans adapted to be opened with the use of a conventional can opener rather than those cans incorporating self opening means. Consequently, the cover member 24*a* has been modified so that a depending circular portion 38, conforming in size to the diameter of the can 30*a*, has been molded to the cover member 24*a*. The depending portion 38 will reduce the amount of air space within the chest 20*a* and thereby diminish the amount of thermal losses.

The FIG. 7 shows an alternate embodiment wherein like numerals have been used to represent like parts and the suffix letter *b* is used to designate like parts in this particular embodiment. This embodiment shows a modification to the cover member 24*b* wherein a depending circular shaped ring portion 36*b* has been employed for use with cans 30*b* having self-opening means, such as a snap-off tab. The use of the ring 36*b* is necessary in order to accommodate cans 30*b* having the self-opening mechanism and hence not having a flush top and will similarly reduce the amount of air space available and the resultant thermal conductivity.

The FIGS. 8, 9, 10 and 11 are directed to alternate means for anchoring the ends 27 handle member 26. Similar numerals will be used to represent like parts in these embodiments and the suffix letters *c*, *d*, *e* and *f* will be used respectively when referring to FIGS. 8, 9, 10 and 11. The flange portion 34*c* in FIG. 8 has been provided with a bushing sleeve insert 40 extending through the hole 36*c* in the flange member 34*c* and aperture 32*c* of cover member 24*c*. When the cover member 24*c* has been removed from the base 22*c*, the sleeve insert 40 will extend above the base member 22*c* and will provide a means for realigning the cover member 24*c*.

FIG. 9 shows a means for anchoring the end 27*d* of the handle member 26*d* wherein a soft metallic ball 42 is crimped around the end 27*d* of the handle member 26*d* and is of sufficient size to prevent its passage through the hole 36*d*. The two ends 27*d* of the handle 26*d* will thus be securely anchored within the flange portion 34*d* of the base member 22*d*.

FIG. 10 shows a further modification wherein a bushing sleeve insert 44 is placed within the hole 36*e* of the flange portion 34*e*, however, the sleeve insert 44 in this version does not extend into the cover member 24*e*. The sleeve insert may preferably be made of a metallic or synthetic plastic material and will provide protection around the hole 36*e*.

FIG. 11 shows a further means for anchoring the end of the handle 26*f* and comprises the use of an annular ring member or washer 46, preferably made of metal or plastic material. The annular member 46 has an opening of sufficient size to permit passage of the handle member 26*f* but will not permit passage of the knotted end 27*f* thereof, thus anchoring the ends 27*f* of the handle 26*f*.

The thermally insulated portable chest as illustrated herein and described above may obviously be adapted to contain any number of cans or other types of containers. In the embodiment illustrated the chest carries six such cans and the outside dimensions of the container are approximately 10 inches in length, 6 inches in height, and 7 inches in width and has a minimum wall thickness of approximately one-half inch. It has been found that when the cans of a liquid refreshment are thoroughly chilled and placed within the chest, that they will retain their coldness for several hours.

The above cited embodiments are intended as exemplary and while they have described the invention with specific implementations thereof, other modifications and various changes might be made to the embodiments as so set forth and will be apparent to those skilled in the art.

It should, therefore, be understood that all material herein described or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. An article of manufacture for holding a plurality of containers in a thermally insulated environment comprising a one piece thermally insulated rigid plastic foam portable rectangular parallelepipedic shaped chest, said chest including a base member having a rectangular bottom with walls extending upwardly from the edges of said bottom, the upper edges of said walls being in a common plane, material integral with said bottom and extending between at least two of said walls and defining at least two compartments, each of said compartments conforming in general size and shape to the containers so as to snugly accommodate a container, substantially all of the uppermost surface of the material forming each of said compartments being in a common plane which is below and parallel to the plane defined by the upper edges of said walls, the bottom of each of said compartments having a smaller cross sectional area than the upper portion thereof, first and second ears extending outwardly from the upper portions of opposed walls, said chest further including a one piece rigid plastic foam cover member having a depending portion for snugly fitting within the inside surfaces of the upper most portions of said walls and abutting the uppermost portions of containers placed in said compartment so that the containers are snugly held and prevented from freely moving, said cover further including first and second opposed tabs, said first tab in registry with and overlaying said first ear and said second tab in registry with and overlying said second ear, said chest additionally including a handle means extending through said first ear, said first tab, said second tab and said second ear for preventing said cover member from being moved more than a predetermined distance from said chest and means captively attaching said handle means to said first and second ears.

2. A thermally insulated portable chest comprising substantially rigid plastic foam material defining a thermally insulated environment and defining a predetermined shape and size designed to hold a plurality of containers in said environment, a base member molded from plastic foam, the base member having cavity means therein defining a plurality of compartments of substantially cylindrical cavities, each of said compartments being open at one end and closed at an opposite end, each of said cavities conforming in general size and shape to dimensions of a predetermined container such that said container is snugly accommodatable by said cavities of respective each of said compartments, a cover member molded from plastic foam and adapted to interlockingly engage the base member and overlie the open end of the compartment to effectuate a thermal seal, handle means secured to the base member for providing a carrying support, said handle means including an elongated member having two ends, the base member further including a flange portion on opposed sides thereof, and said flange portion having means associated therewith for anchoring each of the ends of the elongated member in each of the respective flange portions, wherein the diameter of the open end of the compartment is larger than the diameter at the closed end of the compartment to facilitate the entry and removal of a container, wherein the open end of each compartment contains at least one depression around the periphery of the opening, said depression extending the opening an amount sufficient to permit access to a container within the compartment for removing the same, and wherein the cover member has a depending circular shaped ring portion overlying the open end of the compartment and is adapted for abutting contact with a container placed therein having a self-opening tab in the top surface.

3. A thermally insulated portable chest comprising substantially rigid plastic foam material defining a thermally insulated environment and defining a predetermined shape and size designed to hold a plurality of containers in said environment, a base member molded from plastic foam, the base member having cavity means therein defining a plurality of compartments of substantially cylindrical cavities, each of said compartments being open at one end and closed at an opposite end, each of said cavities conforming in general size and shape to dimensions of a predetermined container such that said container is snugly accommodatable by said cavities of respective each of said compartments, a cover member molded from plastic foam and adapted to interlockingly engage the base member and overlie the open end of the compartment to effectuate a thermal seal, handle means secured to the base member for providing a carrying support, said handle means including an elongated member having two ends, the base member further including a flange portion on opposed sides thereof, and said flange portion having means associated therewith for anchoring each of the ends of the elongated member in each of the respective flange portion, wherein the diameter of the open end of the compartment is larger than the diameter at the closed end of the compartment to facilitate the entry and removal of a container, wherein the open end of each compartment contains at least one depression around the periphery of the opening for providing access means to a container within the compartment for removing same, said depression extending the opening an amount sufficient to permit access to a container within the compartment for removing same, and wherein the

cover member has a depending circular portion overlying the open end of the compartment and is adapted for abutting contact with a container placed therein and having a flush top surface.

4. A thermally insulated portable chest as claimed in claim 3 wherein the bushing sleeve further projects through the cover member and thereby serves to align the cover during placement over the base member.

5. A thermally insulated portable chest as claimed in claim 3 wherein the flange portion defines a hole therethrough for accommodating the handle means, and further includes a bushing sleeve extending through the said hole.

6. A thermally insulated portable chest as claimed in claim 5 wherein the plastic foam material is manufactured from a base of polystyrene having a non-interconnected cellular structure.

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