A thermal energy storage container cover which is adapted to be detachably engaged with a base such that the container may define a cavity for food storage, a chamber for storing utensils, and/or a compartment which contains a thermal energy storage material.
THERMAL ENERGY STORAGE CONTAINER

BACKGROUND

[0001] The present invention relates to thermal energy storage containers and covers and, more particularly, to containers and covers having a thermal energy storage material located therein and to covers having a separately accessible chamber for storage of utensils and/or food accessories.

[0002] Thermal energy storage packs are generally known for use in maintaining the contents of a storage container in a heated or cooled state. For example, frozen thermal packs are pre-filled with a thermal energy storage material which can be frozen and then placed alongside food in an insulated container, such as a cooler, in order to maintain the cooler contents, such as food and drinks, in a cold state for a predetermined time period. Such thermal energy materials generally have 10-15 times the thermal capacity of frozen water and therefore maintain the cooler contents in a cold state for an extended period of time in comparison to ice alone. Such cold packs can be reused numerous times by refreshing them between use, and also avoid the problem of melting liquid contacting the items in the cooler. Energy storage materials which maintain heat are also known which can be preheated in a microwave, or through other means.

[0003] These heat or cold packs generally come in predetermined sizes which are not always convenient for a small quantity of food, such as a single person’s meal. In addition, for a person desiring to transport only a single meal for later consumption, placing one or more food storage containers and a thermal energy storage pack alongside food in a cooler or box and storing utensils or other food accessories can be a significant inconvenience.

[0004] It may be advantageous to provide a single container which includes one or more cavities for food storage, a compartment which holds thermal energy storage material, and/or a chamber for utensils and other food accessories.

SUMMARY

[0005] One embodiment of the present invention is directed to a thermal energy storage container. The thermal energy storage container comprises a base and a cover. The base defines at least one food storage cavity, such that any two cavities are separated by dividing walls in the base. The cover is detachably engaged with the base along its lateral sides, and comprises a cover body, a lid, and thermal energy storage material. The cover body defines a compartment such that when the cover and base are engaged, the compartment is located adjacent to the one or more food storage cavities formed by the base. Thermal energy storage material is located in this compartment such that depending on its temperature, it can heat or cool the contents of the one or more food storage cavities. The upper surface of the cover defines a chamber that is adapted to receive at least one utensil and/or other food accessory. The lid is positioned on the upper surface of the cover, and this lid allows access to the utensils or food accessories without opening the container or interfering with the interface of the thermal energy storage material and the food storage cavities.

[0006] Another embodiment of the present invention is separately directed to a thermal energy storage container. The thermal energy storage container comprises a base and a cover. The base defines at least one food storage cavity, such that any two cavities are separated by dividing walls in the base. The cover is detachably engaged with the base along its lateral sides, and comprises a cover body, a lid, and thermal energy storage material. The cover body defines a compartment such that when the cover and base are engaged, the compartment is located adjacent to the one or more food storage cavities formed by the base. Thermal energy storage material is located in this compartment such that depending on its temperature, it can heat or cool the contents of the one or more food storage cavities.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The foregoing summary, as well as the following detailed description of the preferred embodiments of the present invention, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there are shown in the drawings embodiments which are presently preferred. It is understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown. In the drawings:

[0009] FIG. 1 is a perspective view of a thermal energy storage container according to a preferred embodiment of the present invention in which a base may define three cavities.
adapted to receive food, and a cover is detachably engaged with the base, the cover comprising a cover body and a lid which in combination enclose a chamber for storage of utensils and/or food accessories;

[F0010] FIG. 2 is a top plan view of the thermal energy storage container of FIG. 1 showing the lid of the utensil storage chamber and the upper surface of the cover body, in which the lid preferably rotates about an axis generally skew from the lateral sides of the cover body;

[F0011] FIG. 3 is a bottom plan view of the thermal energy storage container of FIG. 1, showing the lower surface of the base and preferred tabs which may descend from the lateral sides of the cover body and engage the base;

[F0012] FIG. 4 is a front elevational view of the longer edge of the thermal energy storage container of FIG. 1, showing the shroud extending generally outward from the cover body and covering the crescent sections of the base, the shroud preferably includes two tabs which engage the base;

[F0013] FIG. 5 is a left side elevational view of the shorter edge of the thermal energy storage container of FIG. 1, showing the tab descending from the lateral side of the cover body and engaging the base;

[F0014] FIG. 6 is a cross sectional view of the thermal energy storage container of FIG. 1 as taken along the line 6-6 of FIG. 1, showing the cover body defining a compartment in which is located thermal energy storage material, a detachable panel may allow access to the compartment, and the thermal energy storage material located in this compartment may be configured as a removable insert;

[F0015] FIG. 7 is a cross sectional view of an alternate embodiment of the thermal energy storage container of FIG. 1 as taken along the line 6-6 of FIG. 1, showing the base defining a compartment in which is located thermal energy storage material, a detachable panel may allow access to the compartment, and the thermal energy storage material located in this compartment may be configured as a removable insert;

[F0016] FIG. 8 is a cross sectional view of an alternate embodiment of the thermal energy storage container of FIG. 1 as taken along the line 6-6 of FIG. 1, showing the cover body defining an annular compartment in which is located thermal energy storage material, a detachable panel may allow access to the compartment, and the thermal energy storage material located in this compartment may be configured as a removable insert;

[F0017] FIG. 9 is a perspective view of the thermal energy storage container of FIG. 1 showing the cover disengaged from the base, the cover comprising a cover body defining a chamber in which two utensils are located, and a lid positioned along the upper surface of the cover body, the lid rotated to its open position to expose the chamber.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[F0018] Certain terminology is used in the following description for convenience only and is not limiting. The words “right,” “left,” “front,” “back,” “lower,” and “upper” designate directions in the drawings to which reference is made. The words “inwardly” and “outwardly” refer to directions toward and away from, respectively, the geometric center of the container and designated parts thereof. The language “at least one of ‘A’, ‘B’, and ‘C’,” as used in the claims and in corresponding portions of the specification, means “any group having at least one ‘A’; or any group having at least one ‘B’; or any group having at least one ‘C’;— and does require that a group have at least one of each of ‘A’, ‘B’, and ‘C’.” Additionally, the terms “a” and “one”, as used in the claims and in corresponding portions of the specification, are defined as including one or more of the referenced item unless specifically stated otherwise. The term “utensil”, as used in the claims and in corresponding portions of the specification, means “any implement or food accessory used in (or with) the consumption of food or beverage items, including but not limited to a fork, a spoon, a knife, salt, pepper, a straw, chopsticks, or the like. The term “consumable”, as used in the claims and in corresponding portions of the specification, means “any item which is to be stored for later consumption or use, including but not limited to foods and beverages, including both items stored directly in the thermal energy storage system and items in separate packaging”. The above terminology includes the words above specifically mentioned, derivatives thereof, and words of similar import.

[F0019] Referring now to FIGS. 1-9, wherein like numerals indicate like elements throughout, the preferred embodiments of a thermal energy storage container 10 according to the present invention are shown. Briefly stated, the thermal energy storage container 10 includes a base 12 and a cover 14 which are adapted to maintain one or more consumable products within an acceptable temperature range for a desired period of time. The cover 14 comprises a cover body 16 and a lid 18. The cover body 16 defines a chamber 20 adapted to receive at least one utensil 48 or other food accessory, and the lid 18 is preferably positioned along the upper surface 54 of the cover body 16, and in combination with the cover body 16, the lid 18 encloses the chamber 20.

[F0020] Still referring to FIGS. 1-9, at least one of the base 12 or cover 14 defines a compartment 22 in which is located a thermal energy storage material 60. When the cover 14 is engaged with the base 12, the compartment 22 is preferably located adjacent to a cavity 36 formed by the base 12 to facilitate thermal transfer to consumables stored in the cavity 36. The thermal energy storage material 60 may be configured as a removable insert 62. When the thermal energy storage material 60 is configured as a removable insert it is preferably located in polymer pouch or container. However, any suitable material may be used to provide a casing for the removable insert without departing from the scope of the present invention. A detachable panel 24 may allow access to the compartment 22 to allow insertion and removal of a removable insert 62. The removable insert 62 can be removed from the container 10 and heated or cooled separately from the remainder of the container 10, and can be inserted when consumables are placed into the container 10 and require maintenance at a given temperature. Alternatively, access to the compartment 22 may not be allowed, and thermal energy storage material 60 may be nonremovably located in the compartment 22. In such an alternative embodiment, the base 12 or cover 14 is heated or cooled to allow the thermal energy storage material located therein to achieve the necessary temperature to heat and/or cool food located in the cavity 36.

[F0021] As shown in FIG. 1, the present invention relates to a thermal energy storage system 10 comprised of a base 12 and a cover 14. The base 12 and cover 14 are preferably made of a polymeric material, such as polyethylene terephthalate (PET), polyvinyl chloride (PVC), polylactide carbonate (PLC). However, the base 12 and cover 14 can be made of any other suitable material without departing from the scope of the present invention. The cover 14 preferably has a generally
rectilinear shape. When the cover 14 is engaged with the base 12, the thermal energy storage system 10 is preferably in the general shape of a rectangular prism where the distance 74 from the bottom of the base 12 to the top of the cover 14 is less than the distance 70 from the left side of the cover 14 to the right side of the cover 14, and less than the distance 72 from the front side of the cover 14 to the back side of the cover 14. However, any proportions and any shape can be used without departing from the scope of the present invention. For instance, the thermal energy storage system 10 can have a generally oval shape, a generally cylindrical shape, or a generally cubic shape without departing from the scope of the present invention.

[0022] As shown in FIGS. 1 and 2, the upper surface 54 of the cover 12 may include a lid 18 which in its closed position is preferably generally flush with the upper surface 54 of the cover body 16. The lid 18 can have a generally rectilinear shape. It is preferred that the generally rectilinear shape formed by the lid 18 is generally askew to the generally rectilinear shape formed by the cover 14. A recess 44 may be located on the cover 12 to allow the lid 18 to be opened by first inserting a finger in the recess 44 to grasp the lid 18 and then lifting the finger to rotate the lid 18 upwards about the pivots 26. The axis of rotation of the lid 18 is preferably generally askew from the lateral sides of the cover 14. The cover body 16 can include a plurality of tabs 32 which descend from the lateral sides of the cover body 16 and are adapted to engage the base 12.

[0023] As shown in FIG. 3, the base 12 may be divided into three cavities 36 in which consumables can be separately stored. However, the base 12 may define a single cavity or may be divided into any number of cavities without departing from the scope of the present invention. If the base defines more than one cavity, dividing walls 38 function to separate the consumables in each cavity 36 under ordinary movement of the food storage system. A lip 40 extends generally outwardly from an edge of the base 12 proximate to the opening of the three cavities 36 and can include two crescent sections 56. Each crescent section 56 may include a notch 42. When the cover 14 is fully engaged with the base 12, the tab 32 of the cover body 16 can be inserted into the notch 42.

[0024] As shown in FIGS. 4 and 5, the cover body 16 preferably comprises a shroud 30 which extends generally outwards from the cover body 16. When the cover 14 is engaged with the base 12, the shroud covers the lip 40 and the crescent sections 56 of the base 12. The shroud 30 can further include a plurality of tabs 32 which are each adapted to engage a notch 42 in the base 12 when the cover 14 is engaged with the base 12. The base 12 may be separated into three cavities 36 by dividing walls 38 which extend upwards from the lower surface of the base 12.

[0025] As shown in FIG. 6, when the thermal energy storage system 10 is active, the removable insert 62 which contains the thermal energy storage material 60 is enclosed in the compartment 22 of the cover body 16. The compartment 22 is located adjacent to the at least one cavity 36 formed by the base 12. A detachable panel 24 is preferably located on the surface of the cover 14 opposite from the lid 18. When the cover 14 is disengaged from the base 12, the detachable panel 24 may be removed to allow access to the compartment 22, and the removable insert 62 containing the thermal energy storage material 62 can be removed from the compartment 22. When the cover 14 is engaged with the base 12, the dividing walls 38 of the base 12 may limit the movement of the detachable panel 24 and thereby prevent the removable insert 60 containing thermal energy storage material 62 from completely leaving the compartment 22. However, the detachable panel may be located in any way that allows the removable insert 62 to be removed from the compartment 22 without departing from the scope of the present invention. Alternatively, the cover body 16 may completely enclose the compartment 22, and the thermal energy storage material 60 may be nonremovably located in the compartment 22.

[0026] Still referring to FIG. 6, the cover body 16 defines a chamber 20 adapted to receive at least one utensil 48 or other food accessory, and the lid 18 encloses this chamber 20. The lid 18 allows access to the chamber 20 without disengaging the cover 14 from the base 12. The cover body 16 preferably comprises a shroud 30 which extends generally outwards from the cover body 16. When the cover 14 is engaged with the base 12, the shroud 30 preferably covers the lip 40 and the crescent sections 56 of the base 12, and the shroud 30 further includes a plurality of tabs 32 which are extend over the lateral edges of the crescent sections 56 of the base 12. Each tab 32 is preferably adapted to engage a notch 42 in the base 12.

[0027] In an alternative embodiment, as shown in FIG. 7, the base 12 may be comprised of a base body 34 and thermal energy storage material 60. The base body 34 may define a compartment 22 which contains thermal energy storage material 60. The thermal energy storage material 60 may be located in a removable insert 62. The base may additionally comprise a detachable panel 24 located on the lower surface of the compartment 22. The detachable panel 24 can be removed without detaching the cover 14 from the base 12. The removable insert 62 which contains the thermal energy storage material 60 can be replaced without exposing the consumables stored in the cavities 36 of the base body 34. Alternatively, the base body 16 may completely enclose the compartment 22, and the thermal energy storage material 60 may be nonremovably located in the compartment 22. The compartment 22 is preferably located adjacent to the largest of the three cavities 36 formed by the base body 34, and this cavity should contain consumables which must be maintained within an acceptable temperature range for a predetermined period of time. The other two cavities may contain consumables which do not need to be maintained within this temperature range.

[0028] In an alternative embodiment, as shown in FIG. 8, the cover body 16 may define a compartment 22 of a generally annular shape which contains a thermal energy storage material 60. The thermal energy storage material 60 may be located in a removable insert 62. A detachable panel 24 may form a portion of the lower surface of the cover body 16. When the cover 14 is disengaged from the base 12, the detachable panel 24 may be removed to allow access to the compartment 22, and the removable insert 62 containing the thermal energy storage material 62 can be removed from the compartment 22. Alternatively, the cover body 16 may completely enclose the compartment 22, and the thermal energy storage material 60 may be nonremovably located in the compartment 22. The compartment 22 is located adjacent to the three cavities 36 formed by the base 12.

[0029] Referring to FIGS. 6-8, the shroud 30 of the cover 14 preferably engages the base 12 at its lip 34 and at the notch 42 in the crescent sections 56 which are located on opposing sides of the base 12. The tabs 32 can be locked into place to make a form locking connection between the cover 14 and the
base 12. However, any other suitable attachment elements may be utilized in accordance with the invention without departing from the scope of the present invention.

[0030] Referring to FIG. 9, two utensils 48 are shown in their preferred location in the chamber 20 of the cover 12. The lid 18 preferably rotates about an axis that is generally askew from the lateral sides of the cover body 16. The lid 18 is shown in its open position, and may include ribs 50 which enable it to maintain a planar shape when opened. The lid 18 can include a raised rim 52 to allow a close mating with the top surface 54 of the cover 12. A lid recess 46 matches the recess 44 of the cover 12 to allow the lid 18 to be easily opened for access to the utensil storage chamber 20. The utensils 48 can be added to the container 10 while simultaneously heating and/or cooling any food contained in the base 12.

[0031] Still referring to FIG. 9, the base 12 preferably defines three cavities 36 adapted to receive consumables. Dividing walls 38 in the base 12 function to separate the consumables in each cavity 36. A lip 40 extends generally outward from an edge of the base proximate to the opening of the at least one cavity. The lip 40 may include two generally crescent sections 56 on opposing sides of the base 12. Each crescent section 56 may include a notch 42 which engages the tab 32 of the cover 14 when the cover 14 is engaged with the base 12.

[0032] Referring to FIGS. 1-9, one embodiment of the present invention operates as follows. A person places the cover 14 in a freezer to chill the thermal energy storage material 60 therein. Then food is placed in the cavities 36 in the base and the cover 14 secured thereover. Then the lid is opened and a utensil 48 may be placed inside the cover. Once the utensil is secured in the utensil storage chamber 20, the container is ready to transport the consumables in an easy to transport and efficient fashion.

[0033] While various shapes, configurations, and features have been described above and shown in the drawings for the various embodiments of the present invention, those of ordinary skill in the art will appreciate from this disclosure that any combination of the above features can be used without departing from the scope of the present invention. Accordingly, it is recognized by those skilled in the art that changes may be made in the above described embodiments of the invention without departing from the broad inventive concept thereof. For example, the shape of the container, the relative dimensions of the container, the number and location of cavities adapted to receive consumables, and, if present, the location of the detachable panel may be changed without departing from the scope of the present invention. It is understood, therefore, that this invention is not limited to the particular embodiments disclosed, but is intended to cover all modifications which are within the spirit and scope of the invention as defined by the appended claims and/or shown in the attached drawings.

What is claimed is:

1. A container adapted to separately hold at least one of a food, a utensil, and a food accessory, comprising:

a base defining at least one cavity adapted to receive food; and

a cover detachably engaged with the base, the cover comprising:

a cover body having lateral sides and an upper surface defining at least one chamber adapted to receive at least one utensil;

the cover body defining a compartment located such that, while the cover is engaged with the base, the compartment is located adjacent to at least one cavity formed by the base;

thermal energy storage material located in the compartment and adapted to heat and/or cool food located in the at least one food receiving cavity in the base; and

a lid positioned along the upper surface of the cover body and adapted to, in combination with the cover body, enclose the at least one chamber, wherein the at least one chamber allows the at least one of the utensil and the food accessory to be added to the container while simultaneously heating and/or cooling any food contained in the base body and reducing the transfer of thermal energy between any food in the base body and the atmosphere surrounding the container.

2. The container of claim 1, wherein the cover body includes a detachable panel located on a surface opposite from the lid adapted to allow access to the compartment.

3. The container of claim 1, wherein the thermal energy storage material is configured as a removable insert to allow the thermal energy storage material to be heated or cooled separately from the cover.

4. The container of claim 1, wherein the lid rotates around an axis that is generally askew from the lateral sides of the cover body.

5. The container of claim 1, wherein the cover has a major surface with a generally rectilinear shape and the lid has a generally rectilinear shape, the generally rectilinear shape formed by the lid being generally askew to the generally rectilinear shape formed by the cover.

6. The container of claim 1, wherein the lid is aligned at an angle relative to the upper surface of the cover body.

7. A container, comprising:

a base defining at least one cavity adapted to receive food; and

a cover detachably engaged with the base, the cover comprising:

a cover body having lateral sides and an upper surface defining at least one chamber adapted to receive a food accessory and/or food;

the cover body defining a compartment located such that, while the cover is engaged with the base, the compartment is located adjacent to at least one cavity;

thermal energy storage material located in the compartment and adapted to heat and/or cool food located in the at least one food receiving cavity in the base; and

a lid positioned along the upper surface of the cover body and adapted to, in combination with the cover body, enclose the at least one chamber, wherein the lid rotates around an axis that is generally askew from the lateral sides of the cover body.

8. The container of claim 7, wherein at least one utensil is located in the at least one chamber.

9. The container of claim 8, wherein when the lid is closed, an outer surface of the lid is generally flush with the upper surface of the cover surrounding the at least one chamber.

10. The container of claim 7, wherein the cover has a major surface with a generally rectilinear shape and the lid has a generally rectilinear shape, the generally rectilinear shape formed by the lid being generally askew to the generally rectilinear shape formed by the cover.
11. The container of claim 10, wherein the lid is pivotally connected to the cover body via a hinge.

12. The container of claim 10, wherein the thermal energy storage material is a gel.

13. The container of claim 10, further comprising a plurality of tabs depending from the lateral sides of the cover body and adapted to engage the base.

14. The container of claim 7, wherein the cover body includes a detachable panel located on a surface opposite from the lid adapted to allow access to the compartment.

15. The container of claim 7, wherein the thermal energy storage material is configured as a removable insert to allow the thermal energy storage material to be heated or cooled separately from the cover.

16. A container adapted to separately hold consumables, comprising:
   a base comprising:
   a base body defining at least one cavity adapted to receive food;
   a lip extending generally outwardly from an edge of the base body proximate to the opening of the at least one cavity, the lip including generally crescent sections on opposing sides of the base body, the crescent sections each including a notch therein;
   a cover detachably engaged with the base, the cover comprising:
   a cover body having lateral sides and an upper surface defining at least one chamber adapted to receive a food accessory and/or food; the cover body defining a compartment located therein; thermal energy storage material located in the compartment and adapted to heat and/or cool food located in the at least one food receiving cavity in the base; and a lid positioned along the upper surface of the cover body and adapted to, in combination with the cover body, enclose the at least one chamber, wherein the lid is aligned at an angle relative to the upper surface of the cover body;
   a shroud extending generally outwardly from the cover body and adapted to, when the cover is secured to the base, cover the lip and the crescent sections of the base body, the shroud further including a plurality of tabs each adapted to engage a notch in the base body when the shroud covers the lid of the base body; and
   at least one utensil located in the at least one chamber.

17. The container of claim 16, wherein the cover body includes a detachable panel located on a surface opposite from the lid adapted to allow access to the compartment.

18. The container of claim 16, wherein the thermal energy storage material is configured as a removable insert to allow the thermal energy storage material to be heated or cooled separately from the cover.

19. The container of claim 18, wherein the base body defines multiple cavities for receiving food with dividing walls configured to prevent thermal energy storage material from completely leaving the compartment if the panel is dislodged while the cover is engaged with the base.