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(54) **THERMOPANEL, INSULATED CONTAINER WITH THERMOPANEL, AND METHOD OF USING SAME**

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ABSTRACT

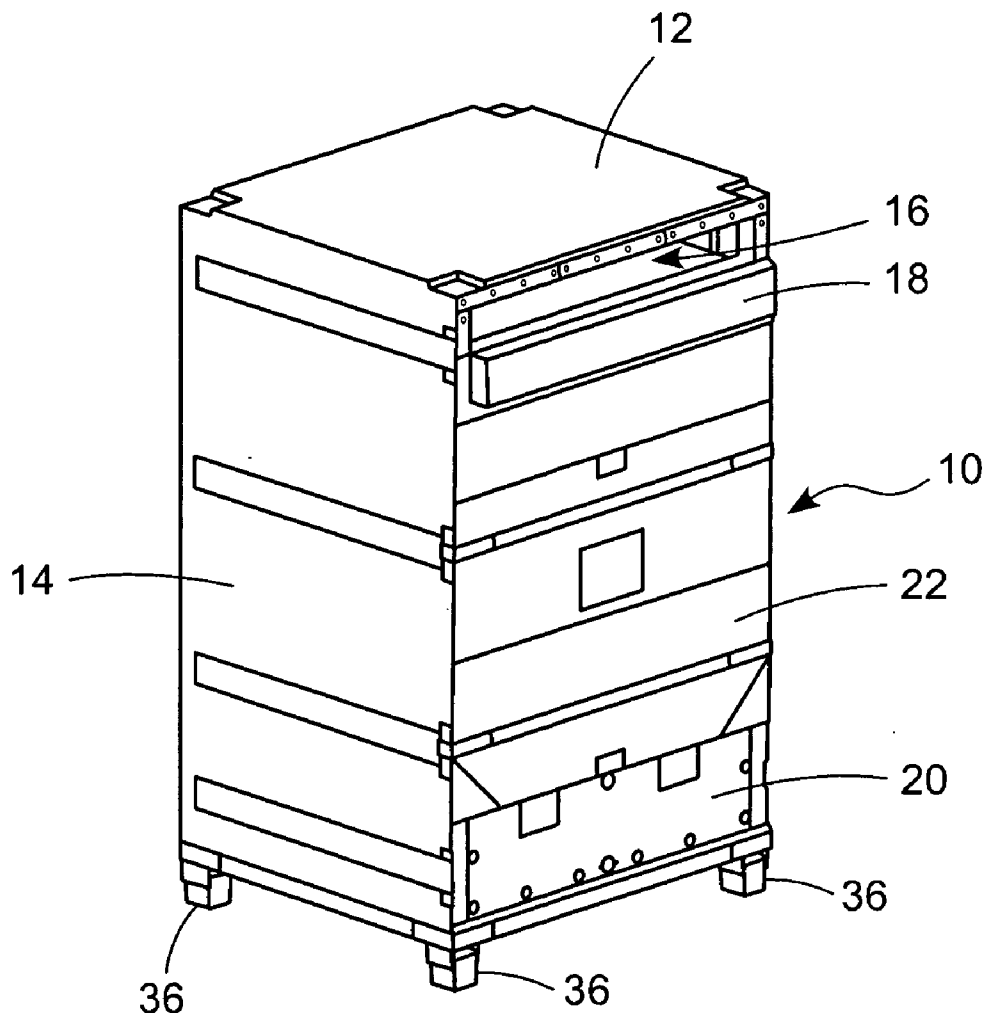
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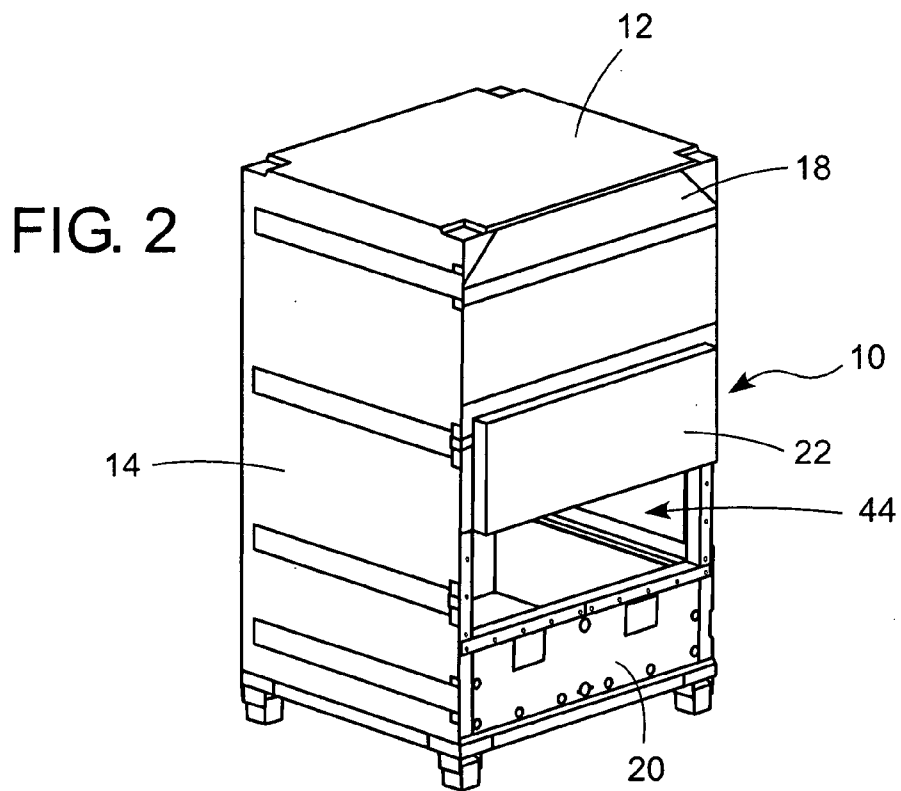
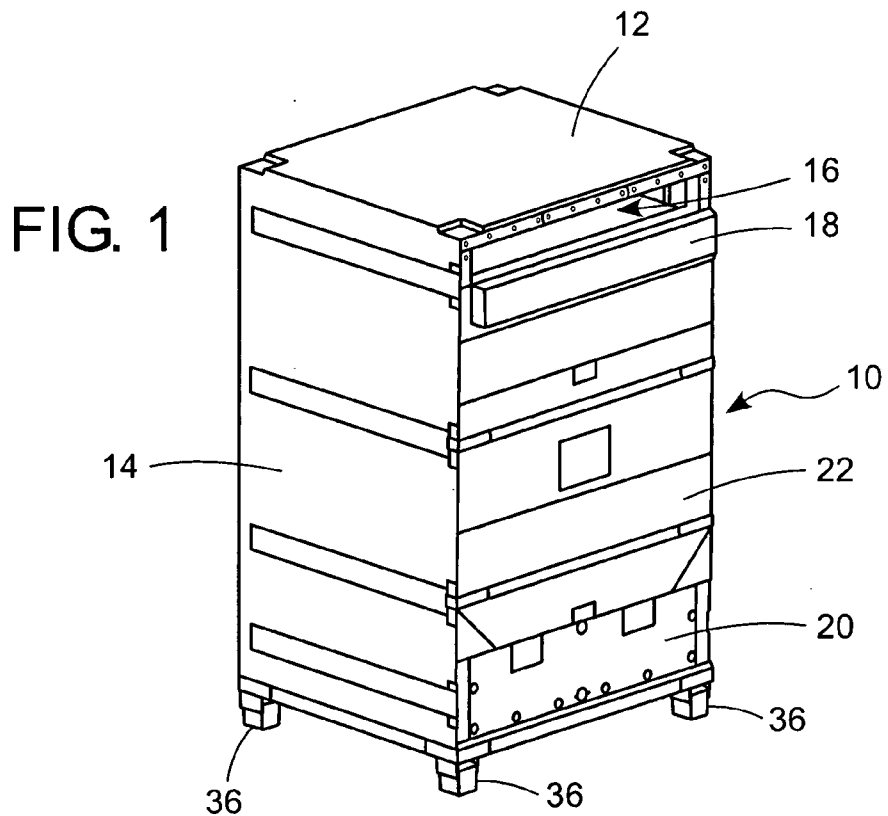
A thermopanel is provided for use in a container for the storage or transport of goods, the thermopanel includes an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter; and an insulated insert that is removably placeable in the center area; wherein when the insulated insert is in place in the center area, the thermopanel provides greater insulation than when the insulated insert is not in place in the center area.

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Related U.S. Application Data

(60) Provisional application No. 60/596,094, filed on Aug. 31, 2005.





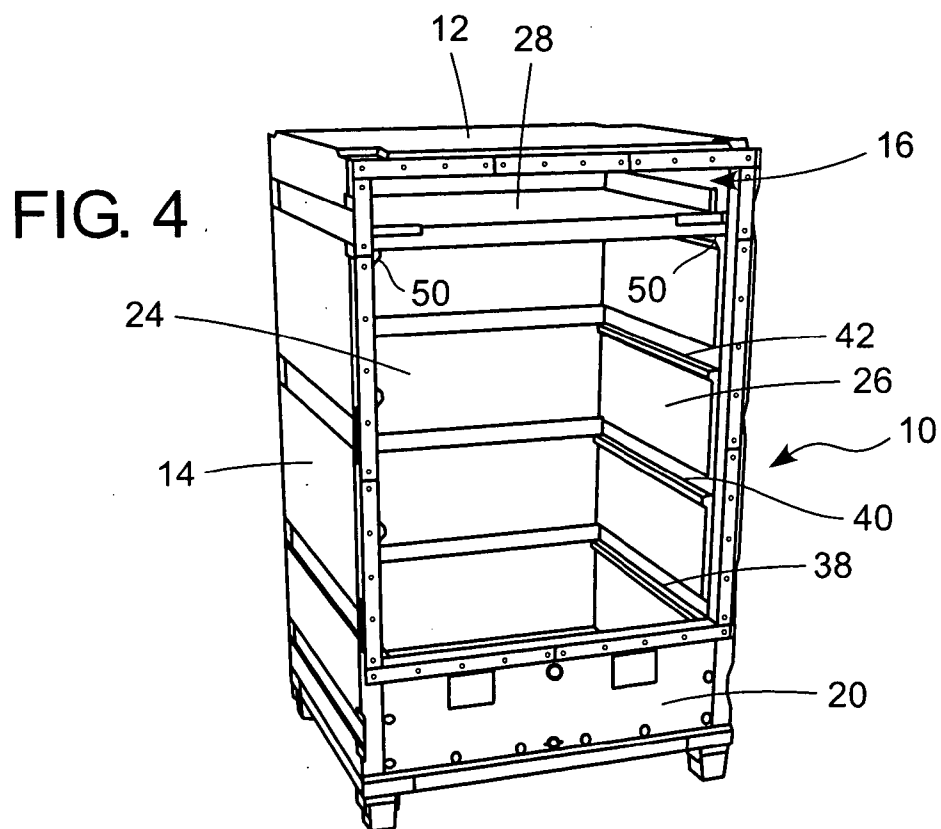
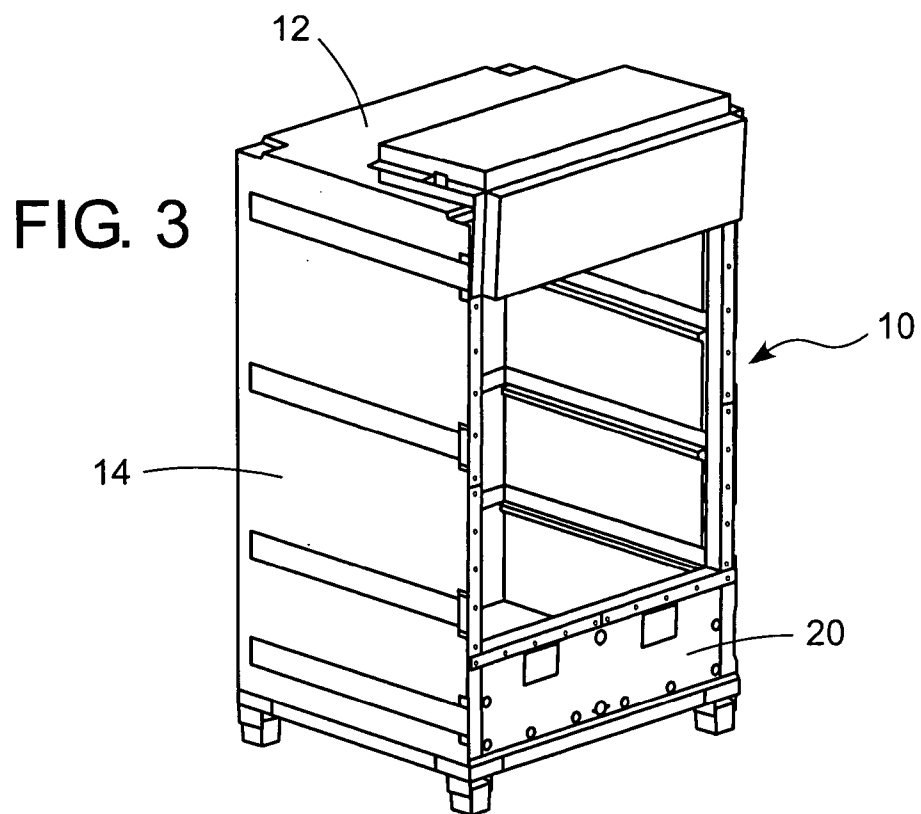


FIG. 5

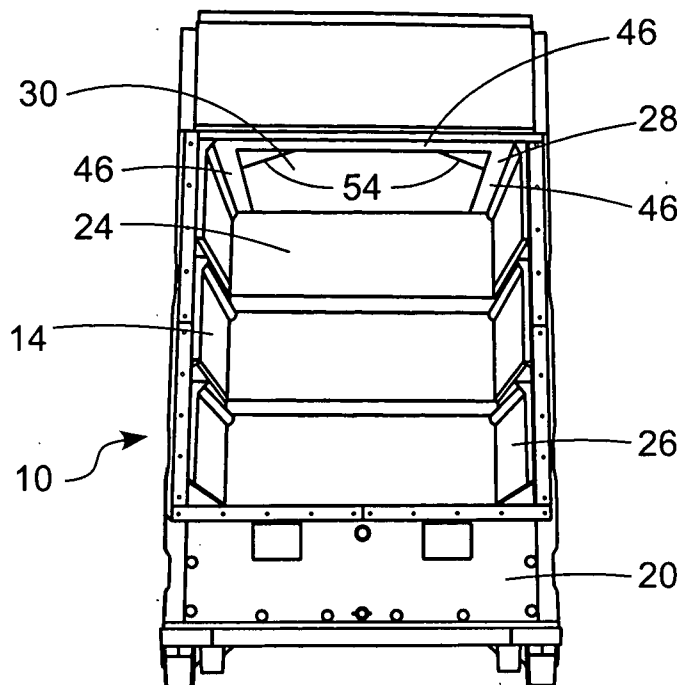
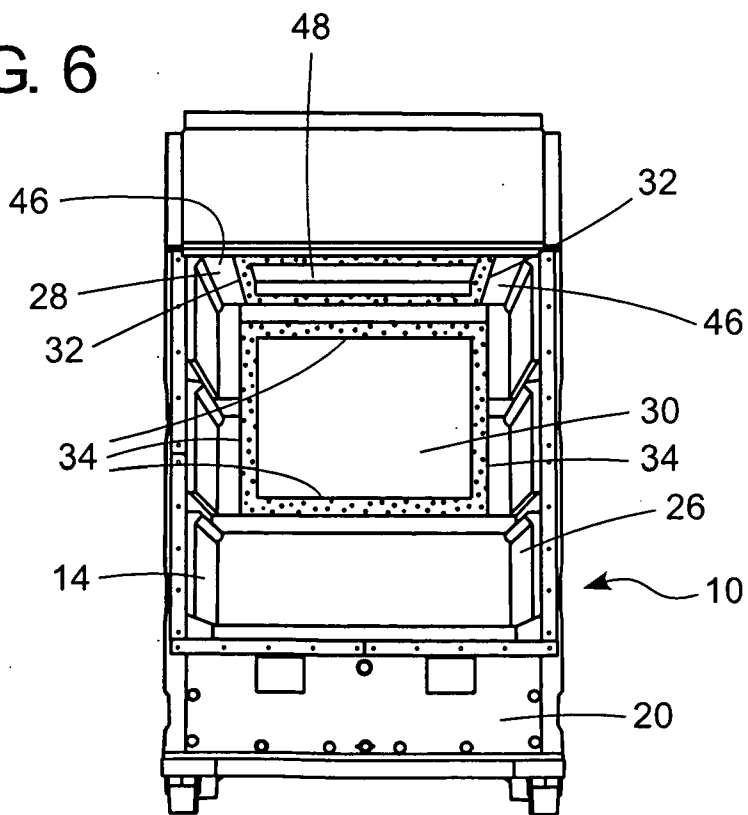
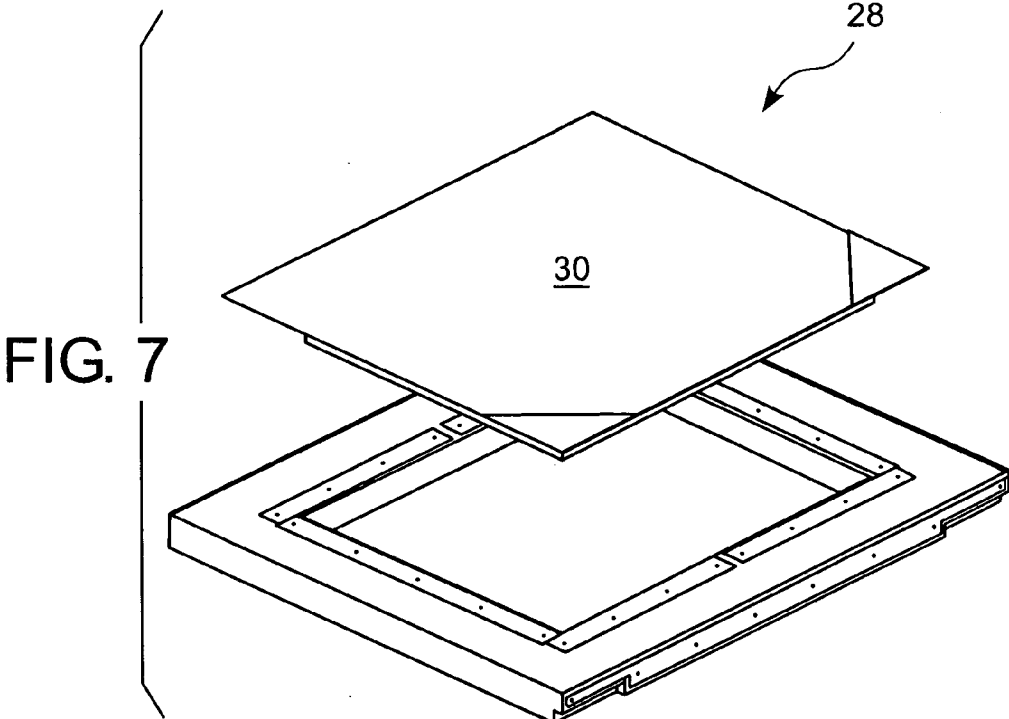


FIG. 6





THERMOPANEL, INSULATED CONTAINER WITH THERMOPANEL, AND METHOD OF USING SAME

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application claims the benefit of U.S. provisional application Ser. No. 60/596,094, filed on Aug. 31, 2006. The entire contents of U.S. provisional application Ser. No. 60/596,094 are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] This invention is generally directed to a method for refrigerating insulated containers by the use of a refrigerating medium and to a container refrigerated in accordance with the method. In particular, the invention relates to containers for the transportation and storage of frozen and/or chilled products, where the temperature inside the container is maintained at a desired level and for a specified period of time. Further, the invention makes possible that one type of container may be used for handling both chilled and/or frozen products, with minor modifications.

[0003] BACKGROUND OF THE INVENTION

[0004] U.S. Pat. No. 6,131,404 discloses a container that is provided to serve plural requirements, namely, the storage or transport of chilled and/or frozen products for a specified period of time. The container is of a thermally insulated type and comprises one or more top mounted refrigerating cells of different capacities cooperating with one or more insulated panels of different cold transfer characteristics which allows that the desired temperature and the duration of the conditioned climate inside the container can be adapted to meet a variety of demands. The same container can be used for different purposes by simple insertion of different cell/panel combinations. Cost reduction stems from considerations about level of investment, inventory/storage, etc. This may be advantageous both for the user and/or for the supplier, especially if the supplier will rent out containers for various purposes.

[0005] EP 0 591 047 B1 discloses an insulated container equipped with a refrigerant box in the upper region of the container and a stack of products in a lower region of the container. Below the refrigerant box there is arranged an insulated panel having a horizontal extension that allows the formation of a slit between the panels and the inner walls of the container. The slit allows an even distribution of the cooling medium that passes toward the products and further downwards between the outer walls of the stack and the inner walls of the container.

[0006] EP 0 631 096 B1 discloses a system for filling a receptacle or cell with CO.sub.2-snow, the receptacle being arranged in an insulated chamber. The quantity of CO.sub.2 injected in the receptacle is determined according to predetermined injection periods modified according to climatic parameters. EP 0 337 860 B1 discloses an isothermal container with an interior space divided horizontally by a screen into an upper area receiving an open reservoir of a sublimating refrigerant, and a lower area receiving at least one compartment of products to be kept cold. The screen is produced from a thermally insulating material and is slightly smaller than the internal section of the container. The reservoir is produced in the form of a drawer.

[0007] WO 95/25253 discloses a double-sided releasable partition element for an isothermal chamber, containing two adjacent compartments, i.e. a first unsealed compartment which can be filled with a solid sublimable coolant element and a second sealed compartment or housing filled with a eutectic or air. The two-compartment partition element maintains significantly different temperatures or opposite sides of the element. The element is further arranged to fit into grooves in the lateral sides of the chamber.

OBJECTS AND SUMMARY

[0008] The present invention is seen as an improvement and/or variation of U.S. Pat. No. 6,131,404, the subject matter of which is incorporated herein in its entirety.

[0009] In accordance with a preferred embodiment of the present invention, a container is provided that may serve plural requirements, namely, the storage or transport of chilled and/or frozen products for a specified period of time. In the preferred embodiment, the container is of a thermally insulated type and comprises one or more top mounted refrigerating cells of different capacities cooperating with one or more insulated panels of different cold transfer characteristics which allows that the desired temperature and the duration of the conditioned climate inside the container can be adapted to meet a variety of demands.

[0010] According to one embodiment of the invention, a thermopanel is provided for use in a container for the storage or transport of goods, the thermopanel comprising an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter; and an insulated insert that is removably placeable in the center area; wherein when the insulated insert is in place in the center area, the thermopanel provides greater insulation than when the insulated insert is not in place in the center area.

[0011] According to another embodiment of the invention, a container is provided for the storage or transport of goods in a frozen and/or chilled state, the container comprising an insulated cabinet; a thermopanel that comprises an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter, wherein the thermopanel is arranged in the insulated cabinet so as to divide the container into two sections; and an insulated insert that is removably placeable in the center area, wherein when the insulated insert is in place in the center area, the thermopanel provides greater insulation than when the insulated insert is not in place in the center area; wherein a refrigerant or sublimating agent is placable in one section and the other section provides a space for the goods to be stored or transported.

[0012] According to another embodiment of the invention, a method is provided for controlling a temperature in an insulated container for the storage or transport of goods in a frozen and/or chilled state, the insulated container comprising a thermopanel that comprises an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter, wherein the thermopanel is arranged in the insulated container so as to divide the container into first and second sections; and an insulated insert that is removably placeable in the center area, the method comprising placing a refrigerant or sublimating agent in the first section; maintaining the insulated insert in place in the center area when refrigerated conditions in the

second section are desired; and maintaining the center area without the insulated insert in place when frozen conditions in the second section are desired.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The organization and manner of the structure and operation of the invention, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying drawings, wherein like reference numerals identify like elements in which:

[0014] FIG. 1 is a perspective view of a container which incorporates an embodiment of the present invention, wherein a top portion of the front door is open for loading dry ice;

[0015] FIG. 2 is a perspective view of the container of FIG. 1, wherein a lower portion of the door is open to expose the storage section of the container;

[0016] FIG. 3 is a perspective view of the container of FIG. 1, wherein a larger portion of the door is open to expose the storage section of the container;

[0017] FIG. 4 is a perspective view of the container of FIG. 1, wherein the entire door is removed for purposes of illustration;

[0018] FIG. 5 is a perspective view of the container of FIG. 1, illustrating a thermopanel in its up position;

[0019] FIG. 6 is a perspective view of the container of FIG. 1, illustrating the thermopanel in its down position;

[0020] FIG. 7 is a perspective view of an embodiment of the thermopanel according to the present invention;

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

[0021] While the invention may be susceptible to embodiment in different forms, there is shown in the drawings, and herein will be described in detail, a specific embodiment with the understanding that the present disclosure is to be considered an exemplification of the principles of the invention, and is not intended to limit the invention to that as illustrated and described herein.

[0022] As shown in FIG. 1, a container 10 is provided with legs 36 for easy handling. Alternatively, wheels could be mounted instead of the legs. The container 10 has a rigid top wall 12 and a bottom wall, not illustrated. The container also includes two rigid sidewalls 14, 26, and a rigid backwall 24. The container 10 may preferably be of an insulated sheet type, i.e., the shell forming the inner and outer surfaces of the walls envelope a layer of insulating material such as polyurethane foam. The shell may be produced for instance out of polyethylene or fiberglass, or out of any suitable material having good insulating properties. In one embodiment, the shell is rotationally molded.

[0023] The front wall of the container 10 is provided with a flexible door that may be of a multi-part type with an upper door 18 and a lower door 22. The doors 18, 22 may be made out of a vinyl coated polyester and may further be sectioned in plural hinged elements. The doors 18, 22 may be provided with fasteners, for instance of the VELCRO type, at its peripheral edges that cooperate with similar fasteners at the

front end sides of the sidewalls 14, 26 and the top wall 12. In addition, the lower door 22 may be provided with strip fasteners preferably of the VELCRO type, that cooperate with pins in the front end sides of the container 10, as illustrated in greater detail in U.S. Pat. No. 6,131,404. The upper door 18 and the lower door 22 may be interconnected by a fastener system, preferably of the VELCRO type.

[0024] The inner side walls of the container 10 are provided with a slide system such as opposite grooves or recesses. 38, 40, 42 at different vertical levels, to sustain one or more trays (not shown). It should be understood, however, that other sliding systems known in by those skilled in the art may be applied within the scope of the invention.

[0025] A thermopanel 28 is arranged near the upper portion of the interior of the container 10. The panel divides the interior of the container 10 into an upper room 16 and a lower room 44. In the upper room 16, a refrigerant or sublimating agent is placed, while the lower room 44 provides a space for the goods to be stored or transported. The refrigerant may be contained in a cell which has a size adapted to the required cooling capacity.

[0026] The thermopanel 28 provides a floor for supporting the refrigerant or sublimating agent. The thermopanel 28 can be made of various materials, including but not limited to fiberglass molded construction or polyethylene rotational molded with solid skin on top. Foam insulation 46 may be provided underneath an outer perimeter of the thermopanel 28, leaving a noninsulated area 48 in the center of the underside of the thermopanel 28. The noninsulated center area 48 allows for adequate thermal transfer when dry ice or some other refrigerant is placed on top to maintain a frozen temperature inside the lower room 44 beneath the panel.

[0027] When slightly warmer temperatures are desired, an insulated insert or panel 30 is placed within the noninsulated center area 48 to reduce the heat transfer between the upper room 16 and the lower room 44. The insulated panel 30 preferably has a four sided flange 34 extending around an outer periphery thereof in order to attach the panel 30 to the periphery of the noninsulated area 48 of the thermopanel 28. Preferably, an attachment mechanism, such as Velcro can be permanently attached to the flange 34 of the panel 30 and to the periphery 32 of the noninsulated area 48 of the thermopanel 28.

[0028] The panel 30 is preferably of flexible construction that will allow the panel 30 to be easily lowered from a first position within the noninsulated area 48 of the thermopanel 28, such as illustrated in FIG. 5, to a second position resting against back against inner wall of container, such as illustrated in FIG. 6. The panel 30 may include handles 54 on an underside thereof to facilitate lowering the panel from the first position to the second position.

[0029] When chilled applications are desired, e.g., temperatures in the 33 to 42 degrees Fahrenheit range, the first position should be used, and when frozen applications are required, e.g., temperatures in the -20 to 0 degrees Fahrenheit range, the second position should be used. In the disclosed embodiment, the panel 30 is connected to the back edge of the thermopanel 28 in a permanent manner, such as through a flexible hinge.

[0030] However, in an alternative embodiment, the panel 30 can be completely removable from the thermopanel 28. For example, the panel 30 may be held in place solely by the VELCRO fasteners.

[0031] The thermopanel 28 may be slidably supported in the container 10 on projecting flanges 50 (FIG. 4) or slidably supported within recesses (not shown) formed within the interior walls of the container 10. Alternatively, the thermopanel 28 may be permanently mounted within the container 10 according to any way known to those of skill in the art.

[0032] The container 10 may be further provided with compartment panels for dividing the lower room 44, as is illustrated in U.S. Pat. No. 6,131,404. The compartment panels are open and are preferably of a two piece wire shelf type that secures good gas circulation properties. In addition, the container 10 may be provided with a false floor that provides a slit between the bottom surface of the goods and the surface of the container 10 bottom. Still further, it should be understood that the stack of goods (not shown) may be restricted from contacting the inner wall surfaces of the container by an arrangement of spacers or the like (not shown) arranged between the stack of goods and the inner walls of the container 10. See U.S. Pat. No. 6,131,404, the subject matter of which is incorporated herein by reference.

[0033] The lower door 22 of the container 10 and the container 10 may be made in accordance with the teachings of U.S. Pat. No. 6,131,404. Accordingly, further details thereof are omitted.

[0034] It should also be recognized that the thermopanel 28 and the panel 30 may be used together on various other applications, in addition to the container specifically disclosed herein.

[0035] While a preferred embodiment of the present invention is shown and described, it is envisioned that those skilled in the art will recognize that the present invention various modifications of the present invention without departing from the spirit and scope of the invention.

What is claimed is:

1. A thermopanel for use in a container for the storage or transport of goods, the thermopanel comprising:

an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter; and

an insulated insert that is removably placeable in the center area;

wherein when the insulated insert is in place in the center area, the thermopanel provides greater insulation than when the insulated insert is not in place in the center area.

2. The thermopanel of claim 1, wherein the thermopanel is substantially planar.

3. The thermopanel of claim 1, wherein the insulated insert is hinged to the thermopanel so that the insulated insert can be pivoted from a first position wherein the insulated insert is in the center area to a second position wherein the insulated insert is not in the center area.

4. The thermopanel of claim 1, wherein the thermopanel provides a floor for supporting a refrigerant or sublimating agent.

5. The thermopanel of claim 3, wherein the thermopanel provides a floor for supporting a refrigerant or sublimating agent.

6. The thermopanel of claim 1, wherein the insulated outer perimeter is on an underside of the thermopanel.

7. The thermopanel of claim 1, wherein the thermopanel comprises fiberglass molded construction.

8. The thermopanel of claim 1, wherein the thermopanel is polyethylene rotational molded with solid skin on top.

9. The thermopanel of claim 1, wherein the insulated outer perimeter comprises foam.

10. The thermopanel of claim 8, wherein the insulated panel is on the underside of the thermopanel.

11. The thermopanel of claim 3, wherein the insulated insert is hinged to the thermopanel with VELCRO®.

12. The thermopanel of claim 1, wherein the insulated insert comprises flexible construction that allows the insulated panel to be moved from a first position within the center area to a second position not within the center area.

13. The thermopanel of claim 3, further comprising at least one handle on the insulated insert to facilitate moving the insulated insert from the first position to the second position.

14. A container for the storage or transport of goods in a frozen and/or chilled state, the container comprising:

an insulated cabinet;

a thermopanel that comprises an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter, wherein the thermopanel is arranged in the insulated cabinet so as to divide the container into two sections; and

an insulated insert that is removably placeable in the center area, wherein when the insulated insert is in place in the center area, the thermopanel provides greater insulation than when the insulated insert is not in place in the center area;

wherein a refrigerant or sublimating agent is placable in one section and the other section provides a space for the goods to be stored or transported.

15. The container of claim 14, wherein the insulated insert is in place when temperatures in the range of about 33 to about 42° F. are desired.

16. The container of claim 14, wherein the insulated insert is in place when temperatures in the range of about -20 to about 0° F. are desired.

17. The container of claim 14, wherein the thermopanel is substantially planar.

18. The container of claim 14, wherein the thermopanel provides a floor for supporting the refrigerant or sublimating agent.

19. The container of claim 14, wherein the insulated outer perimeter is on an underside of the thermopanel.

20. The container of claim 14, wherein the thermopanel comprises fiberglass molded construction.

21. The container of claim 14, wherein the thermopanel is polyethylene rotational molded with solid skin on top.

22. The container of claim 14, wherein the insulated insert is hinged to the thermopanel with VELCRO®.

23. The container of claim 14, wherein the insulated insert comprises flexible construction that allows the insulated panel to be moved from a first position within the center area to a second position not within the center area.

24. A method of controlling a temperature in an insulated container for the storage or transport of goods in a frozen and/or chilled state, the insulated container comprising a thermopanel that comprises an insulated outer perimeter that provides greater insulation than a center area within the insulated outer perimeter, wherein the thermopanel is arranged in the insulated container so as to divide the container into first and second sections; and an insulated insert that is removably placeable in the center area, the method comprising:

placing a refrigerant or sublimating agent in the first section;

maintaining the insulated insert in place in the center area when refrigerated conditions in the second section are desired; and

maintaining the center area without the insulated insert in place when frozen conditions in the second section are desired.

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