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Inventor(s)	Waltermire; Jamie et al.

BOX LINER

Abstract

An insulated box assembly can include an insulated liner defining a liner cavity, the liner including a pair of opposing main liner panels, a pair of opposing side liner panels, and a bottom liner panel, the main liner panels, the side liner panels, and the bottom liner panel each being defined by an insulation batt encapsulated in a panel cavity defined between a pair of blank sheets, each panel cavity of each main panel and each side panel being enclosed by a liner border, and the panel cavity of the bottom liner panel being enclosed by a bottom border, wherein the bottom border forms a bottom seam along a perimeter of the bottom liner panel with portions of the liner borders of the main liner panels and side liner panels.

Inventors: **Waltermire; Jamie (Peachtree City, GA), Ott; Paul (Atlanta, GA)**

Applicant: **Pratt Retail Specialties, LLC** (Brookhaven, GA)

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Background/Summary

CROSS-REFERENCE TO RELATED APPLICATIONS [0001] This application is a continuation of U.S. application Ser. No. 17/891,565, filed Aug. 19, 2022, which is a continuation of U.S. application Ser. No. 17/079,437, filed Oct. 24, 2020, which issued into U.S. Pat. No. 11,485,566 on Nov. 1, 2022, which is a continuation of U.S. application Ser. No. 16/526,511, filed Jul. 30, 2019, which issued into U.S. Pat. No. 10,882,681 on Jan. 5, 2021, which is a divisional of U.S. application Ser. No. 15/482,186, filed Apr. 7, 2017, which issued into U.S. Pat. No. 10,800,595 on Oct. 13, 2020, each of which is hereby incorporated by reference herein in its respective entirety.

JOINT RESEARCH AGREEMENT
[0002] The subject matter disclosed herein was developed and the claimed invention was made by, or on behalf of, one or more parties to a joint research agreement between MP Global Products LLC of Norfolk, NE and Pratt Retail Specialties, LLC of Conyers, GA, that was in effect on or before the effective filing date of the claimed invention, and the claimed invention was made as a result of activities undertaken within the scope of the joint research agreement.
TECHNICAL FIELD
[0003] This disclosure relates to packaging. More specifically, this disclosure relates to an insulated liner for box.
BACKGROUND
[0004] Packaging perishable or temperature sensitive contents for storage or shipping can pose challenges. The contents can spoil, destabilize, freeze, melt, or evaporate during storage or shipping if the temperature of the contents is not maintained or the packaging is not protected from hot or cold environmental conditions. Contents such as food, pharmaceuticals, electronics, or other temperature sensitive items can be damaged if exposed to temperature extremes. Many insulated packages are bulky and difficult to store prior to use. Many insulated packages cannot be recycled and are often disposed of in landfills.
SUMMARY
[0005] It is to be understood that this summary is not an extensive overview of the disclosure. This summary is exemplary and not restrictive, and it is intended to neither identify key or critical elements of the disclosure nor delineate the scope thereof. The sole purpose of this summary is to explain and exemplify certain concepts of the disclosure as an introduction to the following complete and extensive detailed description.
[0006] Disclosed is an insulated box assembly including an insulated liner defining a liner cavity, the liner including a pair of opposing main liner panels, a pair of opposing side liner panels, and a bottom liner panel, the main liner panels, the side liner panels, and the bottom liner panel each being defined by an insulation batt encapsulated in a panel cavity defined between a pair of blank sheets, each panel cavity of each main panel and each side panel being enclosed by a liner border, and the panel cavity of the bottom liner panel being enclosed by a bottom border, wherein the bottom border forms a bottom seam along a perimeter of the bottom liner panel with portions of the liner borders of the main liner panels and side liner panels.
[0007] Various implementations described in the present disclosure may include additional

systems, methods, features, and advantages, which may not necessarily be expressly disclosed herein but will be apparent to one of ordinary skill in the art upon examination of the following detailed description and accompanying drawings. It is intended that all such systems, methods, features, and advantages be included within the present disclosure and protected by the accompanying claims. The features and advantages of such implementations may be realized and obtained by means of the systems, methods, features particularly pointed out in the appended claims. These and other features will become more fully apparent from the following description and appended claims, or may be learned by the practice of such exemplary implementations as set forth hereinafter.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] The features and components of the following figures are illustrated to emphasize the general principles of the present disclosure. The drawings are not necessarily drawn to scale. Corresponding features and components throughout the figures may be designated by matching reference characters for the sake of consistency and clarity.

[0009] FIG. **1**A is an exploded view of an insulated box assembly comprising a box, an insulated liner, and an insulated panel in accordance with one aspect of the disclosure.

[0010] FIG. **1**B is a perspective view of the insulated box assembly of FIG. **1**A.

[0011] FIG. **1**C is a perspective view of the insulated box assembly of FIG. **1**A.

[0012] FIG. **2**A is a perspective view of the insulated liner of FIG. **1**A in a collapsed insertion configuration.

[0013] FIG. **2**B is a perspective view of the insulated liner of FIG. **1**A in an expanded configuration.

[0014] FIG. **3**A is an exploded view of the insulated liner comprising two blank liner panels and a bottom panel and the insulated panel of FIG. **1**A.

[0015] FIG. **3**B is an exploded view of the insulated liner and the insulated panel of FIG. **1**A in an aligned configuration.

[0016] FIG. **3**C is a perspective view of the insulated liner and the insulated panel of FIG. **1**A in an assembled configuration.

[0017] FIG. **4**A is a cross-sectional view of the insulated box assembly of FIG. **1**A taken along line **4-4** of FIG. **1**C.

[0018] FIG. **4**B is a detail view of the insulated box assembly taken from Detail **4**B of FIG. **4**A.

[0019] FIG. **4**C is a detail view of the insulated box assembly taken from Detail **4**C of FIG. **4**A.

[0020] FIG. **5** is a perspective view of a method of manufacturing for an insulated panel.

[0021] FIG. **6**A is a top view of another aspect of a liner panel.

[0022] FIG. **6**B is a top view of another aspect of an insulated liner.

[0023] FIG. **7** is a top view of an aspect of a blank sheet and an aspect of an insulation batt for the liner panel of FIG. **3**A.

[0024] FIG. **8** is a top view of another aspect of the blank sheet and another aspect of the insulation batt for the bottom panel of FIG. **3**A.

[0025] FIG. **9** is a top view of another aspect of the blank sheet and another aspect of the insulation batt for the insulated panel of FIG. **3**A.

DETAILED DESCRIPTION

[0026] The present disclosure can be understood more readily by reference to the following detailed description, examples, drawings, and claims, and the previous and following description. However, before the present devices, systems, and/or methods are disclosed and described, it is to be understood that this disclosure is not limited to the specific devices, systems, and/or methods

disclosed unless otherwise specified, and, as such, can, of course, vary. It is also to be understood that the terminology used herein is for the purpose of describing particular aspects only and is not intended to be limiting.

[0027] The following description is provided as an enabling teaching of the present devices, systems, and/or methods in its best, currently known aspect. To this end, those skilled in the relevant art will recognize and appreciate that many changes can be made to the various aspects of the present devices, systems, and/or methods described herein, while still obtaining the beneficial results of the present disclosure. It will also be apparent that some of the desired benefits of the present disclosure can be obtained by selecting some of the features of the present disclosure without utilizing other features. Accordingly, those who work in the art will recognize that many modifications and adaptations to the present disclosure are possible and can even be desirable in certain circumstances and are a part of the present disclosure. Thus, the following description is provided as illustrative of the principles of the present disclosure and not in limitation thereof.

[0028] As used throughout, the singular forms “a,” “an” and “the” include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to “an element” can include two or more such elements unless the context indicates otherwise.

[0029] Ranges can be expressed herein as from “about” one particular value, and/or to “about” another particular value. When such a range is expressed, another aspect includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by use of the antecedent “about,” it will be understood that the particular value forms another aspect. It will be further understood that the endpoints of each of the ranges are significant both in relation to the other endpoint, and independently of the other endpoint.

[0030] For purposes of the current disclosure, a material property or dimension measuring about X or substantially X on a particular measurement scale measures within a range between X plus an industry-standard upper tolerance for the specified measurement and X minus an industry-standard lower tolerance for the specified measurement. Because tolerances can vary between different materials, processes and between different models, the tolerance for a particular measurement of a particular component can fall within a range of tolerances.

[0031] As used herein, the terms “optional” or “optionally” mean that the subsequently described event or circumstance can or cannot occur, and that the description includes instances where said event or circumstance occurs and instances where it does not.

[0032] The word “or” as used herein means any one member of a particular list and also includes any combination of members of that list. Further, one should note that conditional language, such as, among others, “can,” “could,” “might,” or “may,” unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain aspects include, while other aspects do not include, certain features, elements and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or more particular aspects or that one or more particular aspects necessarily include logic for deciding, with or without user input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular aspect.

[0033] Disclosed are components that can be used to perform the disclosed methods and systems. These and other components are disclosed herein, and it is understood that when combinations, subsets, interactions, groups, etc. of these components are disclosed that while specific reference of each various individual and collective combinations and permutation of these may not be explicitly disclosed, each is specifically contemplated and described herein, for all methods and systems. This applies to all aspects of this application including, but not limited to, steps in disclosed methods. Thus, if there are a variety of additional steps that can be performed it is understood that each of these additional steps can be performed with any specific aspect or combination of aspects of the disclosed methods.

[0034] In one aspect, disclosed is an insulated box assembly and associated methods, systems,

devices, and various apparatus. The insulated box assembly can comprised a box, an insulated panel, and an insulated liner. It would be understood by one of skill in the art that the disclosed valve body is described in but a few exemplary aspects among many. No particular terminology or description should be considered limiting on the disclosure or the scope of any claims issuing therefrom.

[0035] FIGS. **1**A-C disclose and describe an insulated box assembly **100** in one aspect of the present disclosure. FIG. **1**A is an exploded view of an insulated box assembly **100** comprising a box **110**, an insulated liner **140**, and an insulated panel **130**. In the present aspect, the box **110** can be a chute box; however, in other aspects, the box **110** can be any suitable type of box. The box **110** can comprise a pair of opposing main box panels **112**, a pair of opposing side box panels **114**, a box bottom panel **413** (shown in FIG. **4**A), and a lid **116**. The box **110** can define a top box end **111** and a bottom box end **113**, and the top box end **111** can be disposed opposite from the bottom box end **113**. The opposing main box panels **112**, the opposing side box panels **114**, and the box bottom panel **413** of the box **110** can define an internal box cavity **122**, and the internal box cavity **122** can define a box opening **120** positioned at the top box end **111** of the box **110**. The lid **116** can be attached to the box **110** at the top box end **111** by a lid hinge **118**, and the lid **116** can be configured to selectively move about and between an open position and a closed position. In the closed position, the lid **116** can be configured to cover the box opening **120** and seal the internal box cavity **122**. In the open position shown in FIGS. **1**A-C, the lid **116** can be configured to uncover the box opening **120**, and a user can add or withdraw contents from the internal box cavity **122**. The internal box cavity **122** can be configured to receive the insulated liner **140** and the insulated panel **130**.

[0036] The insulated liner **140** can be configured to line the internal box cavity **122**. In the present aspect, the insulated liner **140** can comprise a liner bottom **149**, an opposing pair of main liner panels **147**, and an opposing pair of side liner panels **145**. The liner bottom **149**, the opposing pair of main liner panels **147**, and the opposing pair of side liner panels **145** can define a liner cavity **150**. The insulated liner **140** can comprise and be assembled from a bottom panel **146** and an opposing pair of blank liner panels **141**. The blank liner panels **141** can be attached in an opposing configuration by a pair of side seams **143**. Each blank liner panel **141** can define a main subpanel **142** positioned between a pair of side subpanels **144**. In the opposing configuration, the blank liner panels **141** are aligned and facing each other such that the main subpanels **142** of the respective blank liner panels **141** can be aligned and each of the side subpanels **144** of a one of the blank liner panels **141** is aligned with a different one of the side subpanels **144** of another of the blank liner panels **141**. Each of the main subpanels **142** of the blank liner panels **141** can define a one of the main liner panels **147** of the insulated liner **140**. Each of the side seams **143** can attach together a one of the side subpanels **144** from each of the blank liner panels **141**, thereby defining a one of the side liner panels **145**.

[0037] The bottom panel **146** can be positioned at a bottom liner end **162** of the insulated liner **140**. A liner opening **148** of the liner cavity **150** can be defined at a top liner end **160** opposite from the bottom liner end **162**. The bottom panel **146** can define the liner bottom **149** of the insulated liner **140**. In other aspects, the insulated liner **140** can be a one-piece insulated liner **640**, as shown in FIG. **6**B, which can comprise a one-piece blank liner panel **680**, as shown in FIG. **6**A. In such aspects, the liner bottom **149**, the opposing pair of main liner panels **147**, and the opposing pair of side liner panels **145** can be defined by the one-piece blank liner panel **680**.

[0038] As shown in FIG. **1**A, the insulated liner **140** can be collapsed into a collapsed insertion configuration in which the side liner panels **145** can be folded inwards towards the liner cavity **150**, the main liner panels **147** can collapse inwards towards the liner cavity **150**, and the liner bottom **149** of the insulated liner **140** can be in a folded position. In this configuration, the side liner panels **145** do not interfere with the opposing side box panels **114** of the box **110**, and the collapsed main liner panels **147** provide a clearance between the insulated liner **140** and the opposing main box

panels **112**. The clearance can facilitate insertion of the insulated liner **140** into the box **110**. In the collapsed insertion position, the insulated liner **140** can be inserted into the internal box cavity **122** through the box opening **120**. Inserting the insulated liner **140** fully into the internal box cavity **122** can assist in expanding the insulated liner **140** into an expanded configuration. This effect is further described below with respect to FIG. **2**A.

[0039] FIG. **1**B is a perspective view of the insulated box assembly **100** of FIG. **1**A. As shown, the insulated liner **140** can be configured to fit within the internal box cavity **122** of the box **110**. In the expanded configuration, the insulated liner **140** can be sized and shaped complimentary to the internal box cavity **122**. The insulated liner **140** can conform to a shape defined by the internal box cavity **122**. The liner opening **148** can be positioned adjacent to the box opening **120**. The liner opening **148** can define a substantially rectangular shape complimentary in a size and a shape to the box opening **120**. In the present aspect, the main liner panels **147** can be in facing engagement with the main box panels **112**, the side liner panels **145** can be in facing engagement with the side box panels **114**, and the liner bottom **149** can be in facing engagement with the box bottom panel **413** (shown in FIG. **4**A) of the box **110**.

[0040] FIG. **1**C is a perspective view of the insulated box assembly **100** of FIG. **1**A. As shown, the insulated panel **130** can be a top panel **131** configured to cover the liner opening **148**. The insulated panel **130** can comprise insulation, and a seal formed between the insulated panel **130** and the insulated liner **140** can increase an insulation value of the liner cavity **150** as shown in FIG. **4**A. The lid **116** can be placed in the closed position (not shown) to enclose the insulated liner **140** and the insulated panel **130** within the internal box cavity **122**. The lid **116** can comprise a lip **117** which can be shaped complimentary to the box opening **120**. The lip **117** can form a box seal by overlapping a portion of the main box panel **112**, and the side box panels **114** at the top box end **111** of the box **110**.

[0041] FIG. **2**A is a perspective view of the insulated liner **140** of FIG. **1**A in the collapsed insertion configuration. When the side liner panels **145** are folded inwards towards the liner cavity **150**, each pair of side subpanels **144** of the side liner panels **145** can fold relative to each other about the respective side seam **143**. Each side subpanel **144** can fold relative to a one of the main subpanels **142** about a side crease line **242**. Each of the side subpanels **144** can define an acute angle with an adjacent one of the main subpanels **142**.

[0042] In the present aspect, the insulated panel **130**, blank liner panel **141**, and bottom panel **146** can each demonstrate a positional memory which biases the panel **130**,**141**,**146** towards a flat, substantially planar configuration. When the panels **130**,**141**,**146** are subjected to a bending moment or force, the panels **130**,**141**,**146** can elastically deform; however when the bending moment or force is removed, the panels **130**,**141**,**146** can return to the substantially planar configuration. When the panels **130**,**141**,**146** are elastically deformed, internal stresses can produce a force which resists the deflection. As the degree of deflection increases, the internal stresses can increase, and the resisting force can increase as well. When the panels **130**,**141**,**146** are returned to the substantially planar configuration, the force can be minimized or eliminated. The force can be maximized when the panels **130**,**141**,**146** are folded in half.

[0043] When the main liner panels **147** are collapsed inwards towards the liner cavity **150**, the liner bottom **149** folds about a bottom crease line **247**. The bottom crease line **247** can substantially bisect the liner bottom **149**. The liner bottom **149** can fold downwards away from the side liner panels **145** exposing openings between the liner bottom **149** and the side liner panels **145**. The liner bottom **149** can demonstrate the positional memory which can exert a force F.sub.2 biasing the liner bottom **149** towards the expanded configuration from the collapsed insertion configuration. The force F.sub.2 can resist folding of the liner bottom **149** about the bottom crease line **247**. In the present aspect, the force F.sub.2 can be exerted by the bottom panel **146** of the liner bottom **149**; however in other aspects in which the liner bottom **149** is defined by a blank liner panel, the force F.sub.2 can be exerted by the blank liner panel. Once in the expanded configuration, a value of the

force F.sub.2 is minimized.
[0044] In the present aspect, the bottom panel **146** can be attached to the main subpanels **142** by a pair of bottoms seams **246**. In the present aspect, the bottom seams **246** can be flexible and do not demonstrate positional memory or a biasing force; however, in other aspects, the bottom seams **246** can be crease lines defined by a blank liner panel which can demonstrate positional memory and a biasing force.
[0045] The force F.sub.2 can cooperate with a force F.sub.1 to expand the insulated liner **140** from the collapsed insertion configuration to the expanded configuration. When the insulated liner **140** is inserted into the box **110**, interference between the box bottom panel **413** (shown in FIG. **4**A) of the box **110** and the liner bottom **149** of the insulated liner **140** can urge the liner bottom **149** to unfold. As shown, the force F.sub.1 can act on the liner bottom **149** proximate the bottom crease line **247**. The force F.sub.1 can produce a moment about the bottom seams **246** which can bias the liner bottom **149** to unfold and flatten into a substantially planar configuration. The flattening of the liner bottom **149** can expand the opposing main liner panels **147** away from the liner cavity **150**.
[0046] FIG. **2**B is a perspective view of the insulated liner **140** of FIG. **1**A in the expanded configuration. In the expanded configuration, a one of the main liner panels **147** can be parallel to another of the main liner panels **147**, and a one of the side liner panels **145** can be parallel to another of the side liner panels **145**. The liner bottom **149** can be substantially perpendicular to each of the main liner panels **147** and each of the side liner panels **145**. The side liner panels **145**, and the liner bottom **149** can be unfolded and substantially planar. The liner bottom **149** can be in non-sealing, connectionless contact with each of the side liner panels **145**. The main liner panels **147** can be expanded away from the liner cavity **150**.
[0047] In the present aspect, the blank liner panels **141** can also demonstrate the positional memory and exert a force F.sub.3 biasing the side subpanels **144** to rotate about the side crease lines **242** away from the main subpanels **142** and towards the expanded configuration. In the expanded configuration, each of the side subpanels **144** can define a substantially right angle with the adjacent one of the main subpanels **142**. If the insulated liner **140** is not restrained by the box **110**, the side subpanels **144** can be biased to further unfold away from the main subpanels **142** to a collapsed storage position shown in FIG. **3**C. In the present aspect, the side seams **143** can be flexible and do not demonstrate positional memory or a biasing force; however, in other aspects, the side seams **143** can be crease lines which can demonstrate positional memory and a biasing force.
[0048] The forces F.sub.1,F.sub.2,F.sub.3 can cooperate to produce a self-expanding effect biasing the insulated liner **140** from the collapsed insertion configuration to the expanded configuration. The insulated liner **140** can be configured to self-expand from the collapsed insertion configuration to the expanded configuration when the insulated liner **140** is inserted or dropped into the internal box cavity **122** of the box **110**. The self-expanding effect can be desirable in order to reduce or eliminate manual manipulation of the insulated liner **140** when inserting the insulated liner **140** into the box **110**, such as in a manufacturing operation. The self-expanding effect can reduce the time required to assemble each insulated box assembly **100** or can facilitate automated assembly of the insulated box assemblies **100** such as by robotic or mechanized equipment.
[0049] FIGS. **3**A-C show a perspective view of the assembly of the insulated liner **140**. FIG. **3**A is an exploded view of the insulated liner **140** comprising two blank liner panels **141** and a bottom panel **146** and the insulated panel **130** of FIG. **1**A. In the present aspect, panels **130**,**141**,**146** can each define a border which can each be a two-ply seam. The blank liner panels **141** can each define a liner border **341** extending around a perimeter of the respective blank liner panel **141**. The bottom panel **146** can define a bottom border **308** extending around a perimeter of the bottom panel **146**. The insulated panel **130** can define a panel border **333** extending around a perimeter of the insulated panel **130**. The liner border **341** can extend from the liner opening **148** to the bottom panel **146**.

[0050] FIG. **3**B is an exploded view of the insulated liner **140** and the insulated panel **130** of FIG. **1**A in an aligned configuration. The two blank liner panels **141** are shown aligned in an opposing configuration, and the bottom panel **146** is folded about the bottom crease line **247** and aligned with each of the main subpanels **142** of the pair of blank liner panels **141**. At opposing ends of each blank liner panel **141**, a portion of each liner border **341** adjacent to a one of the side subpanels **144** can define a side border portion **343**. The side border portions **343** of a one of the blank liner panels **141** can be aligned and adjacent to the side border portions **343** of a second of the blank liner panels **141**.

[0051] Similarly, at opposing ends of the bottom panel **146** distal from the bottom crease line **247**, the bottom border **308** can define a pair of first bottom border portions **346**. A portion of each liner border **341** adjacent to the main subpanel **142** and distal from the liner opening **148** can define a second bottom border portion **347**. Each of the first bottom border portions **346** of the bottom panel **146** can be aligned with a different one of the second bottom border portions of the pair of blank liner panels **141**. In the position shown, the panels **141**,**146** are prepared to be attached to form the seams **143**,**246**. The aligned side border portions **343** of the opposing blank liner panels **141** can be attached in facing engagement to form the side seams **143**. Each of the sides seams **143** can be formed as a plain seam; however in other aspects, each of the side seams **143** can be a lap seam or any other type of seam. Each of the bottom seams **246** can be formed by attaching a one of the first bottom border portions **346** to a one of the second bottom border portions **347** in facing engagement. Each of the bottom seams **246** can be formed as a lap seam; however in other aspects, each of the bottom seams **246** can be a plain seam or any other type of seam. In other aspects, each of the bottom seams **246** can be formed by attaching a one of the first bottom border portions **346** directly to a one of the main subpanels **142** rather than to a portion of the liner border **341**.

[0052] FIG. **3**C is a perspective view of the assembled insulated liner **140** and the insulated panel **130** of FIG. **1**A in an assembled configuration. In the present aspect, the bottoms seams **246** and the side seams **143** can be flexible and function as living hinges. Each of the side seams **143** can extend from the liner opening **148** to the bottom border portion **347**. The border portions **343**,**346**,**347** can be attached in facing engagement using a glue, adhesive, tape, cement, or any other method of attachment such as stitching or stapling.

[0053] In the embodiment shown in FIGS. **3**C, the insulated panel **130** can be the top panel **131**. In the present aspect, the top panel **131** can be separate and disconnected from the insulated liner **140**. In other aspects, the top panel **131** can be attached to the insulated liner **140** by a top seam (not shown) formed by attaching a portion of the panel border **333** to a portion of the liner border **341** proximate the liner opening **148**. The top seam (not shown) can also function as a living hinge allowing the top panel **131** to rotate about the top seam relative to the insulated liner **140**.

[0054] FIG. **3**C depicts the insulated liner **140** in the collapsed storage configuration. In the collapsed storage configuration, the side liner panels **145** extend outwards and away from the liner cavity **150**, and the main liner panels **147** are collapsed together in facing engagement. Each of the side subpanels **144** can define an obtuse angle with an adjacent one of the main subpanels **142**. In this configuration, the force F.sub.3 exerted about the side crease lines **242** by the positional memory of the blank liner panels **141** is minimized. Conversely, when the insulated liner **140** is in the collapsed insertion configuration shown in FIGS. **1**A and **2**A, the force F.sub.3 is maximized as each of the blank liner panels **141** can be nearly folded in half about each of the side crease lines **242**. The collapsed storage configuration can be used for stacking, storing, or packaging the insulated liners **140** in bulk.

[0055] FIG. **4**A is a cross-sectional view of the insulated box assembly **100** of FIG. **1**A viewed from line **4-4** of FIG. **1**C. In the aspect shown, the insulated box assembly **100** can optionally comprise three insulated panels **130**A,B,C. In other aspects, the insulated box assembly **100** can comprise greater or fewer than three insulated panels **130**. In the present aspects, the insulated panels **130**B and **130**C can be sized smaller than the insulated panel **130**A in order to facilitate

insertion into the liner cavity **150**. In other aspects, the insulated panels **130**A,B,C can all be sized and shaped similarly. The insulated panel **130**A can be the top panel **131** positioned over the liner opening **148**.

[0056] The insulated panel **130**B can be a divider panel **431** which can partition the liner cavity **150** into a first insulated compartment **450**A and a second insulated compartment **450**B. This configuration can be desirable in order to maintain the first insulated compartment **450**A and the second insulated compartment **450**B at separate temperatures. In other aspects, the insulated box assembly **100** can comprise a plurality of divider panels **431** which can divide the liner cavity **150** into more than two insulated compartments **450**. In the present aspect, the divider panel **431** can be in a horizontal orientation configured to partition the liner cavity **150** top-to-bottom. In other aspects, the divider panel **431** can be in a vertical orientation configured to partition the liner cavity **150** side-to-side, front-to-back, or diagonally. In some aspects, the insulated box assembly **100** can comprise a plurality of divider panels **431** in both horizontal orientations and vertical orientations. In the present aspect, the panel border **333** of the divider panel **431** can form a seal with the main liner panels **147** and the side liner panels **145** of the insulated liner **140**. In some aspects, the divider panel **431** can rest upon contents of the second insulated compartment **450**B.

[0057] Insulated panel **130**C can be a floor panel **432** positioned on top of the bottom panel **146**. In some embodiments, the bottom panel **146** may not comprise insulation (not shown), and the floor panel **432** can be placed atop the bottom panel **146** of the liner bottom **149** to insulate the bottom liner end **162**. Such a configuration can be desirable in order to simplify manufacturing or reduce manufacturing steps. In the aspect shown, the bottom panel **146** comprises insulation, and the floor panel **432** can be positioned on top of the bottom panel **146** to provide increased insulation to the bottom liner end **162**. This configuration can be desirable when the contents of the liner cavity **150** are heavy and can compress the insulation at the bottom liner end **162**, thereby possibly rendering the insulation less effective. This configuration can also be desirable to provide increased insulation against conduction of heat through the bottom liner end **162** of the insulated liner **140** when the insulated box assembly **100** is resting upon a hot or cold environmental surface. As shown, each of the panels **130**,**141**,**146** can each be insulated.

[0058] FIG. **4**B is a detail view of the insulated box assembly **100** taken from detail **4**B of FIG. **4**A. As shown in FIGS. **4**B and **4**C and described in further detail with regard to FIG. **5**, the panels **130**,**141**,**146** can each comprise an insulation batt **490** encapsulated between a pair of blank sheets **491**. The insulation batt **490** can be positioned in a panel cavity **492** defined between the blank sheets **491**. The panel cavity **492** can be enclosed by a border **493**, which can be the panel border **333**, the liner border **341**, or the bottom border **308**. The border **493** can be formed by attaching together in facing engagement a perimeter portion **495** of each of the blank sheets **491**. In the present aspect, the perimeter portions **495** of the blank sheets **491** can be attached together by a first adhesive **426** which can be a glue, cohesive, cement, epoxy, or tape strip. In other aspects, the blank sheets **491** can be attached by another suitable method such as stitching or stapling.

[0059] FIG. **4**B shows the construction of the top panel **131** and the blank liner panel **141**. The top panel **131** can taper towards the panel border **333** which can define a beveled panel edge **433**. Similarly, the blank liner panel **141** can taper towards the liner border **341** which can define a beveled liner edge **441** proximate the liner opening **148**. When the top panel **131** is positioned to cover the liner opening **148**, the panel border **333** and the beveled panel edge **433** can cooperate with the liner border **341** and the beveled liner edge **441** to form a seal between the top panel **131** and the insulated liner **140**. The seal can improve an insulation value of the liner cavity **150**.

[0060] FIG. **4**C is a detail view of the insulated box assembly **100** taken from detail **4**C of FIG. **4**A. FIG. **4**C shows a one of the bottom seams **246** formed between the bottom panel **146** and the blank liner panel **141**. In the present aspect, each of the bottom seams **246** can be formed by attaching a one of the first bottom border portions **346** of the bottom panel **146** to a one of the second bottom border portions **347** of the blank liner panels **141**, as described relative to FIG. **3**C, which can

define a four-ply seam comprised of four overlapping perimeter portions **495**. Each of the side seams **143** can be a similarly constructed four-ply seam. The first bottom border portion **346** can be attached to the second bottom border portion **347** in facing engagement with a second adhesive **427**. The second adhesive **427** can be the same as the first adhesive **426**, or in other aspects, the second adhesive **427** can be a different type of adhesive such as a glue, cement, epoxy, or tape strip. As shown, the panel border **333** of insulated panel **130**C can cooperate with the insulated liner **140** to form a seal within the liner cavity **150**.

[0061] FIG. **5** is a perspective view of a method of manufacturing for an insulated panel **480**. The insulated panel **480** can be representative of the insulated panels **130**, the blank liner panels **141**, the bottom panel **146**, or the blank liner panel **680** (shown in FIG. **6**).

[0062] In a step **501**, an insulation batt **490** can be positioned between a pair of blank sheets **491**. The blank sheets **491** can be sized and shaped complimentary to each other; however in some aspects, the blank sheets **491** can differ in size and shape. Each sheet can define an outer edge **595** and a perimeter portion **495** proximate the outer edge **595**. The perimeter portions **495** can extend around the outer edge **595** of each of the respective blank sheets **491**. The insulation batt **490**, blank sheets **491**, and the insulated panel **480** can each be substantially flat and planar prior to assembly.

[0063] The blank sheets **491** can be sized to overhang the insulation batt **490** on all sides with the perimeter portions **495** extending beyond the insulation batt **490**. The perimeter portions **495** can each encompass an interior portion **494** of a different one of the blank sheets **491**. The interior portions **494** can be sized and shaped complimentary to the insulation batt **490**.

[0064] Surfaces of the blank sheets **491** facing the insulation batt **490** can be treated with an adhesive, such as the first adhesive **426**. In the present aspect, only the perimeter portions **495** of the blank sheets **491** can be selectively treated with the first adhesive. In some aspects, the first adhesive **426** can be a cohesive which is configured to selectively adhere only to other cohesive treated areas. In some aspects, the insulation batt **490** can also be adhered to the interior portions **494** of the blank sheets **491**.

[0065] In a step **502**, the blank sheets **491** can be aligned and positioned in facing engagement wherein the perimeter portions **495** can be attached by the first adhesive **426** (not shown). The insulation batt **490** can be aligned between the interior portions **494**. Attaching the perimeter portions **495** can form the border **493** of the insulated panel **480**. The border **493** can be a two-ply seam formed by two overlapping perimeter portions **495**. The border **493** can seal and enclose the insulation batt **490** within the panel cavity **492**, defined between the interior portions **494** of the blank sheets **491**. Portions of the insulated panel **480** containing the insulation batt **490** can define insulated portions **590**. In some aspects, the insulation batt **490** can be aligned off-center from the blank sheets **491** wherein the border **493** can extend outwards from the insulated portions **590** further in some areas than others.

[0066] In a step **503**, the perimeter portions **495** can be fully attached, thereby forming the completed border **493**. A taper from the insulated portion **590** to the border **493** can define a beveled edge **496** which can be similar to the beveled panel edge **433** of the insulated panel **130** and the beveled liner edge **441** of the blank liner panel **141**. The border **493** can extend outwards from the insulated portion **590**.

[0067] In other aspects, the insulated panel **480** may not comprise the border **493** fully encompassing the insulated panel **480**. In some aspects, some portions of the perimeter may expose an unfinished edge in which the insulation batt **490** is exposed. In some aspects, the insulated panel **480** may not define the border **493** on any portion of the perimeter of the insulated panel **480**, and the entire perimeter can define an unfinished edge. In such aspects, the insulated panel **480** can comprise pre-laminated paper and each of the blank sheets **491** can be attached in facing contact with the insulation batt **490** with, for example and without limitation, an adhesive. In some aspects in which the insulated panel **480** defines the border **493**, the insulation batt **490** can also be attached in facing contact with one or both of the blank sheets **491**. In some aspects, the pre-laminated paper

can be provided in a roll, and the insulated panels **480** can be cut to size from the roll.
[0068] In different aspects, the insulation batt **490** can define different thickness from less than 1/16″ to over 2″; however, this range should not be viewed as limiting. In various aspects, the different panels **130**,**141**,**146** can each comprise insulation batts **490** of either different thicknesses or the same thickness. For example and without limitation, the bottom panel **146** can comprise an insulation batt **490** defining a thickness greater than that of an insulation batt **490** comprised by the blank liner panel **141**. In other aspects, each insulation batt **490** can vary in thickness and define contours between areas of greater thickness and areas of lesser thickness.
[0069] In some aspects, the thickness defined by the insulation batt **490** can affect a strength of the force exerted by the positional memory, such as forces F.sub.2 and F.sub.3, and increasing the thickness of the insulation batt **490** can increase the force exerted by the positional memory. Conversely, decreasing the thickness of the insulation batt **490** can decrease the force exerted by the positional memory of the insulation batt **490**. One method of reducing the thickness of the insulation batt **490** can be to define a groove **741**,**880** into the insulation batt **490** as shown in FIG. **7** and FIG. **8**. In the present aspect, each groove can be a V-shaped groove defined into the insulation batt **490** to facilitate folding of the insulation batt **490** about the groove. In other aspects, the grooves can define a different shape, such as semicircular. In some aspects, the groove can be aligned with a crease line of the panel **130**,**141**,**146**, such as crease lines **242**,**247**, in order to allow the panel **130**,**141**,**146** to bend more easily about the respective crease lines **242**,**247**. Grooves can be desirable, for instance, for insulation batts **490** defining large thickness values which can be difficult to bend. Cutting grooves can also be desirable to concurrently optimize both the manufacturing process and the assembly process in which it can be desirable to use a single section of insulation batt **490** that does not exhibit positional memory at specific locations.
[0070] Additionally, a density defined by each of the insulation batts **490** can be varied in different aspects or between different insulation batts **490** comprised by a single insulated liner **140**. In some aspects, increasing the density of the insulation batt **490** can increase an insulation value of the insulation batt **490**. Increasing the density of the insulation batt **490** can also increase resistance to compression of the insulation batt **490**. Compression of the insulation batt **490** can be undesirable as compression can degrade the insulation value of the insulation batt **490**.
[0071] In some aspects, a plurality of insulation batts **490** can be encapsulated between the pair of blank sheets **491**. In these aspects, the plurality of insulation batts **490** can overlap one another or alternatively, can be positioned separate from one another. Separated insulation batts **490** can be encapsulated in separate, isolated panel cavities **492** divided by a portion of the border **493** extending across the insulated panel **480** (not shown). Separately encapsulating the plurality of insulation batts **490** into a single insulated panel **480** can be an alternative to attaching together separate insulated panels **480** with seams or other attachment methods. In some aspects, the insulated panels **480** can define shapes other than rectangular. The insulation batt **490** and the blank sheets **491** can be cut or shaped, such as by die cutting, in order to define different shapes for the insulated panels **480**.
[0072] FIG. **6**A is a top view of another aspect of the blank liner panel **680**. The blank liner panel **680** can be a one-piece blank liner panel **680** configured to form the one-piece insulated liner **640** of FIG. **6**B without additional panels **130**,**146**,**141**,**480**. The blank liner panel **680** can be manufactured through the method shown in FIG. **5**, and the blank liner panel **680** can be constructed similar to the insulated panel **480**. In the present aspect, the blank liner panel **680** can comprise a single, continuous insulation batt **490**; however, in other aspects, the blank liner panel **680** can comprise a plurality of insulation batts **490**. The blank liner panel **680** can define a pair of liner subpanels **604** connected by a bottom subpanel **606**. The blank liner panel **680** can define a border **693** extending around a perimeter of the blank liner panel **680**. Each liner subpanel **604** can define a pair of side border portions **643** of the border **693** positioned at opposite ends of the respective liner subpanel **604**. The blank liner panel **680** can be folded in half about a bottom crease

line **601** to bring the liner subpanels **604** into facing engagement and to align the respective side border portions **643** of each of the liner subpanels **604** with one another. The bottom crease line **601** can correspond to and function similarly to the bottom crease line **247** of the insulated liner **140**.
[0073] The blank liner panel **680** can define a pair of liner crease lines **602**, each positioned at an intersection between a one of the liner subpanels **604** and the bottom subpanel **606**. The liner subpanels **604** can fold relative to the adjacent bottom subpanel **606** about the liner crease lines **602**. The liner subpanels **604** can each define a pair of side crease lines **603**. Each liner subpanel **604** can define a main subpanel **642** positioned between a pair of side subpanels **644**. For each liner subpanel **604**, the side crease lines **603** can extend between the main subpanel **642** and a different one of the side subpanels **644**. Each of the side subpanels **644** can fold about a one of the side crease lines **603** relative to the adjacent main subpanel **642**. In the present embodiment, the side crease lines **603** can be structurally and functionally similar to the side crease lines **242**. In some aspects, the insulation batt **490** underlying each liner crease line **602** can be cut to define a groove which can facilitate bending of the blank liner panel **680** about any of the crease lines **601**,**602**,**603**.
[0074] FIG. **6**B is a top view of another aspect of the insulated liner **640**. The insulated liner **640** can be formed by folding the blank liner panel **680** in half about the bottom crease line **601** and attaching each pair of aligned side border portions **643** in facing engagement in order to form a pair of side seams **646**. At each side seam **646**, a pair of side subpanels **644**, each defined by a different opposing liner subpanel **604**, can be attached by the respective side seam **646**. Similar to the insulated liner **140**, the insulated liner **640** can comprise a liner bottom **649**, an opposing pair of main liner panels **647**, and an opposing pair of side liner panels **645**. Each of the main liner panels **647** can be defined by a one of the main subpanels **642** of the liner subpanel **604** extending between the side crease lines **603**. Each of the side liner panels **645** can be defined by a one of the pairs of side subpanels **644** attached by a one of the side seams **646**. The liner bottom **649** can be defined by the bottom subpanel **606** extending between the liner crease lines **602**. The main liner panels **647** and the side liner panels **645** can define a liner opening **648** defined distal from the bottom crease line **601**.
[0075] FIG. **7** is a top view of another aspect of a blank sheet **491**A and another aspect of an insulation batt **490**A for the blank liner panels **141** of FIG. **3**A. Each of the blank liner panels **141** can be formed by encapsulating the insulation batt **490**A between two blank sheets **491**A. The blank sheet **491**A can define a height H.sub.A and a width W.sub.A. The blank sheet **491**A can define the interior portion **494**A and the perimeter portion **495**A which can surround the interior portion **494**A. The interior portion **494**A can define a height H.sub.B and a width W.sub.D. The perimeter portion **495**A can define a top portion **702** and a bottom portion **701** opposite from the top portion **702**. Attaching two bottom portions **701** of two blank sheets **491**A together can form the second bottom border portion **347**. The perimeter portion **495**A can also define a pair of side portions **743** opposite from one another. Attaching two side portions **743** of two blank sheets **491**A together can form the side border portion **343**. The top portion **702** and the bottom portion **701** can each define a height H.sub.C, and the side portions **743** can each define a width W.sub.E. In the aspect shown, the width W.sub.E can define a value greater than a value of height H.sub.C. In some aspects, the side portions **743** may extend further outwards than the top portion **702** or the bottom portion **701**. This configuration can be desirable to provide increased surface area for attaching the side border portions **343** of two separate blank liner panels **141** to form one of the side seams **143**. In some aspects in which the second bottom border portion **347** is configured to attach to one of the first bottom border portions **346**, the bottom portion **701** may extend further than the top portion **702**.
[0076] The blank sheet **491**A can define the side crease lines **242**. The side crease lines **242** can divide the interior portion **494**A into a main subpanel portion **742** and a pair of side subpanel portions **744**. The main subpanel portion **742** can correspond to the main subpanel **142** of the blank liner panel **141**, and the side subpanel portions **744** can correspond to the side subpanels **144** of the

blank liner panel **141**. The main subpanel portion **742** can define a width W.sub.C, and the side subpanel portions **744** can each define a width W.sub.B.

[0077] In some aspects, the insulation batt **490**A can optionally define a pair of side grooves **741** which can be positioned to align with the side crease lines **242** when the insulation batt **490**A is aligned with the interior portion **494**A. However, in other aspects, the insulation batt **490**A may not define the side grooves **741**. The side grooves **741** can be defined into the insulation batt **490**A, such as by die cutting the side grooves **741** into the insulation batt **490**A. In the present aspect, the side grooves **741** can be V-shaped. The side grooves **741** can be configured to increase flexibility of the insulation batt **490**A which can be desirable, particularly in aspects in which the insulation batt **490**A is relatively thick, for example and without limitation when the insulation batt **490**A is greater than ½″ in thickness. The insulation batt **490**A can range in thickness from less than 1/16″ to over 2″. In some aspects, the preferred thickness range can be from less than 1″ to over 1.5″. The side grooves **741** can define a main insulation portion **752** and two side insulation portions **754** which can be sized and shaped substantially similar to the main subpanel portions **742** and the side subpanel portions **744**, respectively. The side grooves **741** can be defined on either one or both sides of the insulation batt **490**A. In some aspects, the side grooves **741** can extend completely through the insulation batt **490**A dividing the insulation batt **490**A into separate subpanels.

[0078] The insulation batt **490**A can define a width W.sub.F and a height H.sub.D which can each define a value substantially the same or slightly less, for example and without limitation 1″ less, than the width W.sub.D and height H.sub.B, respectively. This sizing allows the insulation batt **490**A to fit within the panel cavity (not shown) defined between the interior portions **494**A of two blank sheets **491**A when the perimeter portions **495**A are attached in facing engagement. Sizing the insulation batt **490**A slightly smaller than the interior portion **494**A can provide clearance for the thickness of the insulation batt **490**A, particularly in embodiments in which the insulation batt **490**A defines a large thickness such as ½″ or greater.

[0079] FIG. **8** is a top view of another aspect of a blank sheet **491**B and another aspect of an insulation batt **490**B for the bottom panel **146** of FIG. **3**A. In this aspect, the blank sheet **491**B can define a width W.sub.H and a height H.sub.E. In the present aspect, the width W.sub.H of the blank sheet **491**B, which can correspond to a width of the bottom panel **146**, can have substantially the same value as the width W.sub.C of the main subpanel portion **742**, which can correspond to a width of the main subpanel **142** of the liner panel **141**. The blank sheet **491**B can define the interior portion **494**B and the perimeter portion **495**B which can extend around a perimeter of the blank sheet **491**B. The bottom border **308** of the bottom panel **146** can be formed by attaching two perimeter portions **495**B of two separate blank sheets **491**B together in facing engagement.

[0080] The interior portion **494**B can define a width W.sub.I and a height H.sub.G. In some aspects in which the side seam **143** is a lap seam, the height H.sub.G can have substantially the same value as the combination of the width W.sub.E of the side portion **743** and the widths W.sub.B of the two side subpanel portions **744**. The combination of width W.sub.E of the side portion **743** and the widths W.sub.B of the two side subpanel portions **744** can be approximately equal to a combined width of a one of the side seams **143** and a pair of side subpanels **144** which can together define a one of the side liner panels **145**. In other aspects in which the side seam **143** is a plain seam, the height H.sub.G can have substantially the same value as twice the widths W.sub.B of the two side subpanel portions **744**. With two blank sheets **491**B aligned and attached in facing engagement, the interior portions **494**B can define the panel cavity (not shown) which can contain the insulation batt **490**B.

[0081] The blank sheet **491**B can define the bottom crease line **247** which can bisect the blank sheet **491**B. The perimeter portion **495**B can define a pair of first bottom border portions **846** which can correspond to the first bottom border portions **346** of the bottom panel **146**. Portions of the perimeter portion **495**B at opposite ends of the bottom crease line **247** can define a pair of side border portions **847**. The side border portions **847** can each define a width W.sub.G and the first

bottom border portions **846** can each define a height H.sub.F. In the present aspect, the width W.sub.G and the height H.sub.F can define values which can be substantially the same; however, in other aspects the height H.sub.F can define a value greater than the value of the width W.sub.G. This configuration can be desirable to provide additional surface area for attaching the first bottom border portions **346** to the second bottom border portions **347** or to the main subpanels **142**.

[0082] The insulation batt **490**B can define a width W.sub.J and a height H.sub.H which can each define a value substantially the same or slightly less, for example and without limitation 1″ less, than the width WI and height H.sub.G, respectively. Similar to FIG. **7**, this sizing allows the insulation batt **490**B to fit within the panel cavity (not shown) defined between two blank sheets **491**B. Sizing the insulation batt **490**B slightly smaller than the interior portion **494**B can provide clearance for the thickness of the insulation batt **490**B, particularly in embodiments in which the insulation batt **490**B defines a large thickness such as ½″ or greater.

[0083] In some aspects, the insulation batt **490**B can optionally define a bottom groove **880** which can be similar in shape, form, and function to the side grooves **741**. The bottom groove **880** can be positioned to align with the bottom crease line **247** when the insulation batt **490**B is aligned on top of the interior portion **494**B. However, in other aspects, the insulation batt **490**B may not define the bottom groove **880**.

[0084] FIG. **9** is a top view of another aspect of a blank sheet **491**C and another aspect of an insulation batt **490**C for the insulated panels **130** of FIG. **3**A. The blank sheet **491**C can define a width W.sub.J and a height H.sub.I. The panel border **333** of the insulated panels **130** can be formed by attaching two perimeter portions **495**C of two separate blank sheets **491**C together in facing engagement. The interior portion **494**C can define a width W.sub.M and a height H.sub.J. With two blank sheets **491**C aligned and attached in facing engagement, the interior portions **494**C can define the panel cavity (not shown) which can contain the insulation batt **490**C.

[0085] The perimeter portion **495**C can define a pair of first panel border portions **946** and a pair of second panel border portions **947**. The second panel border portions **947** can each define a width W.sub.L, and the first panel border portions **946** can each define a height H.sub.K. In the present aspect, the width W.sub.G and the height H.sub.F can define values which can be substantially the same.

[0086] The insulation batt **490**C can define a width W.sub.N and a height H.sub.L which can each define a value substantially the same or slightly less, for example and without limitation 1″ less, than the width W.sub.M and height H.sub.J, respectively. This sizing allows the insulation batt **490**C to fit within the panel cavity (not shown) defined between two blank sheets **491**C. Sizing the insulation batt **490**C slightly smaller than the interior portion **494**C can provide clearance for the thickness of the insulation batt **490**C, particularly in embodiments in which the insulation batt **490**C defines a large thickness such as ½″ or greater.

[0087] In some aspects, such as when the insulated panel **130** corresponding to the blank sheet **491**C is the top panel **131**, the width W.sub.J and the height H.sub.I can be sized complimentary to the size and shape of the liner opening **148**. In this aspect, the width W.sub.J can define a value substantially the same as the width W.sub.C of the main subpanel portion **742** of blank sheet **491**A. In aspects in which the side seam **143** is a lap seam, the height H.sub.I can define a value substantially the same as the combination of the width W.sub.E of the side portion **743** and the widths W.sub.B of the two side subpanel portions **744**. These widths can correspond to a combined width of the two side subpanels **144** and the side seam **143** which can together define a one of the side liner panels **145** as shown in FIG. **2**B. In other aspects in which the side seam **143** is a plain seam, the height H.sub.I can have substantially the same value as twice the widths W.sub.B of the two side subpanel portions **744**. In aspects in which the insulated panel **130** is the divider panel **431** or the floor panel **432** as shown in FIG. **4**A, the width W.sub.J and the height H.sub.I can be sized slightly smaller than the liner opening **148** to accommodate the thickness of the insulation batt **490**A of the blank liner panels **141**.

[0088] A method of assembling the insulated box assembly **100** can comprise configuring the insulated liner **140** in the collapsed installation configuration, aligning the insulated liner **140** with the box opening **120** of the box **110**, inserting the insulated liner **140** into the internal box cavity **122**, and configuring the insulated liner **140** to the expanded configuration. Configuring the insulated liner **140** in the collapsed insertion configuration can comprise folding the side liner panels **145** inwards towards the liner cavity **150**, collapsing the main liner panels **147** inwards towards the liner cavity **150**, and folding the liner bottom **149**. Configuring the insulated liner **140** to the expanded configuration can comprise expanding the main liner panels **147** away from the liner cavity **150**, unfolding the side liner panels **145** outwards from the liner cavity **150**, and unfolding the liner bottom **149**. Configuring the insulated liner **140** to the expanded configuration can further comprise self-expanding the insulated liner **140** with the force F.sub.2,F.sub.3 exerted by the positional memory of the insulated liner. Configuring the insulated liner **140** to the expanded configuration can further comprise positioning a one of the main liner panels **147**, the side liner panels **145**, and the liner bottom **149** in facing engagement with a one of the main box panels **112**, the side box panels **114**, and the box bottom panel **413**. The method can further comprise covering the liner opening **148** with the insulated panel **130** and forming the seal between the insulated panel **130** and the insulated liner **140**.
[0089] In the present aspect, the blank sheets **491** can comprise paper, such as kraft paper; however, in other embodiments, the blank sheets **491** can comprise posterboard, cardboard, plastic sheeting, cloth, or any other suitable material. In some aspects, the pair of blank sheets **491** can each comprise a different material. In some aspects, the blank sheets **491** can be a water-proof or water-resistant material, such as water-resistant kraft paper. The insulation batt **490** can comprise paper or other paper fiber materials; however, in other aspects, the insulation batt **490** can comprise cotton, foam, rubber, plastics, fiberglass, mineral wool, or any other flexible insulation material. In the present application, the insulation batt **490** can be repulpable. In the present aspect, the insulated box assembly **100** can be 100% recyclable. In the present aspect, the insulated box assembly **100** can be single-stream recyclable wherein all materials comprised by the insulated box assembly can be recycled by a single processing train without requiring separation of any materials. In some aspects, only the insulated liner **140** can be single-stream recyclable. In the present aspect, the insulated box assembly **100** can be compostable. In the present aspect, the insulated box assembly **100** can be repulpable. In the present aspect, insulated box assembly **100** and each of the box **110**, the insulated liner **140**, and the insulated panel **130** can be repulpable in accordance with the requirements of the Aug. 16, 2013, revision of the “Voluntary Standard For Repulping and Recycling Corrugated Fiberboard Treated to Improve Its Performance in the Presence of Water and Water Vapor” provided by the Fibre Box Association of Elk Grove Village, IL, which is hereby incorporated by reference in its entirety. In the present aspect, insulated box assembly **100** and each of the box **110**, the insulated liner **140**, and the insulated panel **130** can be recyclable in accordance with the requirements of the Aug. 16, 2013, revision of the “Voluntary Standard For Repulping and Recycling Corrugated Fiberboard Treated to Improve Its Performance in the Presence of Water and Water Vapor” provided by the Fibre Box Association of Elk Grove Village, IL. In some aspects, the insulated box assembly **100** can be biodegradable.
[0090] Recyclable and repulpable insulation materials are further described in U.S. Patent Application No. 62/375,555, filed Aug. 16, 2016, U.S. Patent Application No. 62/419,894, filed Nov. 9, 2016, and U.S. Patent Application No. 62/437,365, filed Dec. 21, 2016, which are each incorporated by reference in their entirety herein.
[0091] The insulated box assembly **100** can be used in applications in which a user or mail carrier transports perishable or temperature-sensitive goods or contents. For example and without limitation, the insulated box assembly **100** can be used to transport groceries or medications. In some applications, a material such as ice, dry ice, or a freeze pack can be placed in the liner cavity **150** to maintain a temperature of goods for longer durations. Alternatively, the insulated box

assembly **100** can be used to transport warm contents, such as takeout delivery of freshly-prepared food. In such applications, a heat pack or other heat source can be placed within the liner cavity to keep contents of the insulated box assembly **100** warm.
[0092] Many forms of packaging and insulation are not accepted by many recycling facilities or curb-side recycling programs in which a waste management service collects recyclables at a user's home. Examples such as bubble wrap or plastic-wrapped insulations may not be accepted. In some aspects, the insulated box assembly **100** can reduce waste and pollution by comprising materials which are recyclable or biodegradable. In aspects in which the insulated box assembly **100** is curb-side or single-stream recyclable, the user may be more likely to recycle the insulated box assembly **100** due to the ease of curb-side collection.
[0093] One should note that conditional language, such as, among others, “can,” “could,” “might,” or “may,” unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or steps. Thus, such conditional language is not generally intended to imply that features, elements and/or steps are in any way required for one or more particular embodiments or that one or more particular embodiments necessarily include logic for deciding, with or without user input or prompting, whether these features, elements and/or steps are included or are to be performed in any particular embodiment.
[0094] It should be emphasized that the above-described embodiments are merely possible examples of implementations, merely set forth for a clear understanding of the principles of the present disclosure. Any process descriptions or blocks in flow diagrams should be understood as representing modules, segments, or portions of code which include one or more executable instructions for implementing specific logical functions or steps in the process, and alternate implementations are included in which functions may not be included or executed at all, may be executed out of order from that shown or discussed, including substantially concurrently or in reverse order, depending on the functionality involved, as would be understood by those reasonably skilled in the art of the present disclosure. Many variations and modifications may be made to the above-described embodiment(s) without departing substantially from the spirit and principles of the present disclosure. Further, the scope of the present disclosure is intended to cover any and all combinations and sub-combinations of all elements, features, and aspects discussed above. All such modifications and variations are intended to be included herein within the scope of the present disclosure, and all possible claims to individual aspects or combinations of elements or steps are intended to be supported by the present disclosure.

Claims

1. An insulated box assembly comprising: an insulated liner, the insulated liner defining a top liner end and a bottom liner end, the top liner end disposed opposite from the bottom liner end, the insulated liner defining a liner cavity, the liner cavity defining a liner opening disposed at the top liner end of the insulated liner, the insulated liner comprising: a pair of opposing main liner panels, a pair of opposing side liner panels, each side liner panel of the pair of side liner panels attached to both main liner panels of the pair of main liner panels, and a bottom liner panel, the bottom liner panel disposed at the bottom liner end, the main liner panels, the side liner panels, and the bottom liner panel further defining the liner cavity; wherein the main liner panels, the side liner panels, and the bottom liner panel are each defined by an insulation batt and a pair of blank sheets, the insulation batt encapsulated in a panel cavity defined between the pair of blank sheets, the panel cavity of each main liner panel and each side liner panel being enclosed by a liner border defined by a perimeter portion of each blank sheet thereof being positioned in facing engagement, and the panel cavity of the bottom liner panel being enclosed by a bottom border defined by a perimeter portion of each blank sheet thereof being positioned in facing engagement, and wherein the bottom

border is disposed in a facing relationship with a portion of the liner border of each main liner panel and each side liner panel, thereby forming a bottom seam along a perimeter of the bottom liner panel.

2. The insulated box assembly of claim 1, wherein the bottom border is secured to the corresponding portions of the main liner panels and side liner panels by an adhesive.

3. The insulated box assembly of claim 2, wherein the adhesive comprises one of glue, cohesive, cement, epoxy, and tape strip.

4. The insulated box assembly of claim 1, wherein the perimeter portions of each blank sheet of each main liner panel and each side liner panel that define the liner borders are secured together by an adhesive.

5. The insulated box assembly of claim 1, further comprising a floor panel positioned on top of the bottom liner panel.

6. The insulated box assembly of claim 5, wherein the floor panel is defined by an insulation batt and a pair of blank sheets, the insulation batt encapsulated in a panel cavity defined between the pair of blank sheets.

7. The insulated box assembly of claim 6, the panel cavity of the floor panel being enclosed by a panel border defined by a perimeter portion of the blank sheets thereof being positioned in facing engagement.

8. The insulated box assembly of claim 7, wherein the perimeter portions of each blank sheet of the floor panel that define the panel border are secured together by an adhesive.

9. The insulated box assembly of claim 7, wherein the panel border of the floor panel is disposed adjacent the bottom seam of the insulated liner.

10. The insulated box assembly of claim 1, further comprising: a box, the box defining a top box end and a bottom box end, the top box end disposed opposite from the bottom box end, the box defining an internal box cavity, the internal box cavity defining a box opening disposed at the top box end of the box, the box comprising: a pair of opposing main box panels, a pair of opposing side box panels, each side box panel of the pair of side box panels attached to both main box panels of the pair of main box panels, and a bottom box panel, the bottom box panel positioned at the bottom box end of the box, the bottom box panel attached to the main box panels and the side box panels, the main box panels, side box panels, and bottom box panel further defining the internal box cavity, wherein the insulated liner is disposed within the internal box cavity of the box.

11. The insulate box assembly of claim 10, wherein the insulated liner is positioned within the internal box cavity, each main liner panel of the pair of main liner panels is positioned in facing engagement with a different main box panel of the main box panels, each side liner panel of the side liner panels positioned in facing engagement with a different side box panel of the side box panels, and the bottom liner end is positioned adjacent to the bottom box end.

12. The insulated box assembly of claim 1, wherein each side liner panel of the pair of side liner panels is defined by a pair of side subpanels attached together by a side seam.

13. The insulated box assembly of claim 12, wherein each side seam extends from the top liner end to the bottom liner end when the insulated liner is in an expanded configuration.

14. The insulated box assembly of claim 1, wherein the insulated box assembly further comprises an insulated panel covering the liner opening of the insulated liner.

15. The insulated box assembly of claim 14, wherein: the insulated liner defines a beveled liner edge proximate the liner opening; the insulated panel defines a beveled panel edge; and the beveled liner edge and the beveled panel edge cooperate to form a seal at the liner opening.