



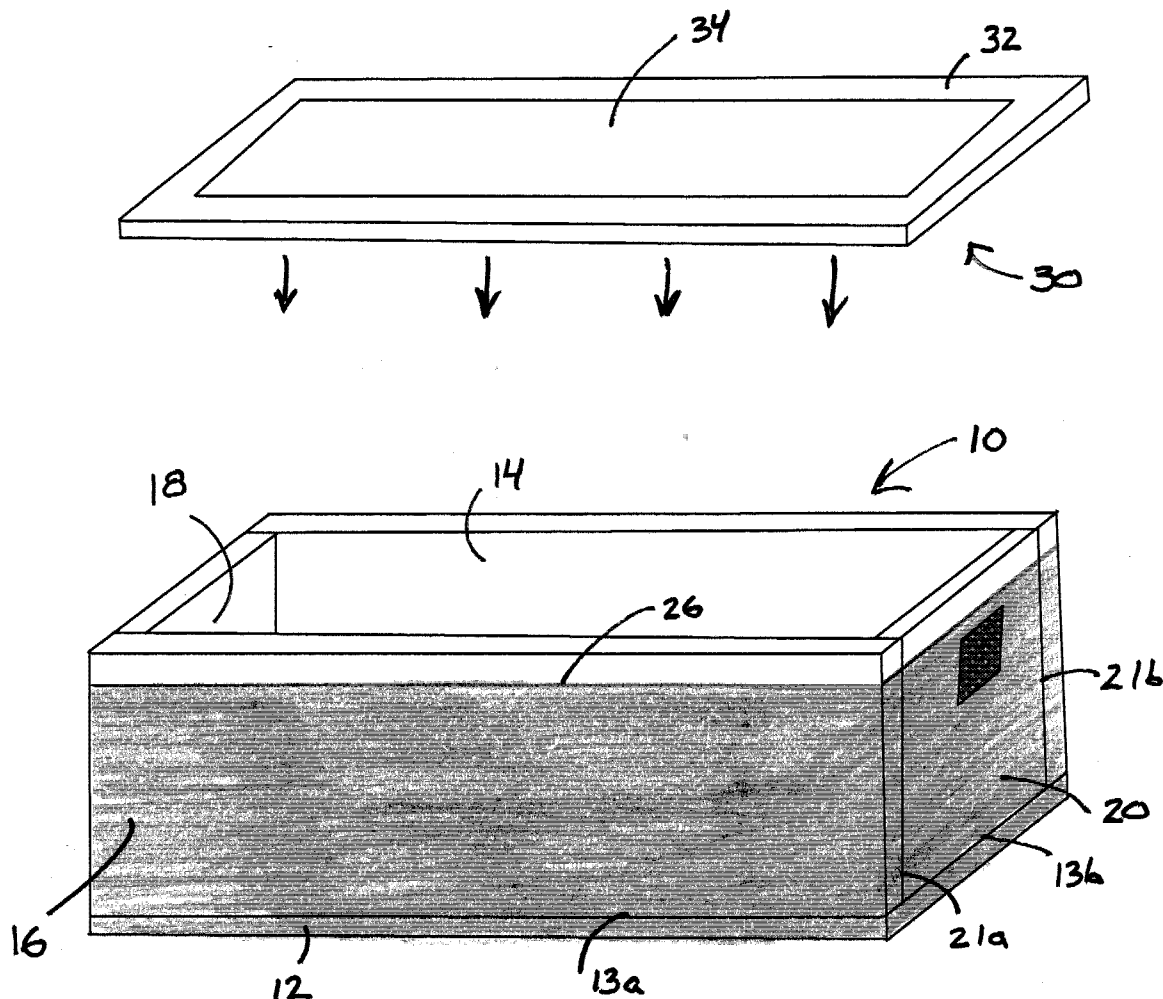
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(19) **United States**(12) **Patent Application Publication**  
**Roderick et al.**(10) **Pub. No.: US 2009/0001086 A1**(43) **Pub. Date: Jan. 1, 2009**(54) **CONTAINER INSERT INCORPORATING  
THERMALLY INSULATIVE PANELS**(75) Inventors: **Kevin H. Roderick**, Albuquerque,  
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(US)(21) Appl. No.: **12/102,703**(22) Filed: **Apr. 14, 2008****Related U.S. Application Data**(60) Provisional application No. 60/911,386, filed on Apr.  
12, 2007.**Publication Classification**(51) **Int. Cl.**  
**B65D 83/72** (2006.01)(52) **U.S. Cl.** ..... **220/592.2; 206/527**(57) **ABSTRACT**

A container insert for providing a thermally insulated enclosure. The container insert includes a bottom panel, side panels and end panels that are interconnected by a plastic backing sheet. The side panels and end panels can be pivoted upwardly to form side walls and end walls. The plastic backing sheet covers the seams between adjacent insulation panels to provide a moisture barrier. The plastic backing sheet can also urge adjacent panels together to reduce the gap between adjacent panels and improve thermal performance.



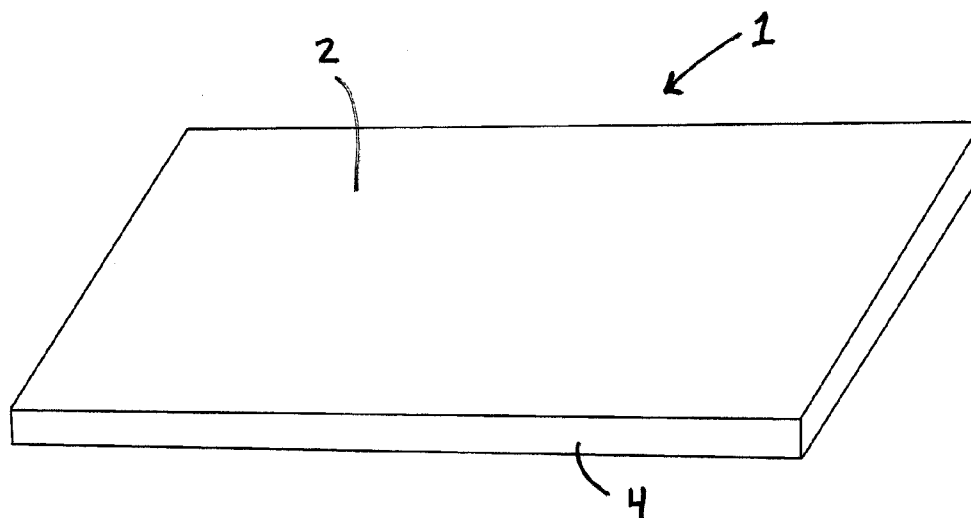


Fig. 1(a)

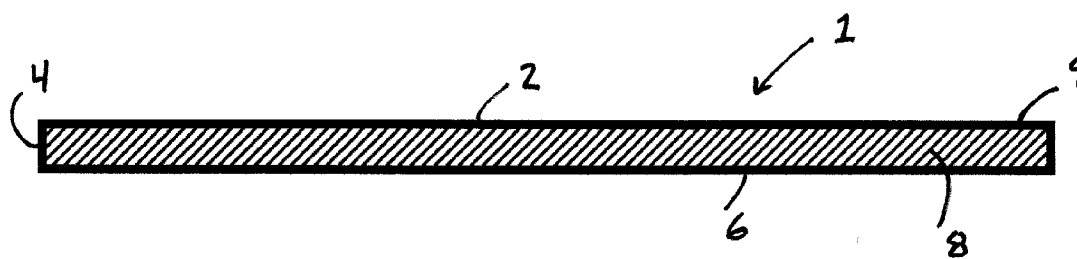


Fig. 1(b)

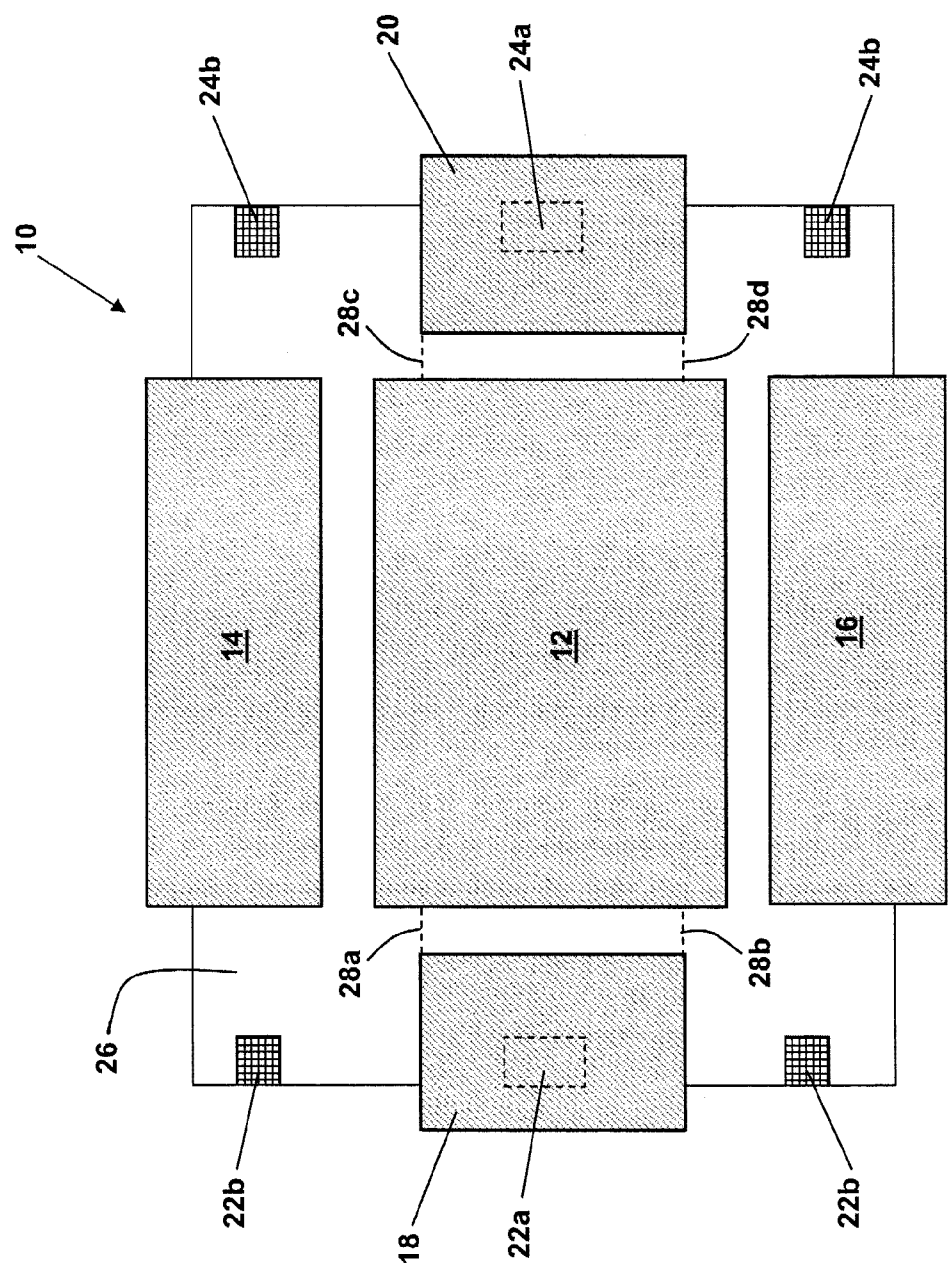


Fig. 2

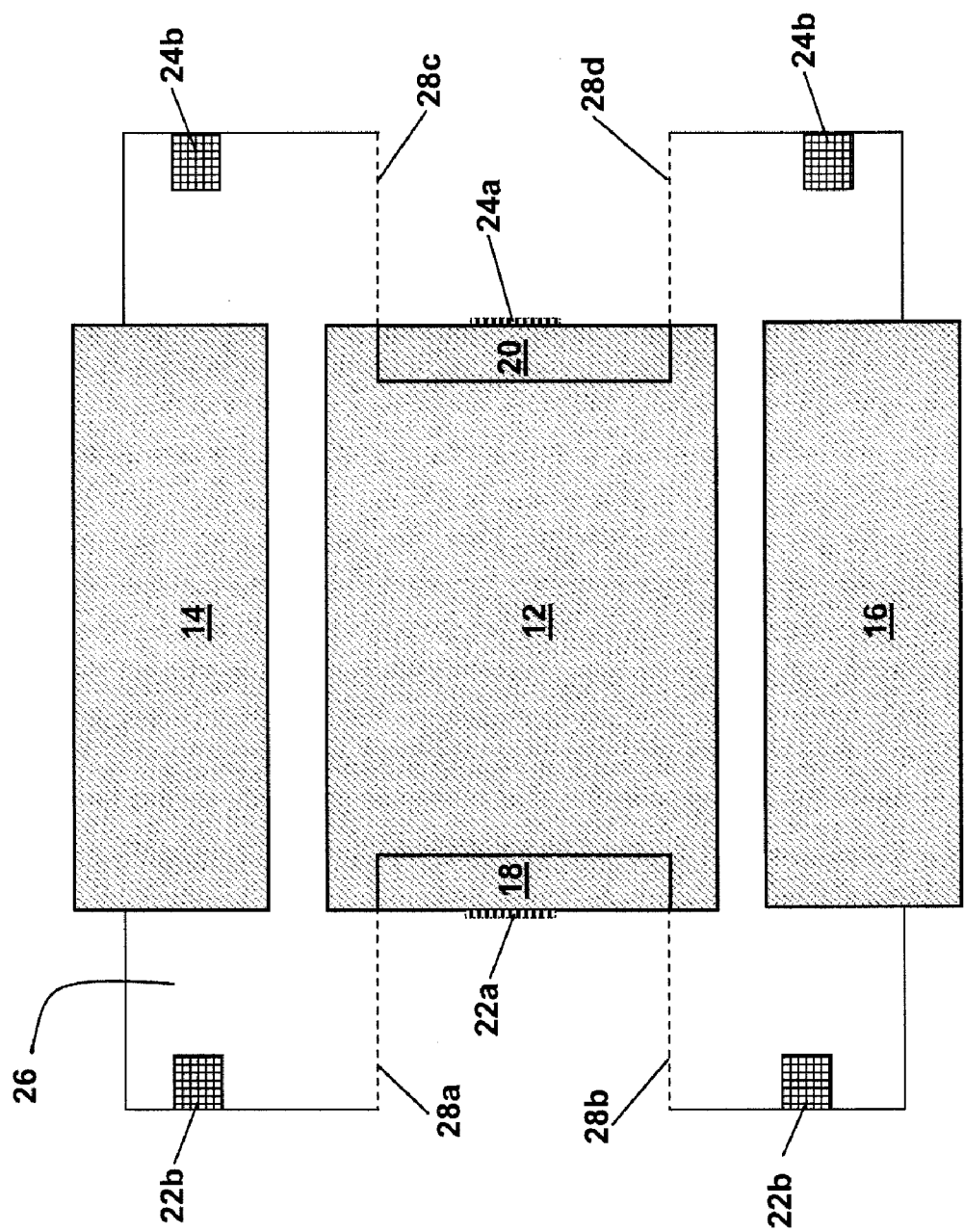


Fig. 3

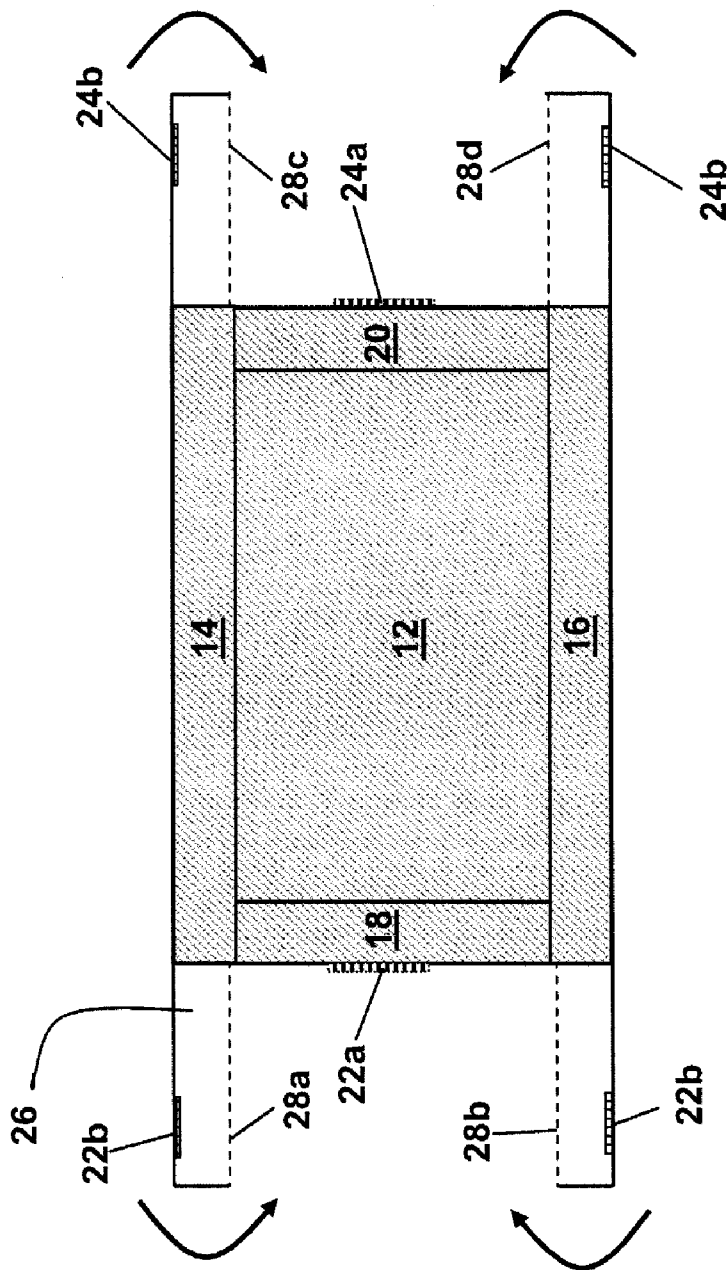


Fig. 4

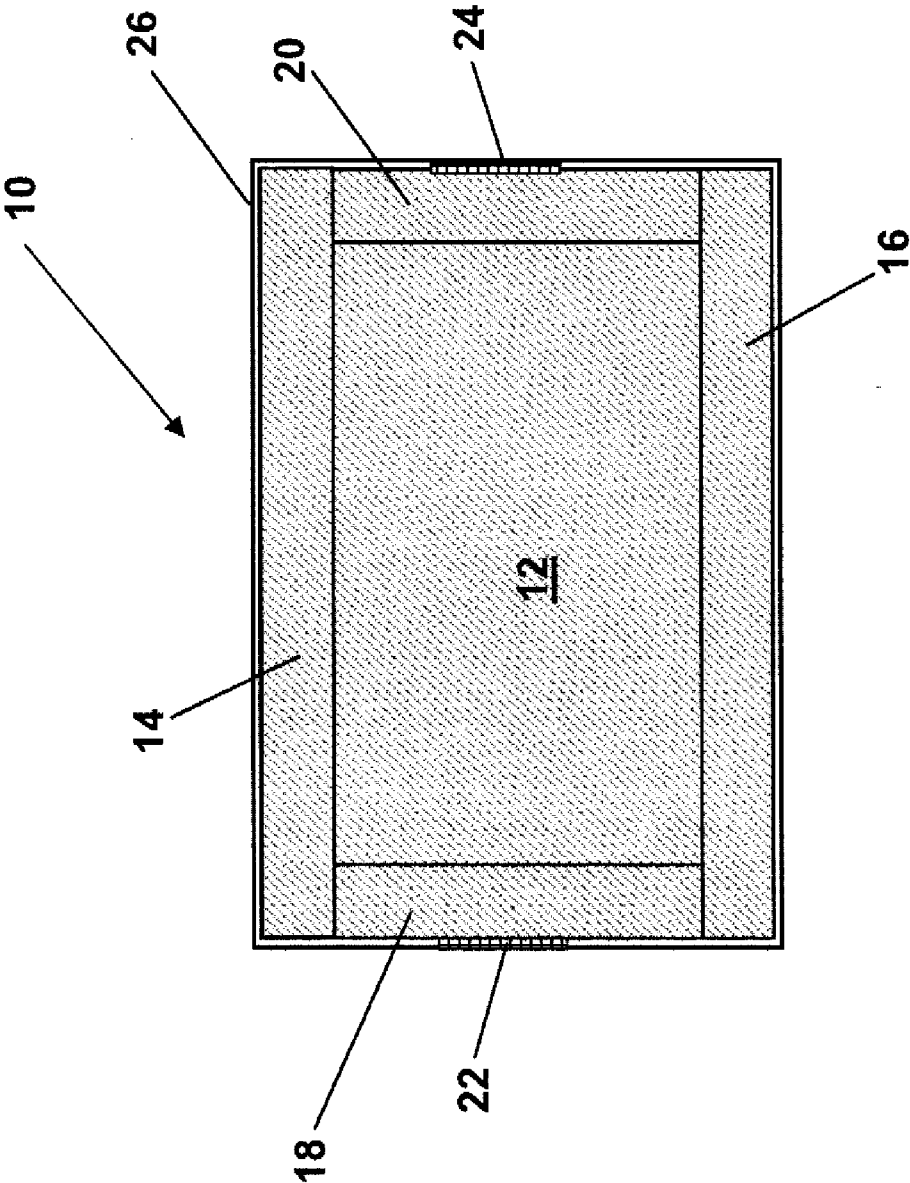


Fig. 5

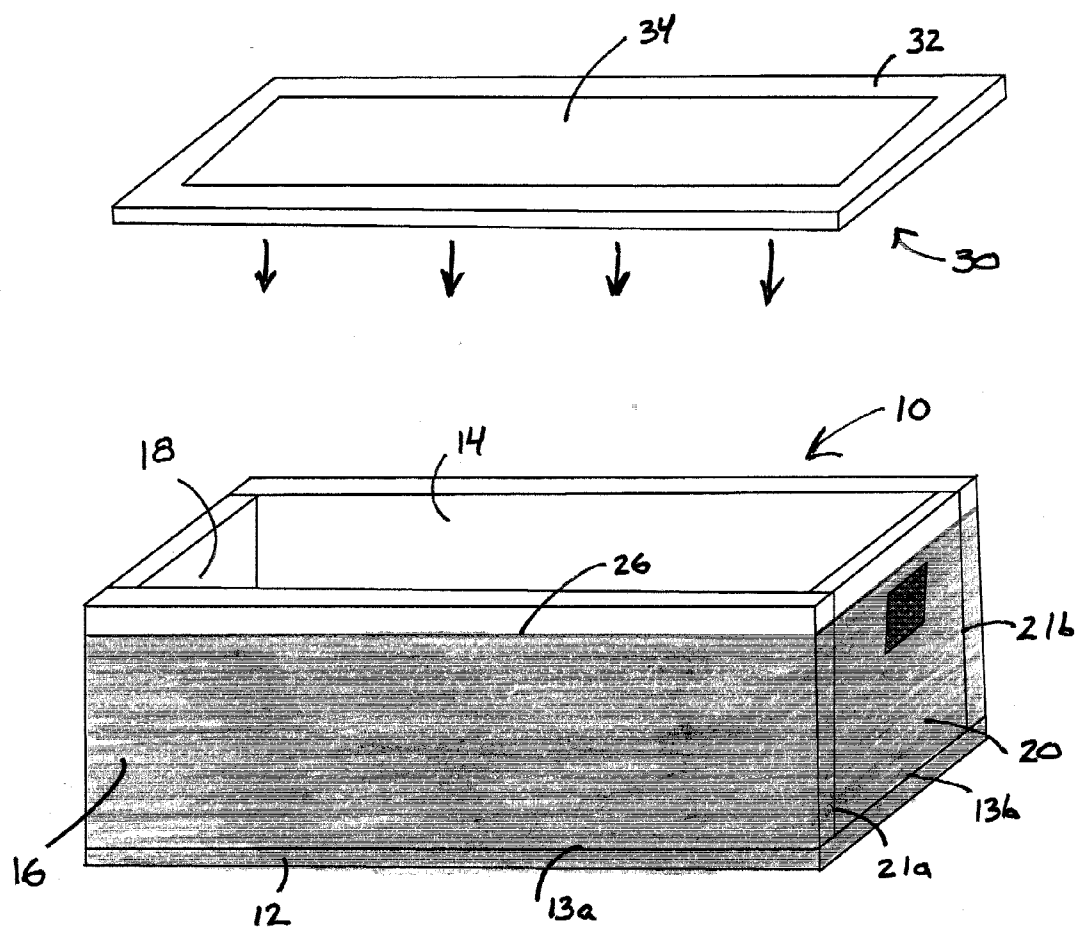


Fig. 6

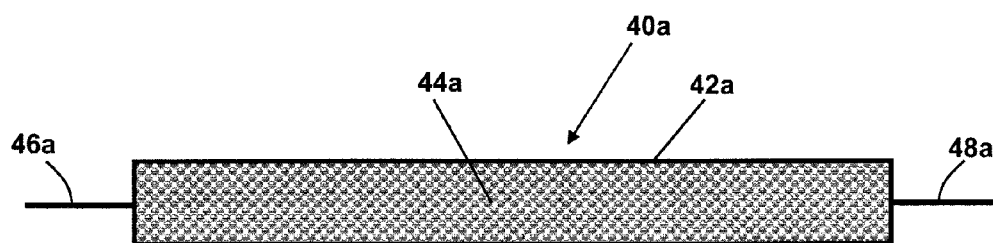


Fig. 7(a)

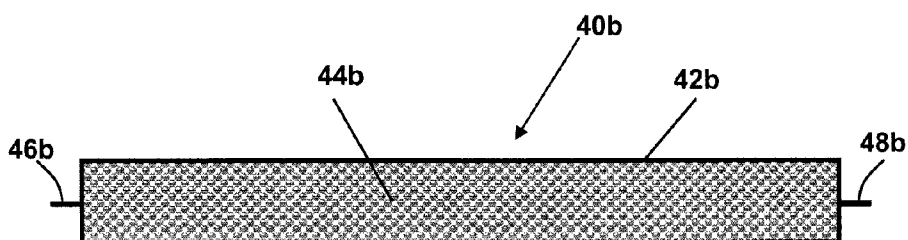
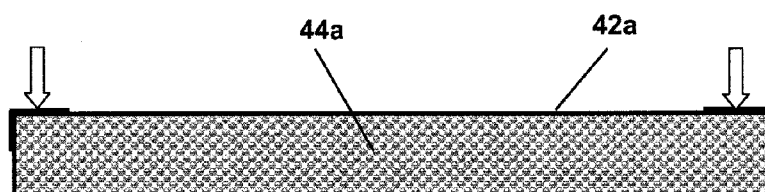
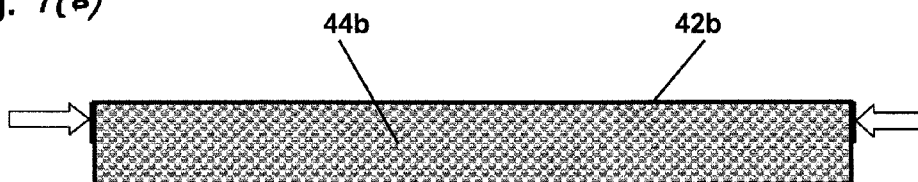


Fig. 7(b)



## CONTAINER INSERT INCORPORATING THERMALLY INSULATIVE PANELS

### CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to U.S. Provisional Patent Application Ser. No. 60/911,386 entitled "CONTAINER INSERT INCORPORATING THERMALLY INSULATIVE PANELS", filed Apr. 12, 2007, the disclosure of which is incorporated herein by reference in its entirety.

### BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to the field of thermally insulated containers that are adapted for the packaging, containment and/or transport of temperature sensitive goods.

[0004] 2. Description of Related Art

[0005] Insulated containers having thermally insulated walls are utilized for the containment and/or transport of goods that can be damaged or otherwise rendered unsuitable for use if exposed to temperatures outside of a particular temperature range. Thermal insulation can be used to maintain a desired temperature within the container despite increases or decreases in the exterior (ambient) temperature.

[0006] For example, the shipment of products that must have their temperature maintained within a specific range below ambient is one of the fastest growing market segments in the modern shipping industry. This growth is driven by a number of factors including widespread concerns about safety in the cold food distribution chain, increasing numbers of pharmaceutical and life sciences products which must have their temperature maintained within certain limits, the rapid growth in high-value specialty chemicals such as those used in the semiconductor industry, the increasing number of sophisticated medical tests which require the shipment of patient specimens to an external laboratory, the increased number of clinical trials associated with new pharmaceutical discovery and the increased delivery of products directly to the customer as a result of Internet ordering.

[0007] This field is generally referred to as controlled temperature packaging (CTP). CTP can be segmented by the target temperature range, namely: frozen (below 0° C.); 2° C. to 8° C.; and less than ambient (e.g., less than 30° C.). In addition, CTP may be segmented by container size, namely: greater than pallet; one cubic foot to pallet; and less than one cubic foot. The one cubic foot to pallet size segment is dominated by systems using ice (e.g., frozen gel packs) and/or dry ice as a coolant where the containers are insulated using expanded polystyrene (EPS). The market segment for containers less than about one cubic foot in size is currently very limited due to the need for a small, lightweight cooling mechanism and due to the need to use relatively thin insulating walls to maximize the available space for the product cavity.

[0008] A relatively simple thermally-insulated container system includes a cardboard box into which EPS sheets have been cut and placed. The container is then filled with dry ice in which, for example, frozen fish is shipped. A more sophisticated approach is a validated system consisting of custom molded EPS forms in a rigid box with both frozen and warm gel packs, the combination of which has been tested through a range of temperature cycles for specified thermal properties. Such a validated system can be used for shipping pharmaceu-

ticals, or for long duration or high-value shipments. For example, many pharmaceutical products such as vaccines and antibodies must be maintained within a temperature range of 2° C. to 8° C.

[0009] The high cost of shipping is at least partially related to the volume occupied by the EPS insulation. For a one cubic foot box with a 60 hour lifetime at 2° C. to 8° C., over 90 percent of the container volume is occupied by EPS and gel packs.

[0010] Some reduction in volume and therefore shipping costs may be obtained by using vacuum insulation panels (VIPs) as the thermally insulating material. VIPs have a high thermal resistance; however, they are much more costly than EPS sheets. Therefore, to be economically competitive, VIPs should be provided in a manner that the VIPs can be readily used multiple times.

[0011] When utilizing a container or similar article that is insulated with VIPs, the highest potential for thermal losses from the container occurs at the edges and corners where two VIPs are in contact. Having an inadequate seal along these edges can severely degrade the performance of the thermally-insulated container. Sealing the edges of adjacent VIPs can be difficult since the standard manufacturing method for VIPs involves evacuating the panel and sealing one or more of the panel edges, which results in a flap protruding from the edge. The presence of such a flap can inhibit gap-free mating between adjacent panels.

[0012] U.S. Pat. No. 7,140,508 by Kuhn et al. discloses a shipping box for shipping high-value objects such as framed paintings, where the walls of the shipping box can be lined with VIPs. To avoid thermal bridges and a decrease in performance, multiple layers of VIPs can be used where the joints between adjacent VIPs in one layer are offset relative to the joints in an underlying layer. It is also disclosed that the edge flaps of the VIPs should not be located in the area in which adjacent VIPs touch, such as along the edge of the panel.

[0013] U.S. Pat. No. 6,244,458 by Frysinger et al. discloses VIPs where the barrier film is provided as a sheet material with edges that are sealed together. The edges are joined together over a sealed portion that extends for ½ inch or more from the underlying edge surface, such that the VIP does not have a smooth, uniform outer profile. Accordingly, adjacent vacuum panels cannot be positioned without space between them. Therefore, Frysinger et al. provide a compressible layer of thermal insulation wrapped around each of the VIPs. It is disclosed by Frysinger et al. that the presence of the compressible insulation layer can reduce thermal edge losses.

[0014] U.S. Pat. No. 6,220,473 by Lehman et al. discloses a soft-sided collapsible insulative container having a base, peripheral sidewalls extending from the base, and a lid. Each of the base, lid and sidewalls are formed of a sealable pocket having a compressible insulation lining. Each pocket is adapted to contain a piece of block insulation to thermally insulate the container. A flexible fabric casing extends tightly around the container in the fully closed position to exert uniform pressure on the container.

[0015] Standard insulation materials, including the compressible insulation disclosed by Frysinger et al. and Lehman et al., do not provide the thermal resistance of VIPs, and will inherently contribute to thermal losses in a container that is otherwise lined with VIPs. There remains a need for a thermally-insulated shipping container system having improved thermal performance.

### SUMMARY OF THE INVENTION

[0016] Accordingly, it is an object of the present invention to provide a thermally insulative container insert that is

adapted to be placed within a container, such as a shipping container. The insert can be placed within an outer container, such as a cardboard box, to provide thermal insulation for a product placed within the container. The insert can advantageously reduce the amount of manual labor previously required to thermally insulate a container, particularly when using vacuum insulation panels. The insert can also minimize or eliminate the gaps that can exist between adjacent insulation panels to increase thermal performance by reducing thermal bridging and reducing the formation of condensation, or the formation of ice in frozen applications. For dry ice shipments in particular, ice can form within the container and increase the heat load, serve as a thermal bridge and can push adjacent panels apart. The present invention can reduce or eliminate the formation of ice by providing a tightly sealed and thermally insulated product cavity.

**[0017]** In one embodiment, a container insert for thermally insulating a container is provided. The insert includes a base insulation panel having a top surface, a bottom surface and a peripheral edge surface. First and second side insulation panels are provided each having a top surface, a bottom surface and a peripheral edge surface. The side panels are attached to the base panel in spaced-apart relation on opposite sides of the base panel by a plastic backing sheet. First and second end insulation panels are also provided each having a top surface, a bottom surface and a peripheral edge surface. Each of the end panels is attached to the base panel in spaced-apart relation on opposite ends of the base panel by a plastic backing sheet. Each of the side panels and the end panels can be pivoted upwardly toward the base panel to contact the base panel along a seam and form side walls and end walls. The plastic backing sheet covers at least a portion of each of the seams between the base panel and the side panels and between the base panel and the end panels to form an enclosure having a base, side walls and end walls and a top opening.

**[0018]** In another embodiment, a container insert includes a base insulation panel having an interior surface, an exterior surface and a peripheral edge surface. First and second side insulation panels are transversely disposed at opposite sides of the base panel to form side walls, where each side panel has an interior surface, an exterior surface and a peripheral edge surface. First and second end insulation panels are transversely disposed at opposite ends of the base panel to form end walls, each end panel having interior surface, an exterior surface and a peripheral edge surface. A plastic backing sheet is disposed around at least a portion of the exterior surfaces of the base panel, side panels and end panels. The plastic backing sheet covers at least a portion of each of the seams between the base panel and the side panels and between the base panel and the end panels, and covers at least a portion of each of the seams between adjacent side panels and end panels, such that the plastic backing sheet urges adjacent panels together along the seams.

#### DESCRIPTION OF THE DRAWINGS

**[0019]** FIG. 1(a) and 1(b) illustrate a thermal insulation panel that is useful in the container insert of the present invention.

**[0020]** FIG. 2 illustrates a top view of a container insert according to an embodiment of the present invention.

**[0021]** FIG. 3 illustrates a top view of a container insert in a partially-assembled state according to an embodiment of the present invention.

**[0022]** FIG. 4 illustrates a top view of a container insert in a partially-assembled state according to an embodiment of the present invention.

**[0023]** FIG. 5 illustrates a top view of a container insert in an assembled state according to an embodiment of the present invention.

**[0024]** FIG. 6 illustrates a perspective view of a container insert in an assembled state according to an embodiment of the present invention.

**[0025]** FIGS. 7(a) and 7(b) illustrate cross-sectional views of vacuum insulation panels according to an embodiment of the present invention.

#### DESCRIPTION OF THE INVENTION

**[0026]** The present invention is directed to a container insert and a method for using the container insert to thermally insulate products contained therein. In this regard, the container insert includes thermally insulative panels that form the walls of the container insert.

**[0027]** FIGS. 1(a) and 1(b) illustrate a thermally insulative panel that can be utilized in the container insert. The thermally insulative panel 1 is preferably rigid such that the panel can form a rigid wall of the container insert. The panel 1 includes a top surface 2 and a mutually opposed bottom surface 6. The thermal insulation panel also includes a peripheral edge surface 4 extending along the perimeter of the insulation panel 1. In one embodiment, the peripheral edge surface 4 can have a thickness of from about 1/4 inch to about 2 inches.

**[0028]** In one particularly preferred embodiment, the insulative panel 1 is a vacuum insulation panel (VIP). In this regard, the insulative panel 1 includes a thermally insulative core material 8 surrounded by a barrier film 9. The barrier film 9 is preferably a polymer barrier film to facilitate heat welding of the panel 1 to a plastic backing sheet, as is described below.

**[0029]** A container insert according to an embodiment of the present invention is illustrated in FIGS. 2-5, which each illustrate a top-view of the container insert 10 in various stages of assembly. The insert 10 is illustrated in FIG. 2 in the fully flat and unassembled configuration, before assembly by a user (e.g., a shipper) and placement into an outer container, such as a cardboard box. It is a significant advantage that the container insert 10 can be shipped to a user in this flat configuration and assembled by the user when needed to store or transport temperature sensitive goods.

**[0030]** The insert 10 is adapted to be assembled and form a thermally insulated bottom wall, side walls and end walls to define a thermally insulated product cavity. The product can be inserted through a top opening, and then a thermally insulated lid panel can be placed over the top opening to provide a thermally insulated product cavity.

**[0031]** Referring to FIG. 2, the insert 10 includes a base insulation panel 12, a first side insulation panel 14, a second side insulation panel 16, a first end insulation panel 18 and a second end insulation panel 20. Although the various panels and walls of the insert 10 are described as being disposed on the bottom, side and end of the container insert, the insert can be utilized in various orientations and such terms are not intended to be limiting in this regard. For example, each of the insulation panels could be a square panel of equivalent dimensions.

**[0032]** Each of the panels is thermally insulative panel, for example a polyurethane panel, an expanded polystyrene panel or the like. According to one embodiment, the thermally

insulative panels comprise vacuum insulation panels (VIPs). VIPs utilize the insulative effects of a near-vacuum to provide a high thermal resistance, and can provide such high thermal resistance at reduced thicknesses as compared to conventional insulation, such as EPS, thereby increasing the useful internal volume (e.g., the product cavity) of a container lined with the insulative panels. VIPs are disclosed in more detail below with respect to FIGS. 7(a) and 7(b).

**[0033]** According to the present invention, the insulation panels are interconnected by a plastic backing sheet 26 that is attached to the bottom surface of each insulation panel. For example, the backing sheet can be heat welded to the bottom surface of each of the insulation panels. The end panels and side panels are attached to the plastic backing sheet 26 in spaced apart relation to the base panel 12 in a manner that they can be pivoted upwardly toward the base panel to form side walls and end walls of the container insert. Although described herein as one contiguous plastic backing sheet, the backing sheet can comprise two or more individual and separate portions, so long as the backing sheet connects the base panel to the side panels and end panels in the manner described herein.

**[0034]** The plastic backing sheet 26 can perform several functions in the assembled container insert 10, including covering and sealing of the seams where adjacent insulation panels are in contact and facilitating the compression of the adjacent panels along the seams to reduce or eliminate gaps between adjacent panels. In this regard, it should be noted that adjacent insulation panels are in direct contact when the insert is assembled, as opposed to having a material layer disposed therebetween. The plastic backing sheet 26 is preferably vapor impermeable, particularly with respect to water vapor to provide a condensation barrier between the product cavity and the outside environment. The plastic backing sheet 26 can also provide abrasion resistance to the exterior surfaces of the container insert 10.

**[0035]** The plastic backing sheet 26 can comprise a single layer of a plastic material, preferably a thermoplastic material such as polyethylene (PE). More preferably, the plastic backing sheet 26 is a multilaminate material comprising two or more layers of plastic materials to provide multiple functionalities. For example, the plastic backing sheet can comprise two layers of PE, with a layer of a material disposed therebetween, such as a polyamide layer (e.g., Nylon) or a polypropylene (PP) layer.

**[0036]** The end panels 18 and 20 are attached to the plastic backing sheet 26 at opposite ends of the base panel 12. The end panels 18 and 20 are spaced-apart from the base panel 12 by a distance that is approximately equal to the thickness of the base panel 12, with a portion of the backing sheet 26 being disposed between the end panels and the base panel 12, preferably along the entire edge of each end panel that is adjacent to the base panel. In one embodiment, the base panel 12 is a VIP having a thickness of at least about 1/4 inch and up to about 2 inches, and therefore the distance between the end panels and the base panel can also be from about 1/4 inch to about 2 inches. In this manner, when the end panels are pivoted upwardly and toward the base panel to form end walls (FIG. 3), the portions of the backing sheet 26 disposed between the base panel 12 and the end panels 18 and 20 forms a tight seal along the bottom horizontal seams where the end panels contact the base panel 12.

**[0037]** The plastic backing sheet 26 can also include linear perforations 28a, 28b, 28c and 28d extending outwardly from

the opposed edges of the end panels 18 and 20 toward the base panel. The backing sheet perforations facilitate the pivoting of the end panels toward the base panel 12 to form end walls without moving the side walls. The backing sheet perforations can be, for example, scores in the sheet to enable the sheet to be easily separated, or can be a cut directly through the sheet 26.

**[0038]** Side panels 14 and 16 are disposed on opposite sides of the base panel 12 in spaced-apart relation to the base panel. As with the end panels, a portion of the plastic backing sheet 26 is disposed between the side panels and the base panel, preferably along the entire edge of the panels that is adjacent to the base panel. The spacing between the base panel 12 and the side panels 14 and 16 is preferably about equal to the thickness of the base panel 12 to facilitate the formation of a tight seal along the lower seams of the side panels when they are pivoted upwardly toward the base panel to form side walls.

**[0039]** As illustrated in FIG. 2, the insert 10 also includes means to secure the backing sheet 26 around the exterior walls of the container insert, that is, around the exterior surfaces (outside the product cavity) of the end panels and side panels. In this regard, the plastic backing sheet 26 extends beyond the opposed side edges of the side panels 14 and 16. In this manner, when the end panels are pivoted upwardly and the side panels are then pivoted upwardly, that portion of the backing sheet extending beyond the edges of the end panels can be wrapped around the exterior surface of the panels and can be attached to the end panels.

**[0040]** In the embodiment illustrated in FIG. 2, the attachment means includes hook and loop fasteners having hook portions 22b and 24b attached to the plastic backing sheet 26, and loop portions 22a and 24a attached to the bottom surface of the end panels.

**[0041]** FIG. 3 illustrates a top-view of the partially-assembled container insert 10, namely where the end panels 18 and 20 have been pivoted upwardly and toward the base panel 12 to form end walls for the container insert 10. The portion of the backing sheet 26 disposed between the base panel 12 and the end panels 18 and 20 thereby forms a tight seal along the entire seam where the peripheral edge surface of the end panels and the top surface of the base panel are in direct contact. This advantageously reduces the permeation of water vapor into the product cavity and hence reduces condensation of water vapor when the interior product cavity of the container insert 10 is at a reduced temperature.

**[0042]** FIG. 4 illustrates a top view of the partially assembled container insert 10. Compared to FIG. 3, the side wall panels 14 and 16 have been pivoted upwardly and toward the base panel 12 to form side walls for the container insert 10. As with the end panels, the portion of the backing sheet 26 disposed between the side panels and the base panel 12 forms a tight seal along the seam where the base panel and side panels are in contact to reduce the permeation of water vapor into the product cavity.

**[0043]** When the side panels are pivoted and placed on the base panel 12 to form side walls, it can be seen that a portion of the backing sheet 26 extends away from opposite ends of each side panel and each such portion of the backing sheet 26 includes a hook portion 22b/24b of a hook and loop fastener. In this regard, these portions of the backing sheet can be pulled tightly and attached to the back side of the end panels 18 and 20 which have loop portions 22a/24a adapted to attach to the hook portions 22b/24b. When the backing sheet 26 is

pulled tightly in this manner, the backing sheet **26** urges the seams between the end panels and side panels together to reduce or eliminate any gaps between the panels and thereby improve the thermal performance of the container insert.

[0044] Other means and methods of attaching the backing sheet **26** so that it securely and tightly wraps around the periphery of the insert **10** and secures the panels can be used. For example, the backing sheet **26** can be attached by heat welding the backing sheet to the external surface of the end panels, which can also include a plastic material. However, temporary fasteners such as hook-and-loop fasteners provide the advantage that the insert can be easily disassembled and re-used.

[0045] A top view of an assembled container insert **10** is illustrated in FIG. 5. It can be seen that the plastic backing sheet **26** is wrapped tightly around the exterior of the side walls and end walls and is attached to the end panels by hook and loop fasteners **22** and **24**. This provides at least two advantages—the plastic sheet compresses the panel edges against each other to form a tight seal along the vertical edges between panels, and the plastic material of the backing sheet **26** provides a barrier to prevent penetration of water vapor or other gases into the product cavity defined by the insert. It will be appreciated that while the backing sheet perforations **28** facilitate pivoting of the end panels **18** and **20** to form end walls (FIG. 2), such perforations should not also be included with respect to the side panels, as this would preclude the ability to tightly wrap the backing sheet **26** around the periphery of the container insert **10**. However, seams could extend from the edges of the side panels, in lieu of those illustrated in the figures extending from the end panels.

[0046] FIG. 6 illustrates a perspective view of an assembled container insert **10**. The insert **10** includes a base insulation panel **12** as well as side walls and end walls. The end walls are formed by the first end insulation panel **18** and the second end insulation panel **20**. The end panels are transversely disposed on the base panel at opposite ends of the base panel to form the end walls. Similarly, the side walls are formed by a first side insulation panel **14** and a second side insulation panel **16** which are also transversely disposed on the base panel at opposite sides of the base panel **12**. By virtue of this assembly, horizontal seams exist where the side panels and end panels contact the base panel and vertical seams exist where the adjacent side panels and end panels are in contact. For example, horizontal seams **13a** and **13b** are formed between the base panel **12** and each of the side wall **16** and the end wall **20**. Similarly, vertical seams **20a** and **20b** form between the end panel **20** and the two adjacent side panels **14** and **16**. The backing sheet **26** advantageously covers these seams and urges (compresses) the panels together to reduce any gap between the panels.

[0047] A lid **30** can be placed on the insert to seal the top opening. The lid can include, for example, an insulation panel **32** of a size and type similar to the base panel **12**. A piece of foam **34** such as polyethylene foam or a similar material can be placed on top of the insulation panel **32** so that the bottom surface of the insulation panel **32** is compressed against the top edge surfaces of the side panels and end panels when the top lid of a container is closed and pressed against the foam **34**.

[0048] As is discussed above, the thermal insulation panels (e.g., panels **12**, **14**, **16**, **18** and **20**) can comprise vacuum insulation panels (VIPs). Cross-sectional views of VIPs are illustrated in FIGS. 7(a) and 7(b). Referring to FIG. 7(a), the

VIP includes a core material **44a** and a barrier film **42a** disposed around the core material **44a**. During the manufacturing process, the core material **44a** can be pressed into the general shape of the panel (e.g., a rectangular shape) which is placed into an envelope of the barrier material **42a**. The barrier material envelope is then evacuated and sealed to form a rigid VIP.

[0049] The core material provides structural strength to prevent the panel walls from collapsing and to provide heat transfer resistance, and a gas impermeable barrier film surrounding the core material that is sealed after a near vacuum is achieved inside the panel. The vacuum insulation panel is evacuated to a low pressure, such not greater than about 100 mbar (about 75 torr), or less.

[0050] The core material can comprise a variety of materials, such as open cell polyurethane or polystyrene foam (e.g., INSTILL, available from the Dow Chemical Company). According to a preferred embodiment, the core material is a particulate material, such as silica, titania and/or carbon. The particulates can form a branched network of primary particles which aggregate into larger particles. Preferably, the core material has pore sizes ranging from about 10 nm to about 100 nm. The VIPs can also include getter or desiccants within the panel that are adapted to adsorb residual gases and moisture, which increases the useful lifetime of the panels.

[0051] The barrier film **42a** is a substantially gas-impermeable material that can be sealed at the edges to form an envelope for the core material. The barrier film can be a laminate film that includes a metallic layer and at least one plastic layer, such as a laminate that includes a metallic layer sandwiched between two plastic layers. However, barrier films that include a metallic layer can be disadvantageous in the container insert since the metallic layer can serve as a thermal bridge at the edges of the insert, reducing the thermal performance of the insulation. Further, metallized layers are subject to stress cracking, which also can reduce thermal performance.

[0052] It is therefore preferred that the barrier film does not include a metallized barrier. In this regard, the barrier film can include a first plastic film layer, preferably a thermoplastic layer, on the internal surface so that the inner layer of the barrier film can be heat sealed after evacuation of the panel. It is also preferred that the barrier film include an outer layer that is also fabricated from a plastic material, such as PE, to enable heat welding of the panels to the plastic backing sheet of the container insert. According to one embodiment, the barrier film comprises a multi-layer coextrudate which is not susceptible to stress cracking. For example, the coextrudate can include a layer of PE and a layer of ethylene vinyl alcohol (EVOH), with a layer of a material such as polyamide (e.g., Nylon) or polyethylene terephthalate (PET) disposed therebetween. The EVOH layer can provide an oxygen barrier and the polyamide or PET can provide toughness, e.g., abrasion resistance. Other layers could include polyvinylidene chloride (PVDC) or a similar material for a moisture barrier.

[0053] These plastic barrier film materials can be made, for example, by coextrusion or lamination. Pigments can also be added to one or more of the various layers for aesthetic purposes, i.e., so that the core material is not visible to the user. In this regard, the plastic barrier film can also be comprised of different colors to indicate different properties, such as the thickness of the panel. The barrier film can have a thickness, for example, of at least about 60 micrometers and not greater than about 200 micrometers.

[0054] Referring to FIG. 7(a), the sealing process to form the VIP typically results in the formation of at least two flaps 46a and 48a along opposite edges of the panel 40a. Depending upon the laminate materials used in the barrier film 42a and the desired pressure within the panel, it may be desirable to have an extended flap such as those illustrated in FIG. 7(a) to ensure that an adequate seal is formed along the edges of the panel.

[0055] These flaps 46a and 48a can inhibit the formation of a tight seal in insulated containers when that peripheral edge surface of the panel presses against an adjacent panel. This has often required the end-user to manually tape the flap down or take other measures to ensure an adequate seal.

[0056] According to the present invention, the flap 46a/48a can be bent and sealed to the surface of the panel. FIG. 7(a) illustrates the flaps being pressed against the top surface of the panel 40a and attached to the surface, such as by using heat and pressure. In this regard, if the barrier material 42a has a plastic outer film, the film can be heat treated under modest pressure to adhere the flap to the surface of the panel.

[0057] FIG. 7(b) illustrates an alternative embodiment of a VIP including a core material 44b wherein the flaps 46b/48b are shorter than the flaps illustrated in FIG. 7(a) and are bent back and attached to the peripheral edge surface of the panel 40b.

[0058] The container insert according to the present invention advantageously provides thermally insulated side walls, end walls and a thermally insulated base. After a product is placed into the cavity defined by the side walls, end walls and base by inserting the product through the top opening, a thermally insulated lid such as a VIP panel can be placed over the opening to completely surround the product with thermal insulation. The container insert and lid can all be placed within an outer container, such as a cardboard box, which is then sealed for storage or shipment of a product. For example, the top lid can rest upon the top edges of the side walls and end walls. A layer of a foam material, such as polyethylene foam, can be placed on top of the lid (e.g., beneath the outer cardboard lid) to provide uniform compression upon the lid when sealed in the container to facilitate the formation of a tight seal. In one embodiment, the lid can also be attached to the backing sheet in a manner that the lid hinges and pulls down to seal in a manner similar to the end panels and side panels.

[0059] While various embodiments of the present invention have been described in detail, it is apparent that modifications and adaptations of those embodiments will occur to those skilled in the art. However, it is to be expressly understood that such modifications and adaptations are within the spirit and scope of the present invention.

What is claimed is:

1. A container insert, comprising:

a base insulation panel having a top surface, a bottom surface and a peripheral edge surface;

first and second side insulation panels each having a top surface, a bottom surface and a peripheral edge surface, where the side panels are attached to the base panel in spaced-apart relation on opposite sides of the base panel by a plastic backing sheet;

first and second end insulation panels each having a top surface, a bottom surface and a peripheral edge surface, where the end panels are attached to the base panel in spaced-apart relation on opposite ends of the base panel by a plastic backing sheet;

wherein each of the side panels and the end panels can be pivoted upwardly toward the base panel to contact the base panel along a seam and form side walls and end walls, wherein the plastic backing sheet covers at least a portion of each seam between the base panel and the side panels and between the base panel and the end panels, to form an enclosure having a base, side walls, end walls and a top opening.

2. A container insert as recited in claim 1, wherein said plastic backing sheet is heat welded to said insulation panels.

3. A container insert as recited in claim 2, wherein said plastic backing sheet comprises a thermoplastic film layer.

4. A container insert as recited in claim 1, wherein said end panels and side panels are spaced apart from said base panel of a distance approximately equal to the thickness of the base panel.

5. A container insert as recited in claim 1, further comprising a thermally insulated lid that is adapted to fit over the top opening.

6. A container insert as recited in claim 1, wherein said plastic backing sheet comprises a plastic film that is substantially impermeable to water vapor.

7. A container insert as recited in claim 1, wherein said plastic backing sheet comprises a laminate polymer structure.

8. A container insert as recited in claim 7, wherein said plastic backing sheet comprises a thermoplastic film.

9. A container insert as recited in claim 1, wherein said insulation panels comprise vacuum insulation panels.

10. A container insert as recited in claim 9, wherein said vacuum insulation panels comprise a core material and a barrier film surrounding the core material, and wherein the barrier film comprises a plastic film.

11. A container insert as recited in claim 10, wherein said barrier film consists essentially of polymeric materials.

12. A container insert as recited in claim 11, wherein said barrier film is a laminate film that comprises at least a first polymer film layer and a second polymer film layer.

13. A container insert as recited in claim 12, wherein said first polymer film layer comprises polyethylene and said second polymer film layer comprises a material selected from the group consisting of ethylene vinyl alcohol (EVOH), polyamide, polyethylene terephthalate (PET) and polyvinylidene chloride (PVDC).

14. A container insert as recited in claim 1, further comprising means for removably attaching said plastic backing sheet to an exterior surface of said end panels.

15. A container insert as recited in claim 14, wherein the attachment means comprises hook and loop fasteners.

16. A method for shipping a product, comprising the step of providing a container insert as recited in claim 1, placing the container insert within a shipping container, placing a product within the container insert, placing a lid on the container insert and transporting the shipping container to a desired location.

17. A method as recited in claim 16, further comprising cooling the product cavity defined by the shipping container insert.

18. A container insert, comprising:

a base insulation panel having an interior surface, an exterior surface and a peripheral edge surface;

first and second side insulation panels transversely disposed at opposite sides of the base panel to form side walls, each side panel having an interior surface, an exterior surface and a peripheral edge surface;

first and second end insulation panels transversely disposed at opposite ends of the base panel to form end walls, each end panel having an interior surface, an exterior surface and a peripheral edge surface; and

a plastic backing sheet disposed around at least a portion of the exterior surfaces of the base panel, side panels and end panels;

wherein the plastic backing sheet covers at least a portion of the seams between the base panel and the side panels and between the base panel and the end panels, and covers at least a portion of the seams between adjacent

side panels and end panels such that the plastic backing sheet urges adjacent panels together along the seams.

**19.** A container insert as recited in claim **18**, wherein each of said base panel, side panels and end panels is a vacuum insulation panel.

**20.** A container insert as recited in claim **18**, wherein said plastic backing sheet is a laminate polymer film comprising at least first and second polymer layers.

**21.** A container insert as recited in claim **18**, wherein said plastic backing sheet is heat welded to said insulation panels.

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