

FIGURE 1

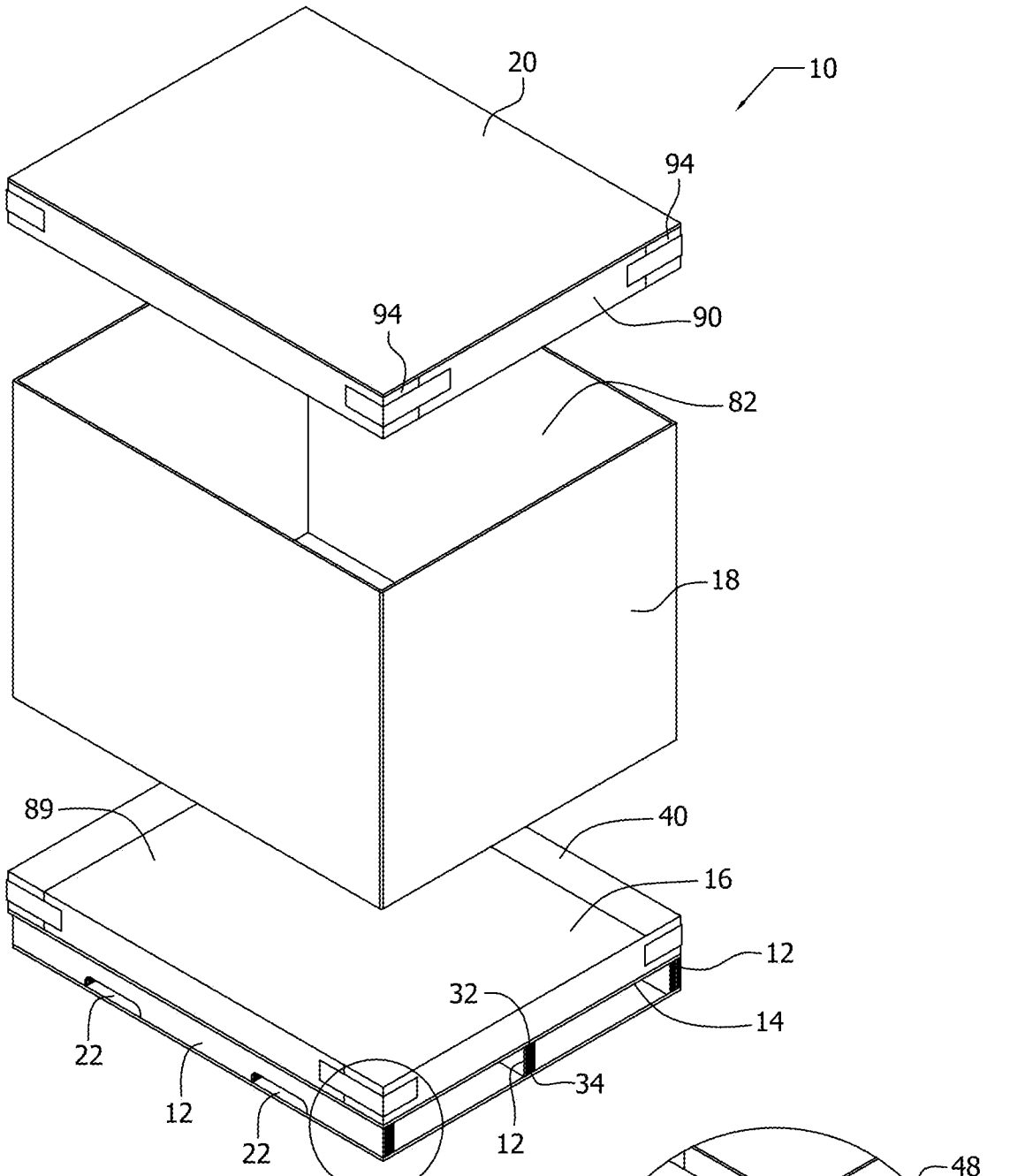


FIGURE 2A

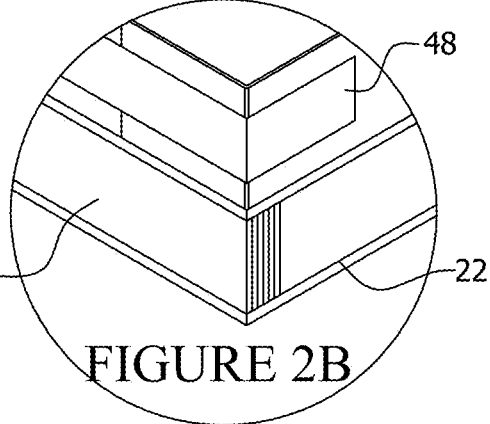


FIGURE 2B

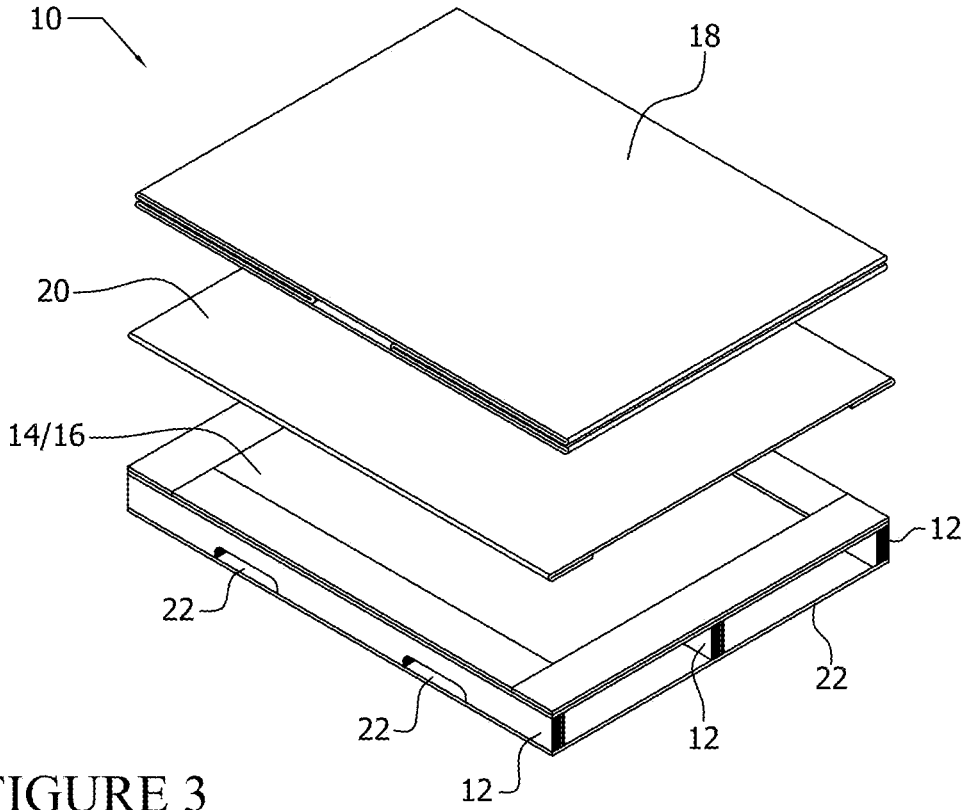


FIGURE 3

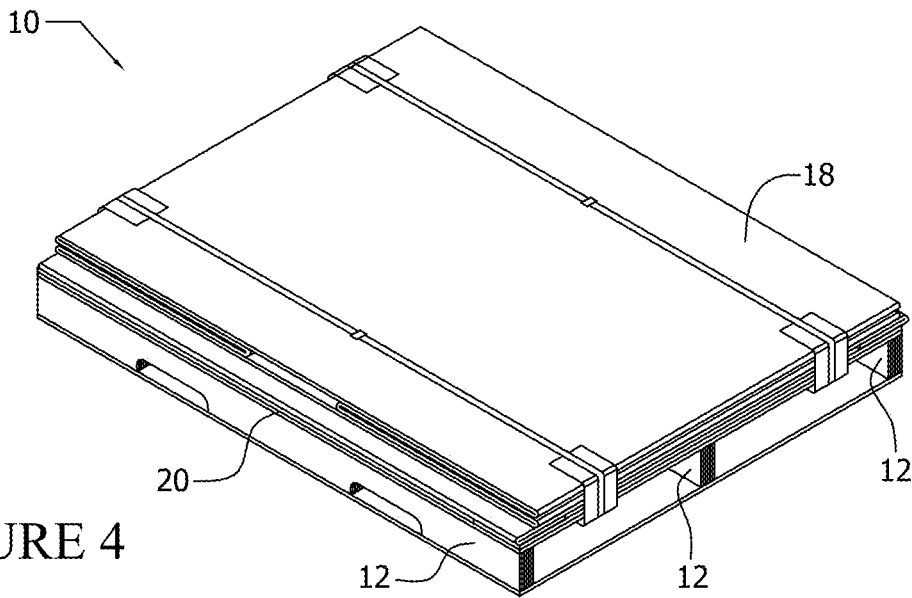


FIGURE 4

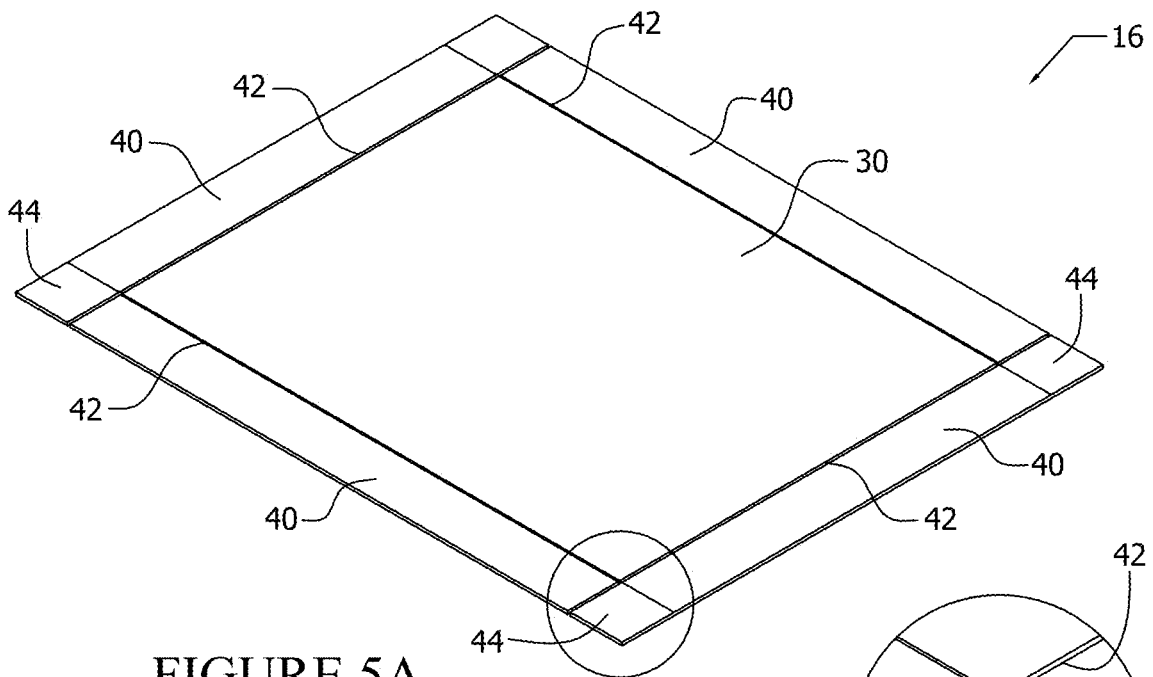


FIGURE 5A

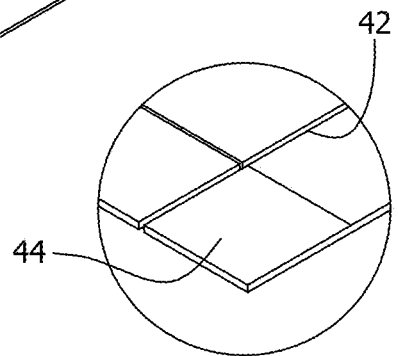


FIGURE 5B

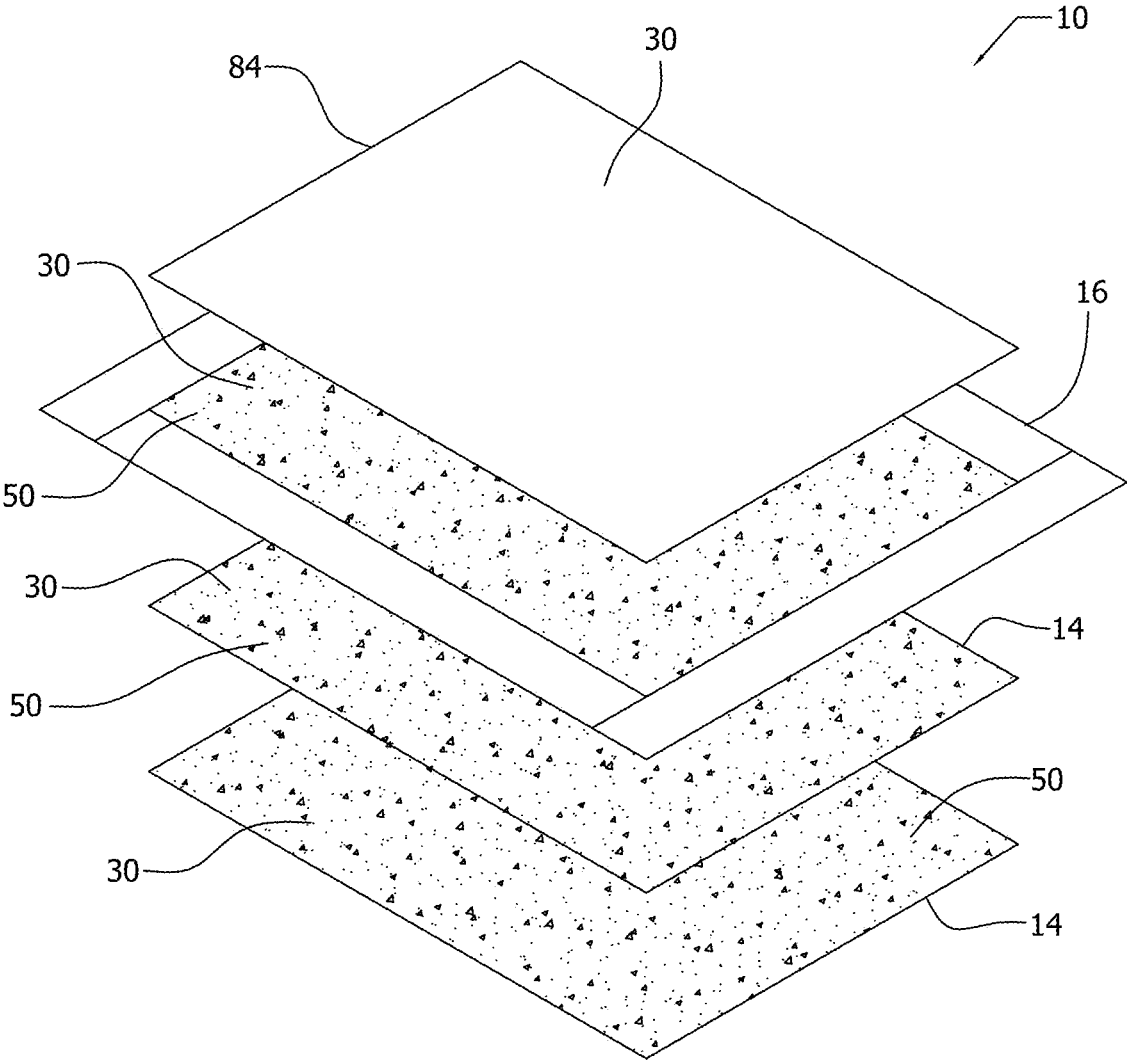


FIGURE 6

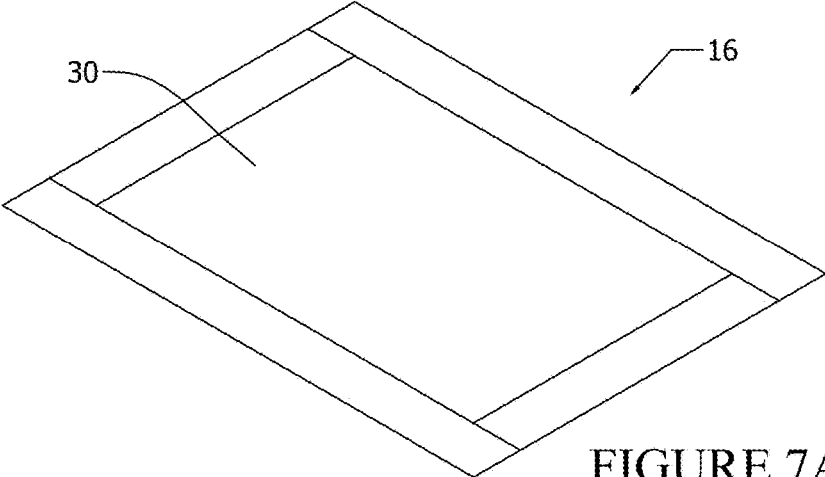


FIGURE 7A

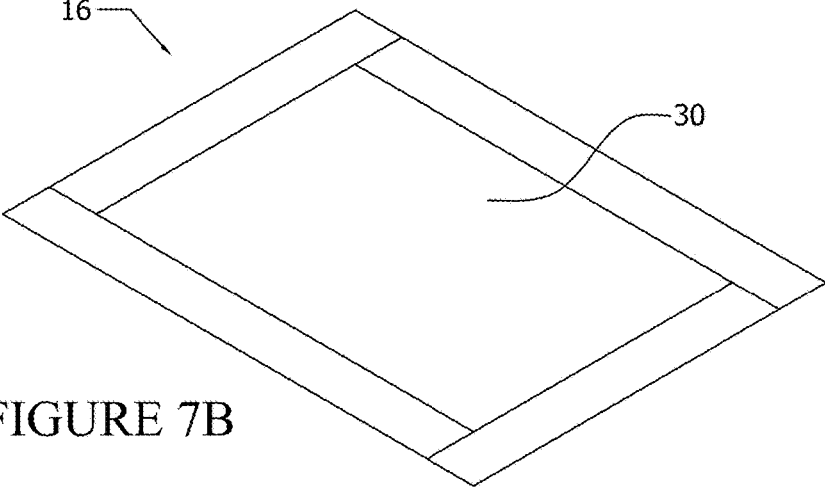


FIGURE 7B

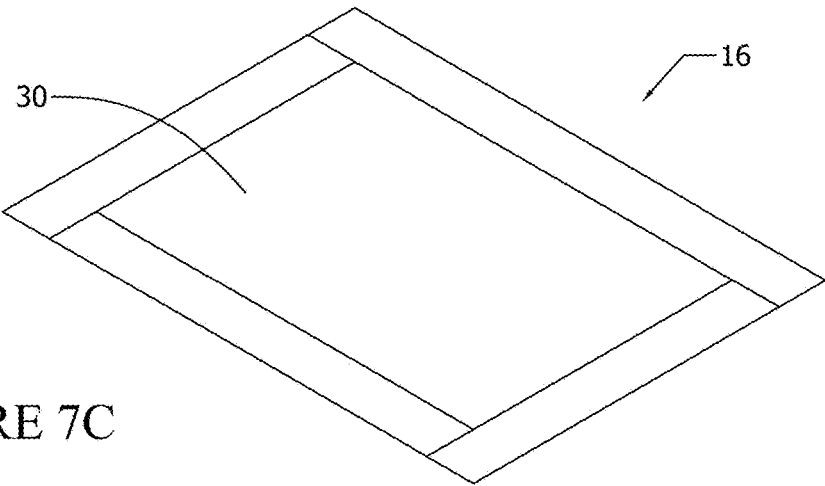


FIGURE 7C

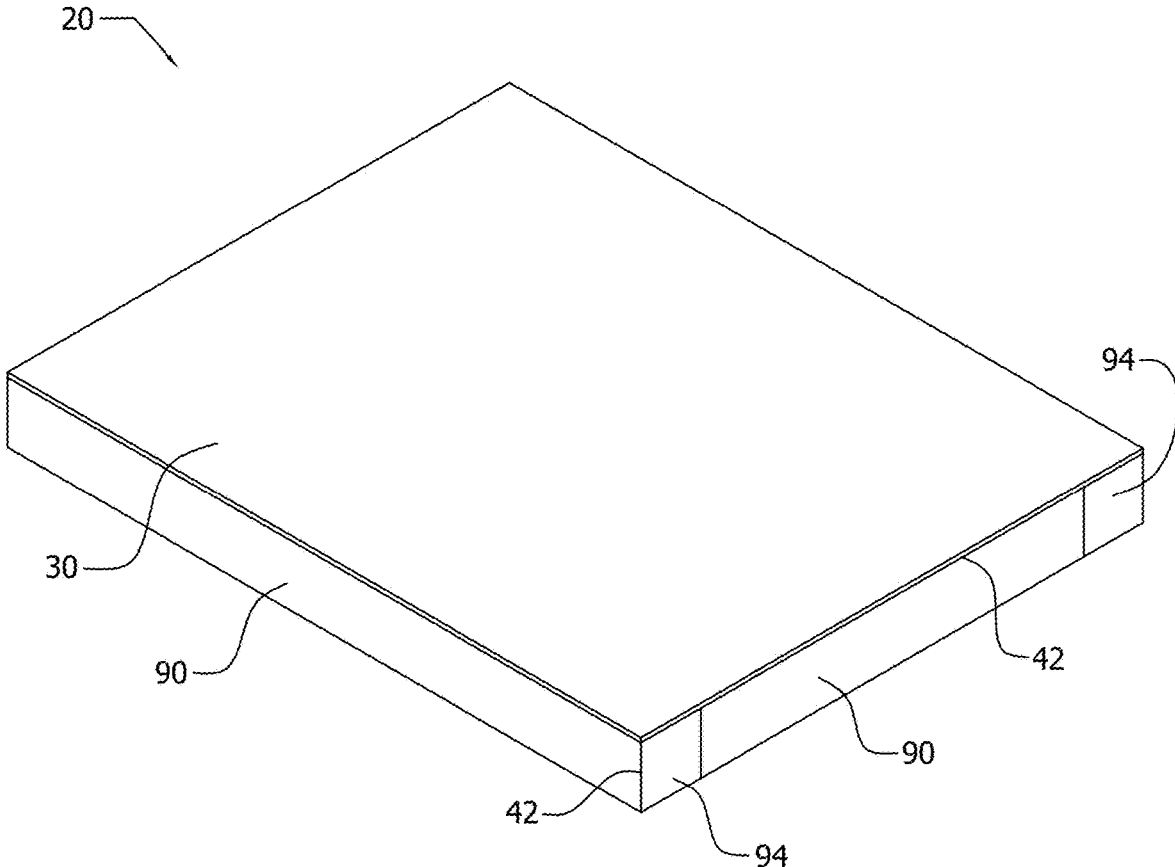


FIGURE 7D

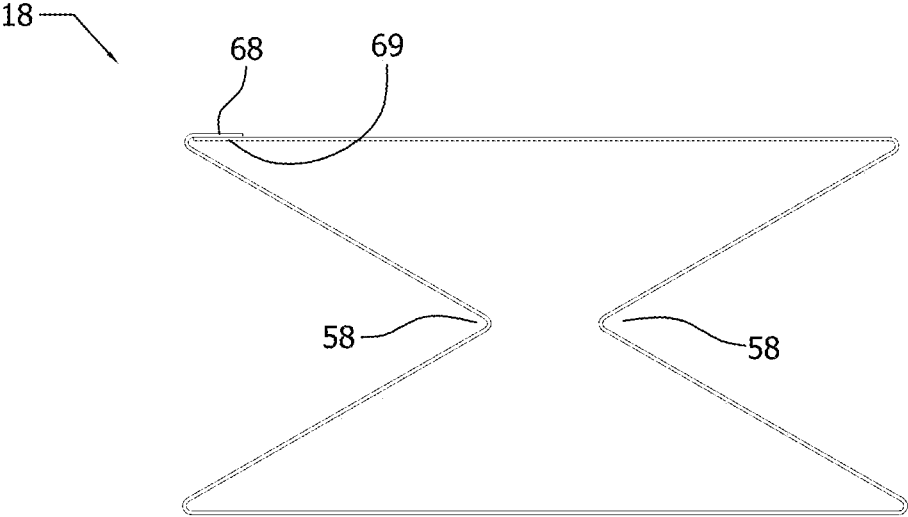


FIGURE 8A

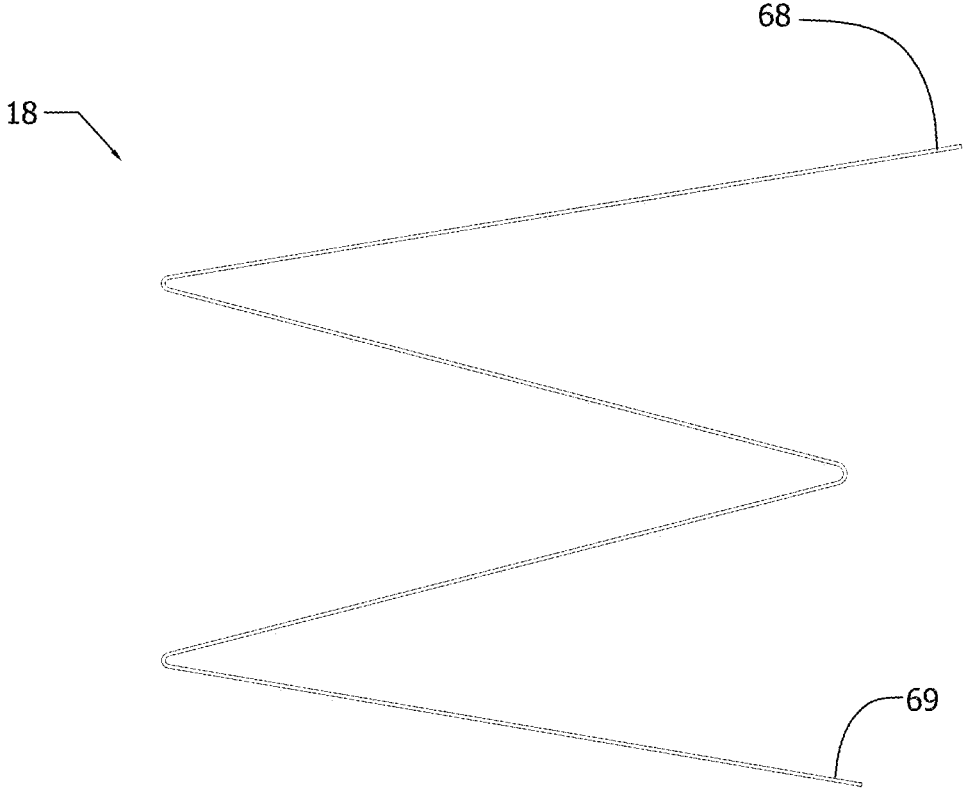


FIGURE 8B

SHIPPING PALLET SLEEVE SYSTEM AND METHODS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority and benefit of U.S. Provisional Patent Application No. 62/861,211 filed 13 Jun. 2019, which is hereby incorporated by reference in its entirety herein.

BACKGROUND OF THE INVENTION

Field of the Invention

[0002] This disclosure relates to shipping pallets, and, more particularly, to pallets fabricated from corrugated fiberboard as sleeve pallets.

Background of the Related Art

[0003] Pallets and skids, collectively herein “pallets”, in various forms have been an important part of shipping freight since the 1930’s. Historically, pallets were constructed of wood. Wooden shipping pallets are relatively costly, heavy and susceptible to damage. Wood continues to dominate the pallet market today. In recent history, lighter plastic pallets and more durable metal pallets have been developed. However, both of these options tend to be more costly.

[0004] The conditions under which most pallets are used typically results in damage that can render the pallet unusable after a short amount of time. Plastic pallets, when damaged, are typically not repairable. Wood pallets are regularly repaired, but this results in a huge amount of waste wood that is relatively difficult to dispose of. Metal pallets tend to better resist damage but their price point and weight is too high to be usable in typical shipping applications. Industries are almost always looking for ways to save costs. Accordingly, a need exists for lower cost, lightweight pallets. As a result, the past few decades have seen shipping pallets developed from other materials. One such material is corrugated fiberboard. Corrugated fiberboard, in certain aspects, may include a fluted corrugated sheet in combination with one or two flat linerboards formed of cellulose based material(s). Corrugated fiberboard is a strong renewable material that is one of the most widely recycled materials in the world. Corrugated fiberboard generally has a high tensile strength but its strength under compression is most significant when applied along the longitudinal axis of the flutes. The flutes of the corrugated fiberboard provide a columnar structure along their longitudinal axis that is strong in compression, in certain aspects. Accordingly, it may be advantageous to configure certain components of corrugate pallets with the flutes of the corrugated fiberboard oriented vertically.

[0005] One particular type of shipping pallet system incorporates a sleeve or wall that extend upward from a shipping pallet’s top deck. These walls are configured to retain goods during the shipping of products on shipping pallets. Such pallets can also be utilized as long term storage solutions as they can be provided with re-closable lids to allow for access to their contents and the recovering of the goods after such access. These sleeve pallet systems are typically manufactured from a combination of materials to meet the cost, strength and durability requirements of shipping goods. The

mix materials generally include wood, corrugate or plastic, and nails or staples. Such a mix of materials complicates the recycling process in that to varying degrees the pallets need to be disassembled and the various materials to permit recycling. This increases costs and reduces the likelihood of the existing sleeve pallets systems from being fully recycled.

[0006] Therefore, a need exists for sleeve systems for shipping pallets that solely utilize components formed from corrugated fiberboard and other cellulose materials and adhesives that allow the entire pallet system to be recycled without the need for time consuming and expensive disassembly.

[0007] Similarly, large shipping boxes, commonly referred as Gaylords, have been sized to correspond to the size of the deck of a pallet as well as being configured to be shipped on pallets. However, these boxes can still require stretch wrapping or other means of securing the boxes to the pallets. This can increase the costs of shipping as well as recycling as a variety of disparate materials may have to be used. When not secured, the boxes have an increased risk of being displaced from the pallet and having the goods contained therein damaged during shipping.

[0008] Therefore, a need exists for a pallet designs and methods for efficient manufacturing of corrugated fiberboard components to secure a goods on a pallet that does not compromise the strength or durability of the components and are also cost effective.

BRIEF SUMMARY OF THE INVENTION

[0009] Apparatus and methods in accordance with the present inventions may resolve many of the needs and shortcomings discussed above and may provide additional improvements and advantages that may be recognized by those skilled in the art upon review of the present disclosure.

[0010] In certain aspects, an apparatus for the shipping and storage of goods is provided. The apparatus having a plurality of stringers, a collar and a sleeve. In certain aspects, an upper deck may also be provided. The upper deck including one or more corrugate sheets. The stringers are adhesively secured to a lower surface of the upper deck and/or the collar. The collar is a single corrugate sheet defining a peripheral flange. In certain aspects, a lower surface of collar adhesively secured to an upper surface of the upper deck. The sleeve may include one or more corrugate sheets. A lower portion of the sleeve received within the peripheral flange of the collar. The apparatus can include a reinforcing insert positioned on an upper surface of the collar. The reinforcing insert adhesively secured to the upper surface of the collar. In certain aspects, the apparatus can further include a cap made from a single corrugate sheet and defining a peripheral cap flange, the cap received over an upper portion of the sleeve.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 illustrates a perspective view of an exemplary shipping pallet sleeve system in accordance with aspects of the present inventions;

[0012] FIG. 2A illustrates a perspective view of an exploded exemplary shipping pallet sleeve system of FIG. 1 in accordance with aspects of the present inventions;

[0013] FIG. 2B illustrates a detailed partial perspective view of an exemplary pallet of the shipping pallet sleeve system in accordance with aspects of the present inventions

[0014] FIG. 3 illustrates a perspective view of an exploded exemplary shipping pallet sleeve system in a collapsed configuration in accordance with aspects of the present inventions;

[0015] FIG. 4 illustrates a perspective view of an exemplary shipping pallet sleeve system in a collapsed configuration in accordance with aspects of the present inventions;

[0016] FIG. 5A illustrates a perspective view of an exemplary upper deck in a collapsed configuration and FIG. 5B illustrates in detail a portion of FIG. 5A in accordance with aspects of the present inventions;

[0017] FIG. 6 illustrates a perspective view of an exploded exemplary upper deck in accordance with aspects of the present inventions;

[0018] FIG. 7A illustrates a perspective view of an exemplary collar in accordance with aspects of the present inventions.

[0019] FIG. 7B illustrates a perspective view of another exemplary collar in accordance with aspects of the present inventions;

[0020] FIG. 7C illustrates a perspective view of another exemplary collar in accordance with aspects of the present inventions;

[0021] FIG. 7D illustrates a perspective view of an exemplary cap in a folded configuration in accordance with aspects of the present inventions;

[0022] FIG. 8A illustrates a side view of an exemplary sleeve in accordance with aspects of the present inventions; and

[0023] FIG. 8B illustrates a side view of an exemplary sleeve in accordance with aspects of the present inventions.

[0024] All Figures are exemplary and selected for explanation of the basic teachings of the present inventions only. Extensions of the Figures with respect to number, position, relationship and dimensions of the parts to form the preferred implementation will be explained or will be within the skill of the art after the following description has been read and understood. Further, the exact dimensions and dimensional proportions to conform to specific force, weight, strength, and similar requirements for various implementations will likewise be within the skill of the art after the following description has been read and understood.

[0025] Where used in the various Figures, the same numerals designate the same or similar elements. Furthermore, when the terms “top,” “bottom,” “right,” “left,” “forward,” “rear,” “first,” “second,” “inside,” “outside,” and similar terms are used, the terms should be understood in reference to the orientation of the implementations shown in the drawings and are utilized to facilitate description thereof. Use herein of relative terms such as generally, about, approximately, essentially, may be indicative of engineering, manufacturing, or scientific tolerances such as $\pm 0.1\%$, $\pm 1\%$, $\pm 2.5\%$, $\pm 5\%$, or other such tolerances, as would be recognized by those of ordinary skill in the art upon study of this disclosure.

DETAILED DESCRIPTION OF THE INVENTION

[0026] The Figures generally illustrate exemplary implementations of a sleeve pallet 10 for the containment and shipping of goods that include aspects manufactured in accordance with the present inventions. The particularly illustrated implementations of sleeve pallet 10 has been chosen for ease of explanation and understanding of various

aspects of the present inventions. It will be understood that the term shipping pallet shall include other similar products used for shipping cargo such as skids, box pallets, shipping crates, and the like that may use the elements of sleeve pallet 10 or other structurally similar components manufactured in accordance with methods of the present teachings. That said, the illustrated implementations are not meant to limit the scope of coverage but, instead, to assist in understanding the context of the language used in this specification and in the appended claims. Accordingly, the appended claims may encompass variations of sleeve pallet 10 that differ from the illustrated implementations.

[0027] The present inventions provide methods for the manufacture of a sleeve pallet 10 and components thereof for use in shipping, retail sales and storage applications. The sleeve pallets 10 in accordance with the present inventions are predominately manufactured from corrugated fiberboard or corrugated plastic, both of which are referred to collectively hereinafter as corrugate. As noted below, these sheets when laminated can include alternative materials in certain layers of the laminate. An exemplary sleeve pallet 10 is illustrated in FIG. 1 and, in an exploded view, in FIG. 2. The illustrated sleeve pallet 10 is generally configured to support a load that may consist of various items individually, boxed or otherwise packaged. Sleeve pallet 10 are generally configured to be lifted by forklift and, in various implementations, may be particularly configured to be placed, for example, in a storage rack, cargo hold, storage bay, railroad car, or truck trailer. Sleeve pallets 10 are typically configured as either a 2-way or as a 4-way pallet. The sleeve pallet 10, as illustrated, includes an upper deck 14 and two or more stringers 12 secured to the upper deck 14, a collar 16, which may be integral with the upper deck 14, a sleeve 18, and a cap 20. The sleeve pallet 10 is configured to receive and support a load of goods on the upper deck 14. The sleeve 18 is generally configured to retain the goods on the upper deck 14. The stringers 12 support the upper deck 14. Upper deck 14 may be single solid piece of sheets of corrugate, two or more laminated sheets of corrugate, or may include two or more deck boards, in various implementations. For example, the upper deck 14 may include between 1 and 6 individual deck boards secured to the upper surface of the stringers 12 but may include more deck boards in certain implementations. The Upper deck 14 is typically bonded to the stringers 12 with an adhesive 50. The collar 16 is adhesively bonded to the upper deck 14 or may be integral with the sheet of corrugate that forms the upper deck 14. The corrugate sheets 40 of the upper deck 14 and collar 16, when both elements are present, are bonded with an adhesive 50, illustrated in FIG. 6, between the linerboards of the corrugate sheets 30. If the upper deck 14 are separate components, they are adhesively bonded to one another to retain the relative position of the collar 16 on the upper deck 14. Upper deck 14 and/or collar 16 in combination with sleeve 18 may be generally configured to meet certain volumetric capacity requirements, to support and retain a specific load, or to support and retain a specific cargo.

[0028] Stringers 12 are generally elongated support elements having a generally rectangular side profile that support the upper deck 14 and collar 16. Stringers 12 have a generally flat upper surface 32 and lower surface 34, and the upper and lower surfaces of the stringer may include shaped cutouts to receive various components of the sleeve pallet 10. The stringers 12 may provide notches 22 for the tines of

a forklift or for a pallet jack underneath the upper deck 14. Notches 22 are configured to receive the tines of a forklift to enable the lifting pallet 10 including materials placed upon upper deck 14 and extend from one side of the stringer 12 through to the other side, in various implementations. The notches 22 of adjacent stringers 12 of a sleeve pallet 10 may be aligned with one another to permit the passage of the tines of a forklift and/or, in certain configurations, a pallet jack through the side of sleeve pallet 10 to provide more flexible access and utility in sleeve pallet 10. The flat upper surface 32 of stringers 12 may provide the surface area necessary to securely bond the stringers 12 to the upper deck 14 or the collar 16.

[0029] A lower deck 22 may also be included in sleeve pallet 10, in certain implementations. The two or more stringers 12 are generally secured between the upper deck 14 and the lower deck 22, as illustrated. The lower deck 22 can be a single solid piece of corrugate or multiple pieces of laminated corrugate. In other implementations, the lower deck 22 may be composed of fiberboard or other material. A typical lower deck 22 will include 3 or 4 separate boards configured to permit the sleeve pallet 10 to be used with a pallet jack that, for example, allows a user to manually raise and move a loaded sleeve pallet 10 around a warehouse. In one implementation, the sleeve pallet 10 may be manufactured solely or predominantly from recyclable materials, such as, for example, paper, corrugate, fiberboard and other cellulose based products that are preferably re-pulpable for ease of recycling.

[0030] The sleeve pallets 10 in accordance with the present inventions are typically made from corrugate sheets 30. The corrugate sheets 30 are typically corrugated fiberboard or corrugated plastic. When corrugated fiber board, the corrugate sheets 30 may utilize, for example, "A", "B", "C", "E", "F" or "micro-flute" configurations as well as other flute configurations that may be used in the paper industry, as would be readily recognized by those of ordinary skill in the art upon study of this disclosure. Similarly, the corrugate sheets 30 may be single wall, double wall or triple wall as used in the paper industry, as would be readily recognized by those of ordinary skill in the art upon study of this disclosure. It will be appreciated that the fluted medium strength along the load-bearing axis typically increases with flute density. The choice of flute density as well as the materials and choice of adhesive 50 included in the corrugate sheets 30 will depend upon the specific design requirements for the sleeve pallet 10 including the loads to be carried.

[0031] The stringers 12 may include a plurality of corrugated sheets 30 and stringers 12 may include one or more solid fiberboard layers for added strength. The sleeve 18 is also typically configured from one or more corrugated sheets 30. The corrugate sheets 30 and, if present, alternative materials are secured together, for example, with an adhesive 50 between the linerboards of the corrugate sheets 30. Specific compositions for the laminate used in stringer 12 may be selected based on the particular design requirements for stringer 12 including, for example, forces to be supported by stringers 12. Similarly, the orientation of the flutes in the corrugate of stringers 12 as well as the geometric configuration of the corrugate may be selected based upon specific design requirements for the stringers 12. In certain configurations of stringers 12, the flutes will be vertically oriented and the flutes off majority of the layers will be parallel to one another in the vertical orientation. Similarly in certain con-

figurations for sleeve 18, the flutes will also be vertically oriented to maximize the vertical load that can be supported.

[0032] The stringer 12 may be sized to have a length substantially the same as the desired length of the sleeve pallet 10. This will frequently correspond to the length of the upper deck 14. The width of the stringers 12 is generally between about 1.5 inches (3.81 cm) and about 4.0 inches (10.16 cm). Certain design requirements may require that stringer 12 have a greater strength. Stringers 12 may be strengthened by increasing in number of layers of corrugate sheet 30, by changing the material of the corrugate sheet 40, through the elimination of notches 18, and/or by the addition of solid fiberboard sheet or sheets of other strong materials into the laminate.

[0033] When present, as shown in FIG. 6, an upper deck 14 is bonded the collar 16 with an adhesive 50. In certain embodiments, the upper deck 14 and the collar 16 may functionally be a single component formed from a single corrugate sheet 30. Regardless, the collar 16 is typically formed from a single corrugate sheet 30 but in certain configurations may be formed from two or more corrugate sheets 30. The collar 16 is generally configured to retain the sleeve 18 on its upper surface and to support a load resting on its upper surface. The collar 16 is typically square or rectangular in outline before, and after, folding and typically has about the same length as the stringers 12 in at least one of its dimensions. The collar 16 includes a peripheral flange 40 that extends around the periphery of the collar 16. The peripheral flange 40 functions to mechanically hold the lower portion of the sleeve 18 on the collar 16. The peripheral flange 40 is configured to be folded upward during the assembly of the sleeve pallet 10. Typically, the peripheral flange 40 is defined by fold line 42 defined by a crease in or cut partially through the corrugate sheet 30. As will be recognized by those skilled in the art, the partial cutting or creasing weakens fold line 42 in the corrugate sheet 30 and allows for more precise folding at desired locations. A collar flap 44 is also formed at each corner. The collar flaps 44 extend from one or more ends of the peripheral flange 40. The collar flaps 44 are cut along one of the fold lines to allow the collar flap 44 to fold around and secure the peripheral flange 40 in an upright position, as illustrated in FIGS. 1 and 2. The collar flaps 44 when the peripheral flange 40 is bent 90 degrees upward at the fold line 42. The collar flap 44 is configured to be bent 90 degrees and secured to the adjacent section of peripheral flange 40, which itself has been bent 90 degrees, to secure the peripheral flange 40 in an upright position. The collar flap 44 can be secured to the adjacent peripheral flange 40 by tape 48, adhesives, or mechanically using detents and slots or various other interlocking configurations as will be recognized by those skilled in the art upon review of the present disclosure. In certain aspects, the collar flaps may be secured to the adjacent peripheral flange by various metal or plastic fasteners as will be recognized by those skilled in the art.

[0034] The sleeve 18 is generally designed to contain and/or protect a goods being shipped or stored in sleeve pallet 10. The sleeve 18 can be formed from one or more corrugated sheets 30. The sleeve 18 typically defines four walls 80 when in an open configuration. The sleeve 18 is typically open on both its top portion and bottom portion. The sleeve 18 defines the peripheral Further, the sleeve 18 is typically collapsible so as to take up a lesser volume and reduce shipping costs during transport to customers. In its

expanded configuration, the sleeve **18** is typically shaped to be received within the peripheral flange **40** and extend with the flange coextensively with the peripheral flange around the collar **16**. The outer surface of walls **80** may abut an inner surface of the flange. In certain embodiments, the lower portion of the sleeve **18** may be secured to the adjacent peripheral flange **40** by adhesives, tapes, or mechanically using detents and slots where the components overlap as will be recognized by those skilled in the art upon review of the present disclosure. The sleeve **18** in combination with the collar **16** define the cavity **82** to contain the goods for shipment and/or storage.

[0035] As also shown in FIG. 6, a reinforcing insert **84** may be provided on the floor **84** of the cavity **82** on an upper surface of the collar **16**. The reinforcing insert **84** is typically a flat sheet of material and, in certain aspects, may be an additional corrugate sheet **30** or may alternatively be a different more durable material to prevent damage to or failure of the collar **18** and/or upper deck **14**. If made from a repulpable cellulose based material, the reinforcing insert **84**, is typically adhesively secured to the upper surface of the collar **16** without compromising the ease of recycling the sleeve pallet **10**. If more durability is needed to protect or reinforce the floor **89** of the cavity **82**, a non-repulpable material such as metal, plastic, or wood could be used for the reinforcing insert. If a non-repulpable material is used, the reinforcing insert may be loosely fit or compressionally fit between the peripheral flange to enable simple and efficient removal before recycling the sleeve pallet **10**. Further, such simple fitment and removal permits the reuse of reinforcing inserts **84** after the useful life of the sleeve pallet **10** has expires. Generally, the reinforcing insert **84** may have a shape corresponds to the floor **89** of the cavity or may be generally coextensive and shaped such that it permits the protection and/or reinforcement of the floor **89** as would be required for particular applications and goods. The insert **84** may be adhesively bonded to the upper surface of the collar **16**, may be compressionally secured between the peripheral flanges **40** of the collar or may be otherwise removably secured to the collar **16**.

[0036] FIGS. 8A and 8B illustrate a top view of a sleeve **18**. The sleeve **18** is typically laterally collapsible into a size that can fit onto over the collapsed components of a pallet sleeve **10** as shown in FIGS. 3 and 4. In a first embodiment to permit the collapse of the sleeve **18** shown in FIG. 8A, the opposing walls of sleeve **18** each include a fold line **58** to permit opposite walls of the sleeve **18** to be folded inward into a flattened four layer folded configuration. The fold lines **58** are located substantially equidistant from the two corners adjacent to each of the fold lines **58**. This spacing allows the inward folding of the opposing sides and the flattening of the sleeve **18**. In a second embodiment to permit the flattening of the sleeve **18** shown in FIG. 8B, the ends **68**, **69** of the sleeve **18** are left unsecured to one another prior to the assembly of the pallet sleeve **10**.

[0037] Further as will be recognized by those skilled in the art upon review of the present disclosure, sleeve pallet **10** may be further modified to have desired properties. For example, the components may be wrapped with a paper or plastic or they may be treated at least in part with, inter alia, fire retardants, insecticides, pesticides, fungicides, and waterproofing to inhibit deterioration. Other materials such as metal foils, plastics, resin impregnated paper, and other fibrous materials such as fibrous glass materials could also

be incorporated into various implementations of the sleeve pallet **10**. When the shipping pallet's **10** useful life is completed, the sleeve pallet **10** may be disposed of, at least in part, by recycling.

[0038] A cap **20** may be provided to retain the goods and protect the goods from the elements. The cap **20** is generally sized and shaped to be received over and retained on the upper opening of sleeve **18**. When present, a cap **20** may be sized to be received over the periphery of the sleeve **18**. The cap **20** is typically formed from a single corrugate sheet **30**, similar to the collar **16**. The cap **20** is generally configured to be retained over the top of the sleeve **18** on the lower surface of the cap **20** and to retain and/or protect the goods on the sleeve pallet **10**. The cap **20** includes a peripheral cap flange **90** that extends around the periphery of the cap **20**. The peripheral cap flange **90** functions to mechanically hold the cap **20** to the upper portion of the sleeve **18**. The peripheral cap flange **90** is configured to be folded downward during the assembly of the sleeve pallet **10**. Typically, the peripheral cap flange **90** is defined by fold line **42** defined by a crease in or cut partially through a corrugate sheet **30**. As will be recognized by those skilled in the art, the partial cutting or creasing weakens fold line **42** in the corrugate sheet **30** and allows for more precise folding at desired locations. A collar cap flap **94** is also formed at each corner of the cap **20**. The collar cap flaps **94** extend from one or more ends of the peripheral cap flange **90**. The collar cap flaps **94** when the peripheral cap flange **90** is bent 90 degrees downward at the fold line **42**. The collar cap flap **94** is configured to be bent 90 degrees and secured to the adjacent section of peripheral cap flange **90**, which itself has been bent up 90 degrees, to secure the peripheral cap flange **90** in a downward position. The collar cap flap **94** can be secured to the adjacent peripheral cap flange **90** by adhesives, tapes, or mechanically using detents and slots as will be recognized by those skilled in the art upon review of the present disclosure.

[0039] The foregoing discussion along with the Figures discloses and describes various exemplary implementations. These implementations are not meant to limit the scope of coverage, but, instead, to assist in understanding the context of the language used in this specification and in the claims. The Abstract is presented, for example, to meet requirements of 37 C.F.R. § 1.72(b) only. This Abstract is not intended to identify key elements of the apparatus and related methods of use disclosed herein or to delineate the scope thereof. Upon study of this disclosure and the exemplary implementations herein, one of ordinary skill in the art may readily recognize that various changes, modifications and variations may be made thereto without departing from the spirit and scope of the inventions as defined in the following claims.

The invention claimed is:

1. An apparatus for the shipping and storage of goods, comprising:

- an upper deck comprised of a corrugate sheet;
- a plurality of stringers adhesively secured to a lower surface of the upper deck;
- a collar comprising a single corrugate sheet defining a peripheral flange, a lower surface of collar adhesively secured to an upper surface of the upper deck; and
- a sleeve comprising one or more corrugate sheets, a lower portion of the sleeve received within the peripheral flange of the collar.

2. An apparatus, as in claim 1, further comprising a reinforcing insert positioned on an upper surface of the collar.

3. An apparatus, as in claim 2, further comprising the reinforcing insert adhesively secured to the upper surface of the collar.

4. An apparatus, as in claim 1, further comprising a cap comprising a single corrugate sheet and defining a peripheral cap flange, the cap received over an upper portion of the sleeve.

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