



US 20090045210A1

(19) **United States**

(12) **Patent Application Publication**
Tilton

(10) **Pub. No.: US 2009/0045210 A1**

(43) **Pub. Date: Feb. 19, 2009**

(54) **PLIABLE GROUND CALCIUM CARBONATES
STORAGE ARTICLES AND METHOD OF
MAKING SAME**

Related U.S. Application Data

(60) Provisional application No. 60/956,690, filed on Aug. 18, 2007.

Publication Classification

(51) **Int. Cl.**
B65D 90/00 (2006.01)
B29C 53/80 (2006.01)
(52) **U.S. Cl.** **220/890; 264/339**

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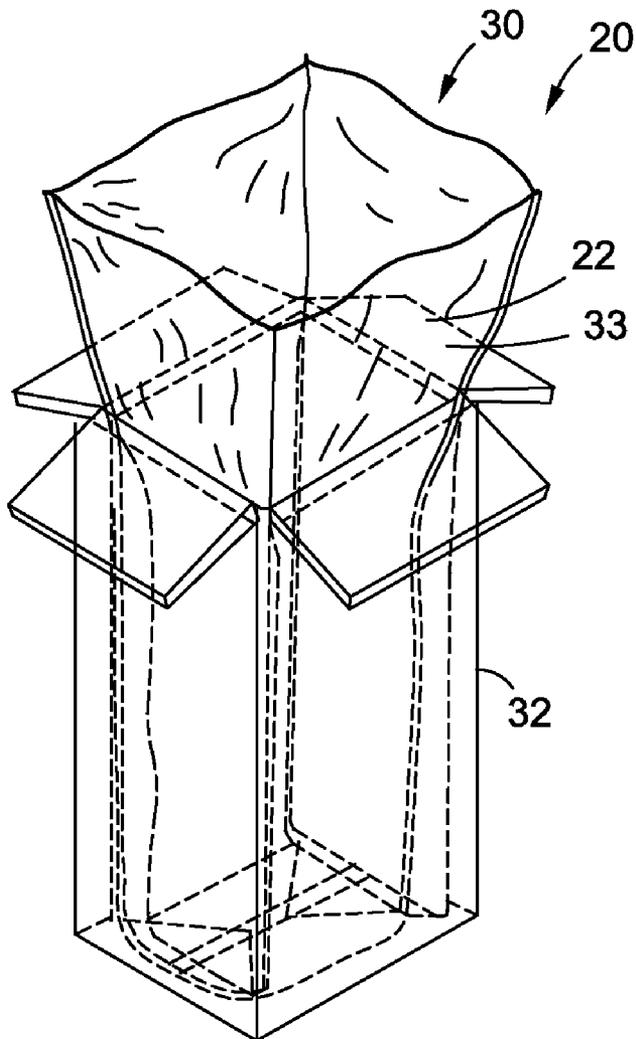
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(57) **ABSTRACT**

The present invention is directed to a storage article, such as a retail and/or shipping package, having an environmentally friendly pliable composite structure that has a high degree of pliability and flexibility and is highly attractive in look and feel. The pliable composite structure has a base layer and a ground calcium carbonate-containing layer covering the base layer. The base layer and ground calcium carbonate-containing layer are shaped, sized and manufactured such that the pliable composite structure formed therefrom is sufficiently pliable and flexible to form the storage article.

(21) Appl. No.: **11/945,166**

(22) Filed: **Nov. 26, 2007**



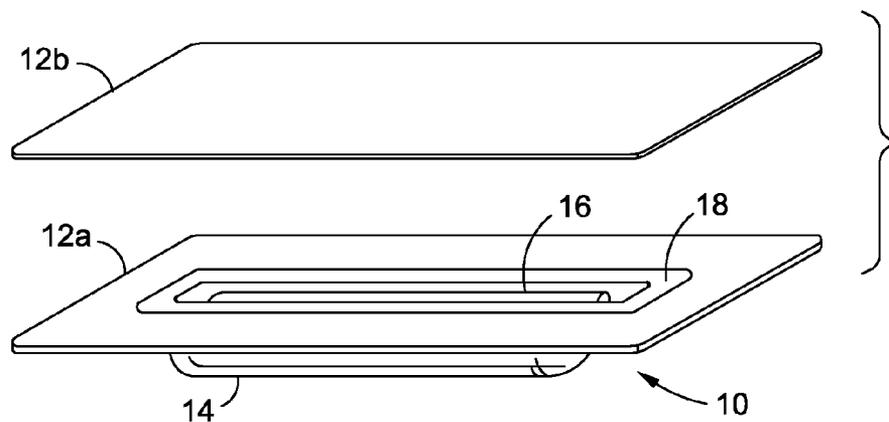


FIG. 1A
(PRIOR ART)

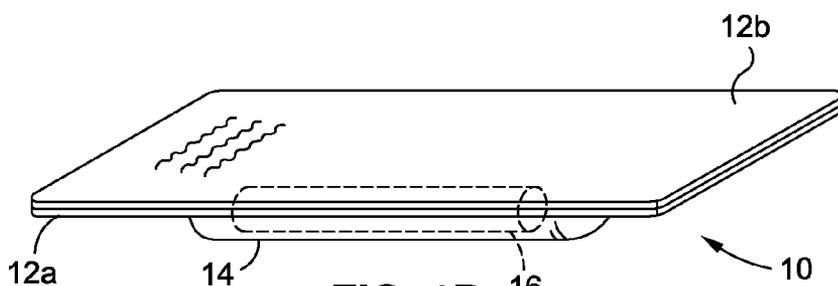


FIG. 1B
(PRIOR ART)

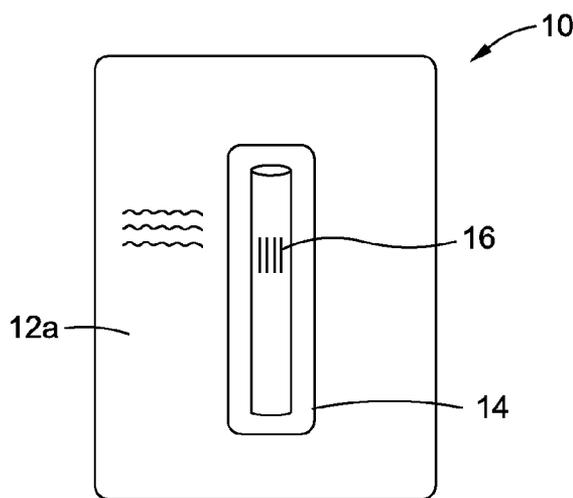


FIG. 1C
(PRIOR ART)

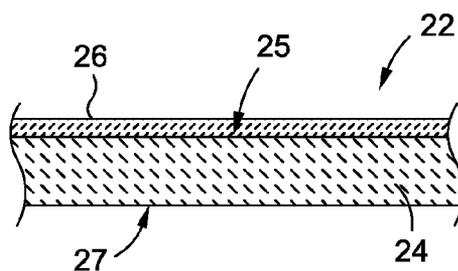


FIG. 2

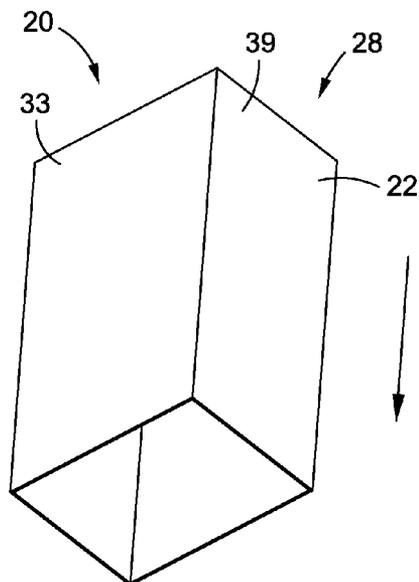


FIG. 3A

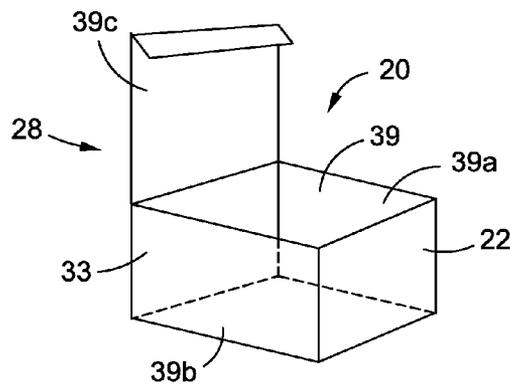


FIG. 3B

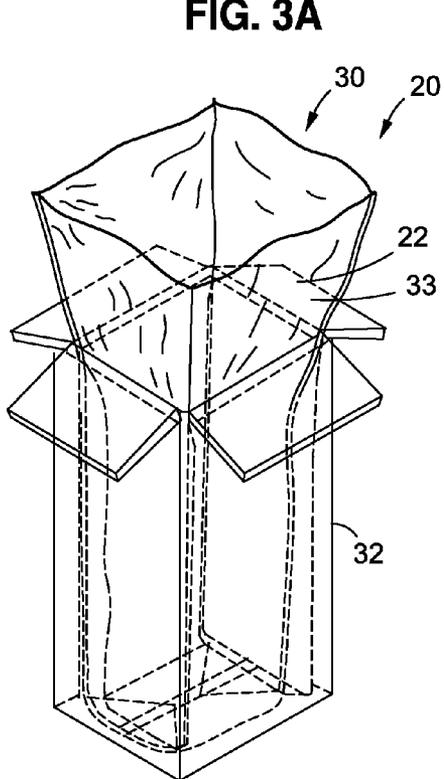


FIG. 4A

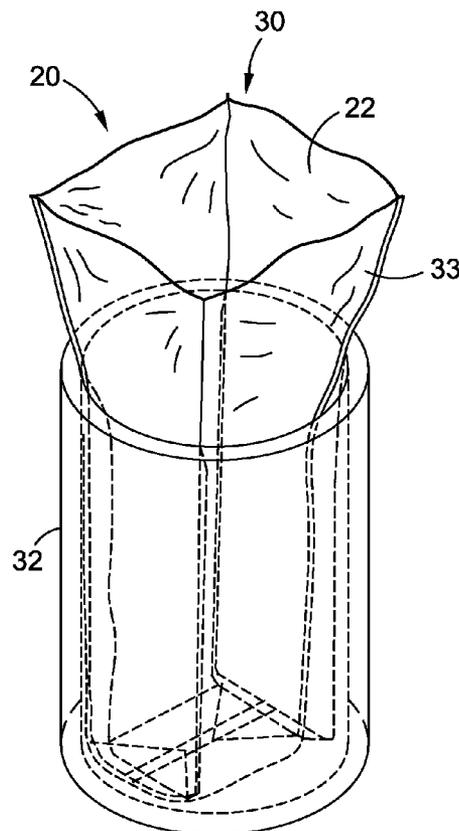


FIG. 4B

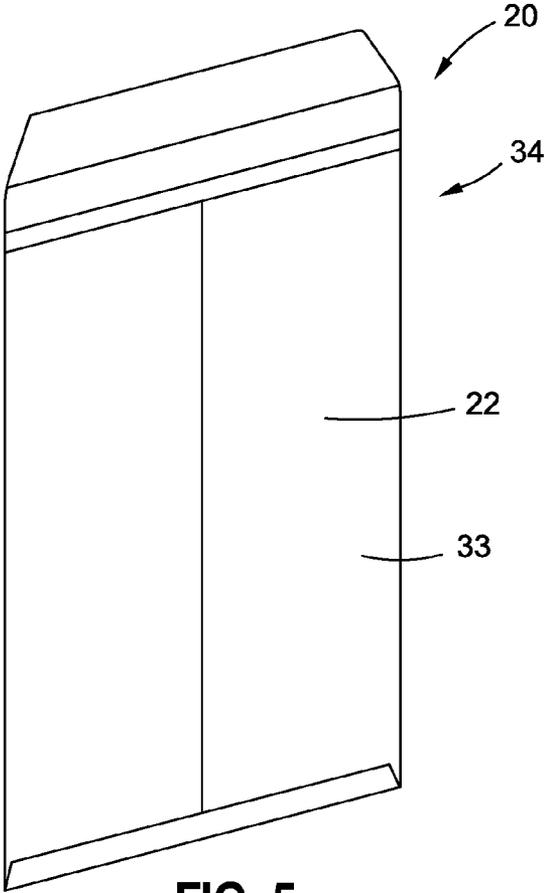


FIG. 5

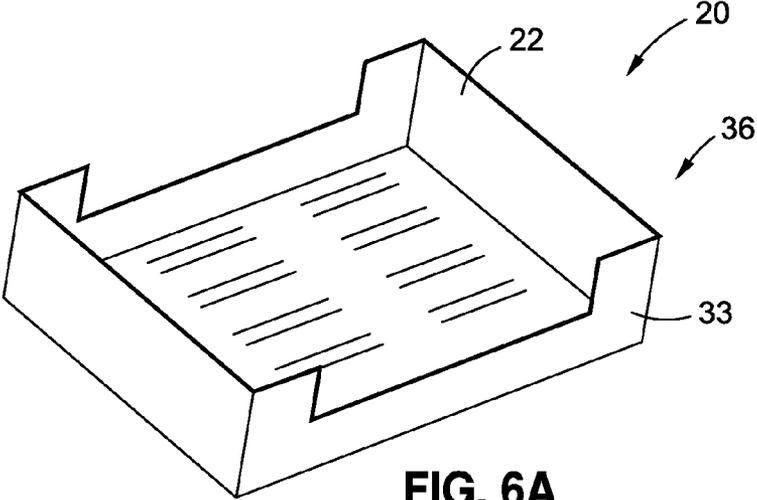


FIG. 6A

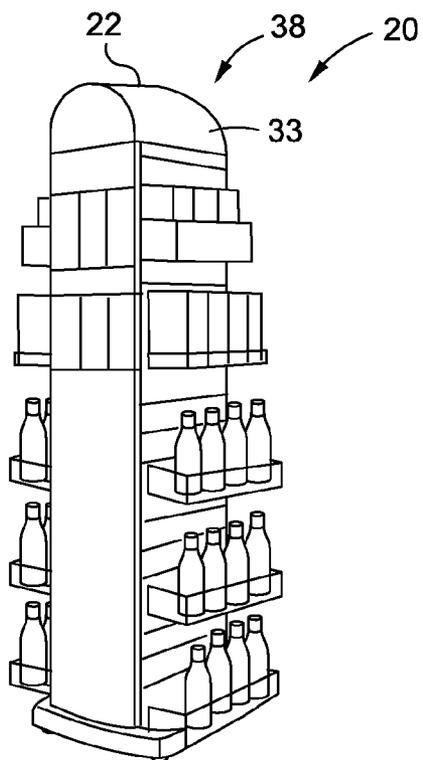


FIG. 6B

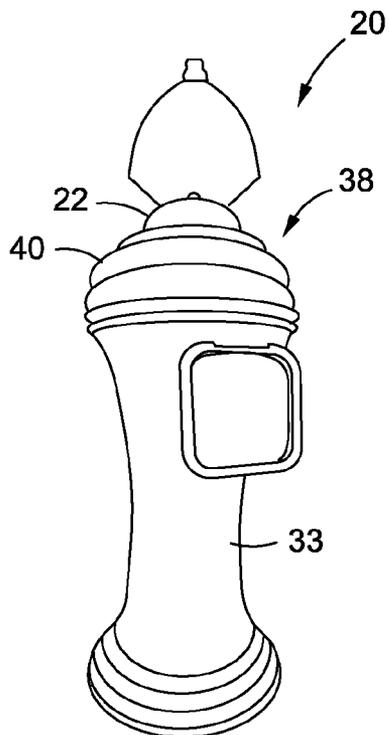


FIG. 6C

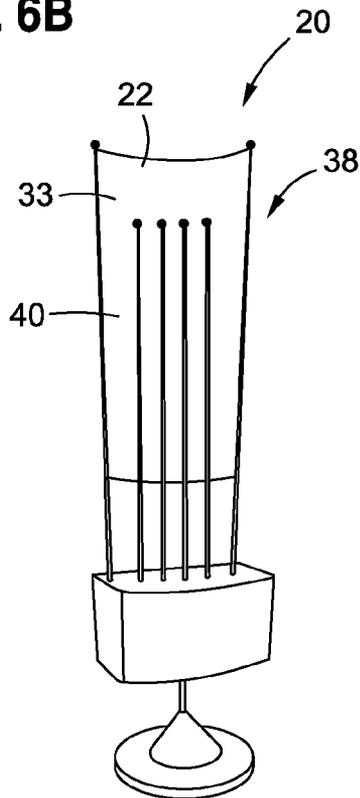


FIG. 6D

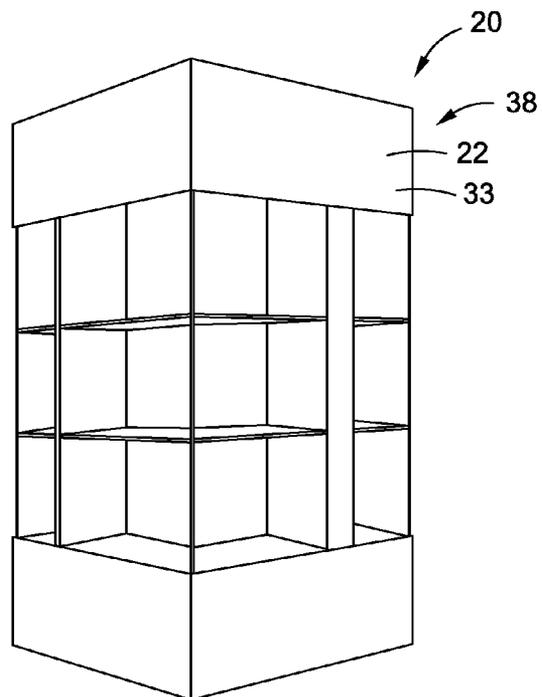


FIG. 6E

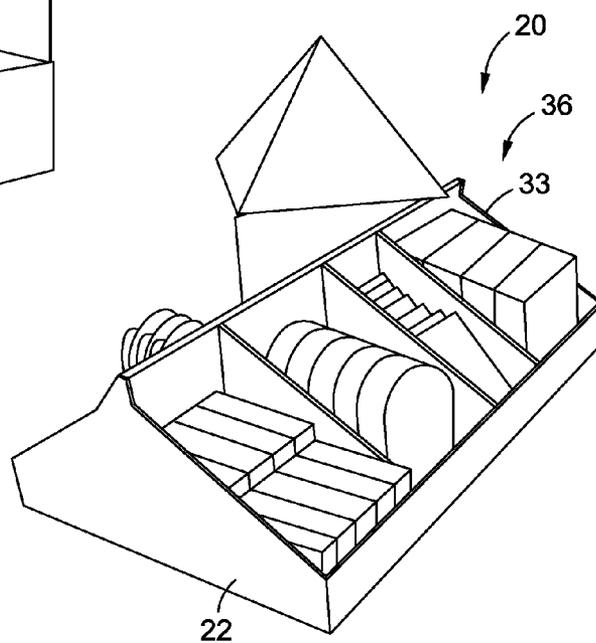


FIG. 6F

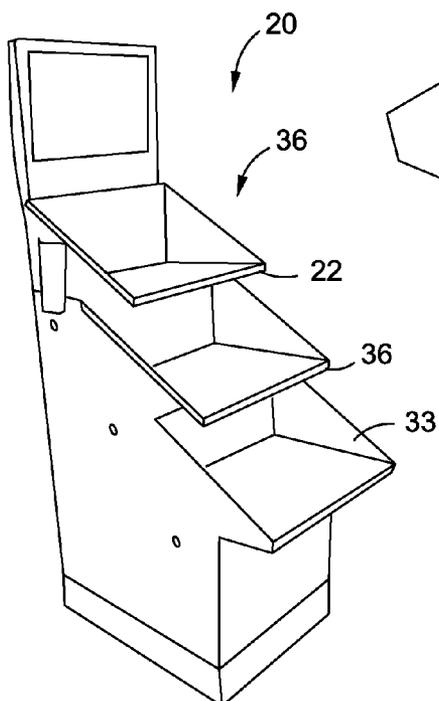
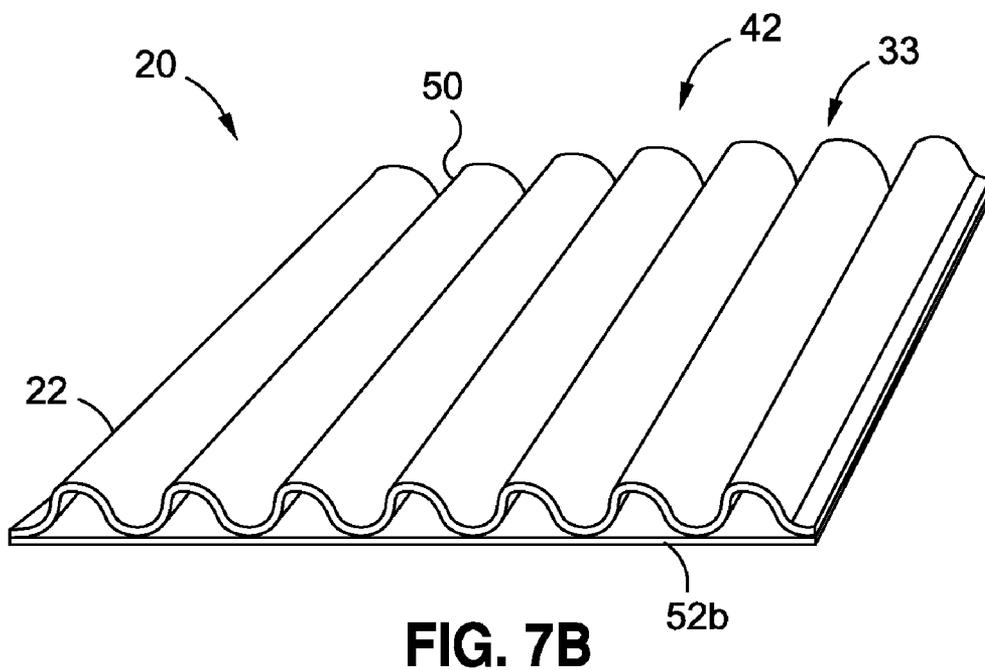
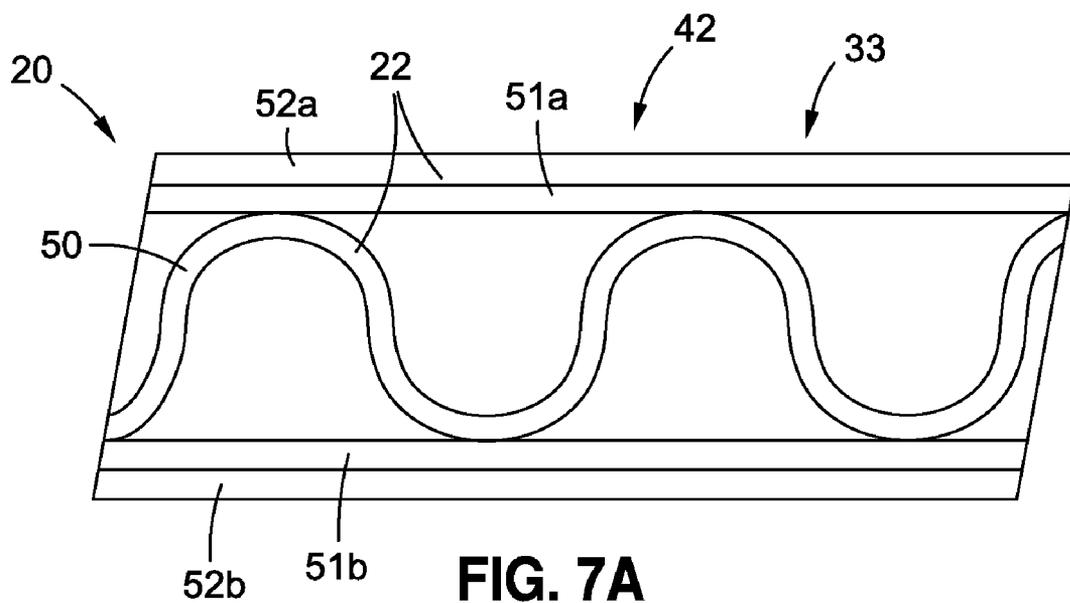


FIG. 6G



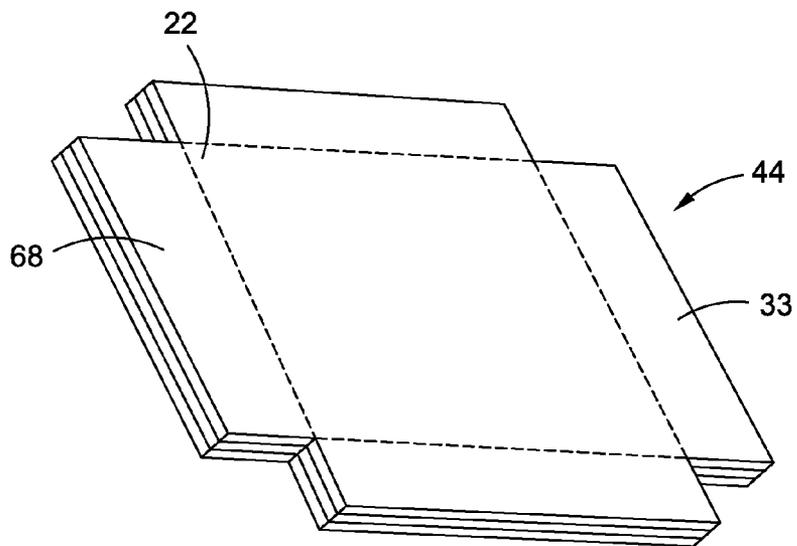


FIG. 8

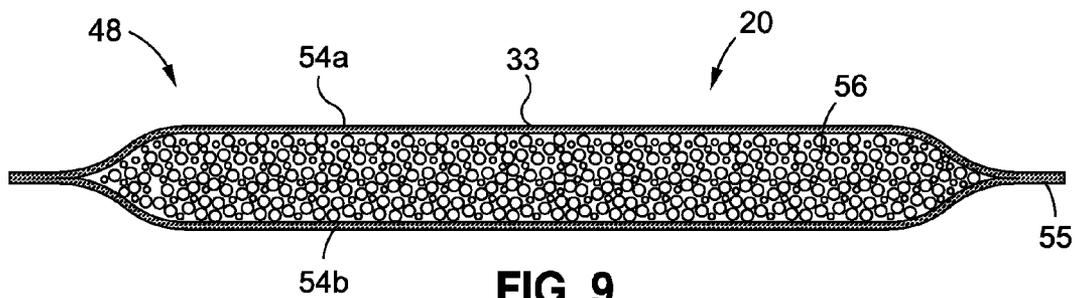


FIG. 9

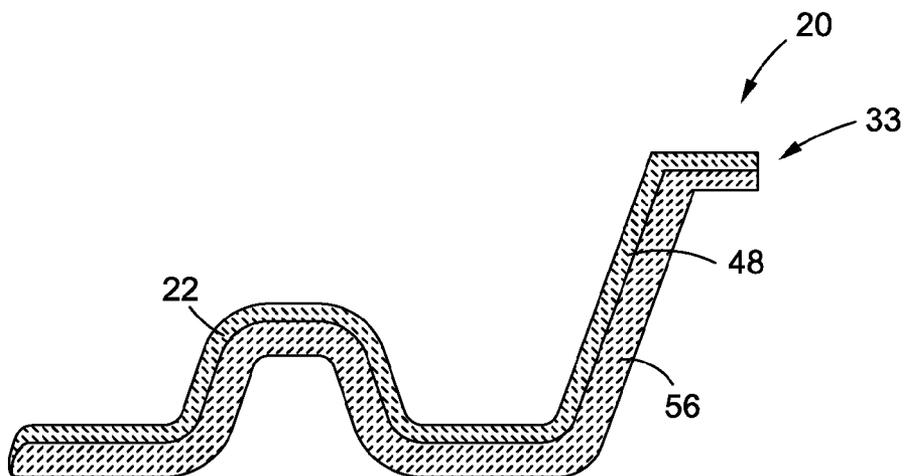


FIG. 10

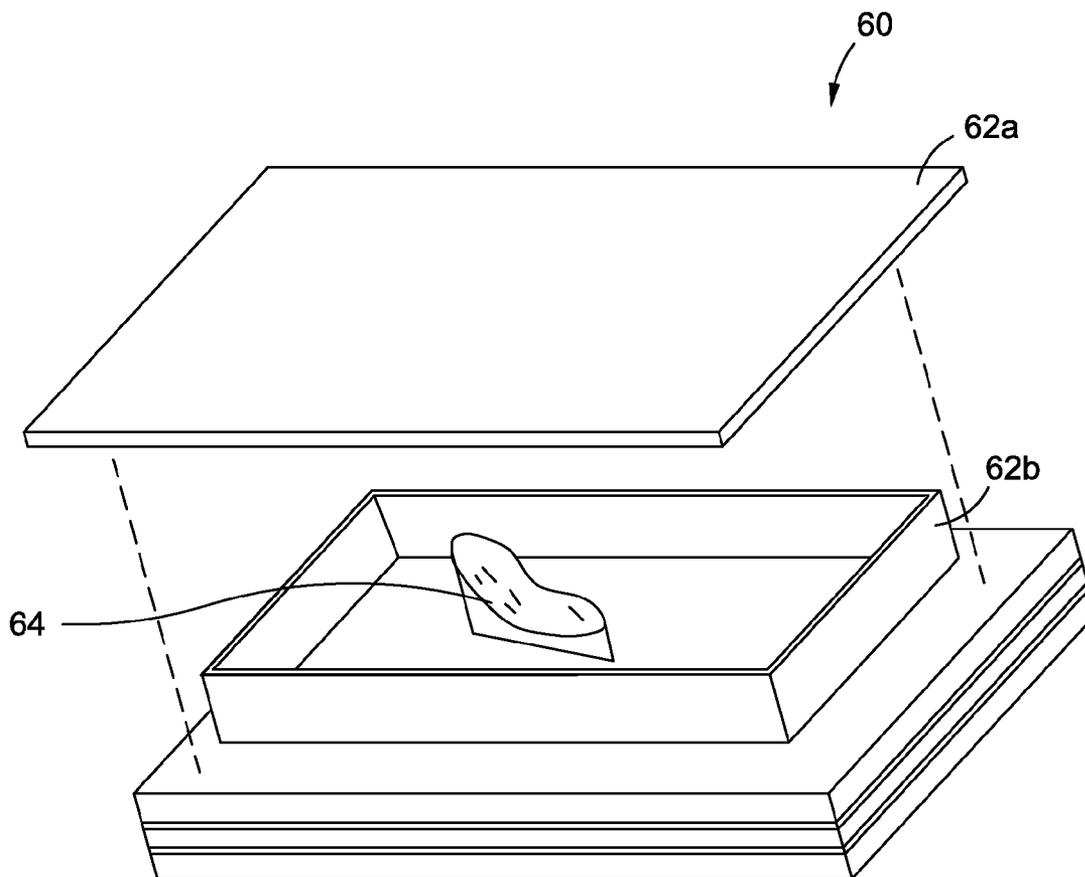


FIG. 11

**PLIABLE GROUND CALCIUM CARBONATES
STORAGE ARTICLES AND METHOD OF
MAKING SAME**

**CROSS-REFERENCE TO RELATED
APPLICATIONS**

[0001] This application claims priority to U.S. Provisional Application No. 60/956,690, filed Aug. 18, 2007, which is hereby incorporated by reference in its entirety.

**STATEMENT RE: FEDERALLY SPONSORED
RESEARCH/DEVELOPMENT**

[0002] Not Applicable

BACKGROUND OF THE INVENTION

[0003] 1. Technical Field

[0004] The present invention relates generally to storage articles such as retail and/or shipping product packages having a pliable ground calcium carbonate-containing material that is highly attractive, efficient to manufacture, and environmentally friendly.

[0005] 2. Related Art

[0006] Packages and packaging material for product retail and shipping purposes are typically designed to be sufficiently durable to allow reliable use of the materials. Considerations that are taken into account in the development of such packages and materials include their resistance to heat, fire and moisture, as well as resistance to infiltration by rodents and pests, and the ability of the packages and materials to deter theft. The packages and packaging materials are also desirably relatively inexpensive to manufacture, and are preferably attractive enough to the customer in appearance, feel and touch to encourage use of the products as well as to enhance the product image or association.

[0007] However, it can be difficult to create packaging products that are both attractive to consumers and inexpensive to fabricate while also being sufficiently durable to meet the needs of retail and shipping use. For example, some lower cost packaging options are poorly configured to prevent theft because of minimal investment in protective structures. Examples of packages that may not be as great of a theft deterrent are common blister packages, and shrink-wrapped or flexible film style packaging. While clamshell style packaging is an example of more theft resistant packaging due to the typically higher gauge materials used therein, the packaging is also typically more expensive due to the use of the higher cost materials.

[0008] A further problem that exists with prior packaging products is that these products may not incorporate environmentally friendly materials and designs. Environmentally friendly materials can have desirable attributes such as biodegradability, compostability, a high recycled content, and may also use less energy, pollute less, and generate fewer greenhouse gases in their manufacture than previous materials. Such environmentally friendly materials are increasingly in demand from consumers and retailers, and can be beneficial for manufacturers by reducing adverse environmental impact of the material.

[0009] An example of an environmentally friendly material is ground calcium carbonate (GCC), which is a material that can be combined with bonding agents and extruded to form material layers. Environmentally friendly ground calcium carbonate extrusion materials include materials similar to

ones with the tradename Via-Stone™ that is manufactured by Taiwan Lung Meng Corporation, which is incorporated into a synthetic commercial printing paper. The ground calcium carbonate material can be fabricated from natural sources, such as limestone, and can be biodegradable, and thus represents an advantage over other non-biodegradable and less environmentally friendly materials.

[0010] FIGS. 1a through 1c show a blister card package 10 that incorporates an environmentally friendly ground calcium carbonate material in a non-composite form, and that is commercially available from One Source Industries in Irvine, Calif. The blister card package 10 is formed by adhering a front card portion 12a to a back card portion 12b, with the front card portion 12a having a cutout sized to fit a plastic “blister” 14 therethrough in which the retail product 16 is contained and displayed. The blister 14 has flanges 18 that are sealed in between the two card portions 12a and 12b to form a sturdy blister card package 10. In this embodiment, a front card portion 12a may be fabricated of a card of ground calcium carbonate containing material, and the back card portion 12b can be formed of a rigid paperboard card. The front and back card portions 12a, 12b can then be heat sealed together to join the cards in a limited surface area that is dictated by the heat sealing pattern at the interface between the two card portions 12a, 12b, thereby trapping the blister between the two card portions 12a, 12b. Adhesive or glue can also be applied at various regions of the interface between the front and back card portions, such as about the blister flanges 18 or about a periphery of the cards. The typically rigid card materials used for the back and/or front card portions 12a, 12b, and use of adhesive or other agents in the adhesion of the card portions 12a, 12b forms a rigid and stiff overall card package, which has the advantages of imparting theft and tear resistance to the blister card package. The ground calcium carbonate-containing material also imparts an attractive look to the blister card package, with the ground calcium carbonate material having the added advantage that it is environmentally friendly, and renders the package readily printable with advertising or product information.

[0011] However, a problem with such blister card products is that they are typically not as attractive to consumers in terms of look, feel and touch, as other less environmentally sound products, due to the rigidity and tactile unpleasantness of the stiff packaging. Also, some large club stores require that packages have designs with sufficient external strength to allow for vertical and other stacking of the packages in pallet pack layers, which can be difficult to achieve when incorporating a plastic “blister” portion into the packaging. The blister packaging also may not provide the best theft deterrence.

[0012] Accordingly, there remains a need in the art for retail and/or shipping packages that are durable and cost effective while also being attractive to consumers in terms of appearance and touch. There is also a need for retail and/or shipping packages that are durable and attractive while incorporating environmentally friendly materials and being resistant to theft.

BRIEF SUMMARY OF THE INVENTION

[0013] The present invention specifically addresses and alleviates the above-identified deficiencies in the art. In this regard, the present invention is directed to an environmentally friendly storage article (e.g., a retail and/or shipping package) having a pliable composite structure that has a high degree of pliability and flexibility. The pliable composite structure has

a base layer and a ground calcium carbonate-containing layer covering the base layer. The base layer and ground calcium carbonate-containing layer are shaped, sized and manufactured such that the pliable composite structure formed therefrom is sufficiently pliable and flexible to form the storage article. The pliable composite structure can be formed by adhering the calcium carbonate-containing layer to the base layer, and shaping the pliable composite structure into a desired component form. The pliable composite structure can be used in the fabrication of packages that are highly attractive in look and feel, while also having high durability.

[0014] In one version, the pliable composite structure is formed into the shape of a box for retail and/or shipping purposes. The pliable composite structure may also be formed into the shape of a container liner, a shipping mailer, a display or display tray, slip or tear sheets, pallet covers, corrugated structures and interior protective packaging components, and other retail and/or shipping components.

[0015] The present invention is best understood by reference to the following detailed description when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] These as well as other features of the present invention will become more apparent upon reference to the drawings wherein:

[0017] FIG. 1a is a schematic side view of a prior art blister card package showing a product held in a blister that is sandwiched between top and bottom card portions;

[0018] FIG. 1b is a schematic side view of the prior art blister card package of FIG. 1a having the top and bottom card portions sealed to one another;

[0019] FIG. 1c is a schematic front view of the prior art blister card package of FIGS. 1a-1b showing the product displayed within the blister portion of the package;

[0020] FIG. 2 is a side view of a pliable composite structure having a base layer and a ground calcium carbonate-containing layer covering the base layer;

[0021] FIGS. 3a-3b are side views of embodiments of pliable composite structures formed into the shape of at least one of a shipping box and retail box;

[0022] FIGS. 4a-4b are side views of embodiments of containers having pliable composite structures formed into the shape of container liners;

[0023] FIG. 5 is a front view of a shipping mailer having the pliable composite structure;

[0024] FIGS. 6a-6g are front views of embodiments of retail displays and display trays having the pliable composite structure;

[0025] FIG. 7a is a sectional side view of a corrugated structure having the pliable composite structure;

[0026] FIG. 7b is a sectional top view of the corrugated structure having the pliable composite structure of FIG. 7a;

[0027] FIG. 8 is top view of a tear sheet or slip sheet having the pliable composite structure which may optionally be used as a pallet cover;

[0028] FIG. 9 is a sectional side view of an interior protective packaging component having the pliable composite structure and containing shock absorbing material;

[0029] FIG. 10 is a sectional side view of an interior protective packaging component having the pliable composite structure molded onto a shock absorbing material; and

[0030] FIG. 11 is a schematic side view of a vacuum-forming apparatus suitable for molding pliable composite structures into shapes for storage articles.

[0031] Common reference numerals are used throughout the drawings and detailed description to indicate like elements.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The detailed description set forth below is intended as a description of the presently preferred embodiment of the invention, and is not intended to represent the only form in which the present invention may be constructed or utilized. The description sets forth the functions and sequences of steps for constructing and operating the invention. It is to be understood, however, that the same or equivalent functions and sequences may be accomplished by different embodiments and that they are also intended to be encompassed within the scope of the invention.

[0033] It has been discovered that environmentally friendly and attractive storage articles 20, such as for example retail and/or shipping packages, can be constructed at least in part from a pliable composite structure 22 having a high degree of pliability and flexibility. The pliable composite structure 22 has a base layer 24 and a ground calcium carbonate-containing layer 26 covering the base layer 24, as shown for example in FIG. 2. The base layer 24 and ground calcium carbonate-containing layer 26 are shaped, sized and manufactured such that the pliable composite structure 22 formed therefrom has a pliability that is sufficient to allow for the production of the storage articles 20. The pliability of the composite structure 22 also imparts an attractive tactile feel to the article 20 that is a substantial improvement over prior products. The pliable composite structure 22 can be readily transformed into desired storage article components 33 by at least one of folding and creasing of the pliable composite structure 22, as well as by using vacuum-forming or thermo-forming techniques.

[0034] The pliable composite structure 22 can be formed by controlling the sizes, shapes and manufacture of the ground calcium carbonate-containing layer 26 and base layer 24 to form the structure 22. For example, a thickness of one or more of the layers 26, 24 can be controlled to provide more or less pliability in the resulting composite structure 22, with thinner layers typically being more pliable than thicker layers. The thicknesses of the layers are also selected with regards to desired durability requirements, with thicker layers providing more durability in some embodiments over very thin layers. A suitable thickness of the ground calcium carbonate-containing layer 26 that provides good pliability as well as durability of the pliable composite structure may be, for example, from about 2 to about 30 mils.

[0035] The manufacture of the layers 26, 24 is also controlled to provide layer compositions that impart the desired pliability in the pliable composite structure 22. For example, the composition and amount of bonding agent used in the formation of the ground calcium carbonate-containing layer 26 can be selected to provide the desired flexibility and pliability of the resulting composite structure 22. In one version, a type and prescribed amount of a bonding agent, such as a thermoformable bonding agent, can be added to the ground calcium-containing layer 26 that is sufficient to provide a composite structure 22 that is capable of being formed into a desired package shape by applying at least one of heat, pressure and vacuum, such as for example by at least one of thermoforming and vacuum forming. Suitable bonding

agents that can be incorporated into the ground calcium carbonate-containing material include HPDE, bio-polymers, polylactic acids, and other bonding agents. The calcium carbonate of the ground calcium carbonate-containing layer 26 can be derived from a limestone source or other calcium carbonate-containing sources. The content of the base layer 24 is also selected to provide a base layer 24 that is sufficiently flexible for use in the formation of the pliable composite structure 22, while also being sufficiently durable to allow for at least one of retail and shipping use. The base layer 24 can be formed from materials such as paperboard, cellulosic fibers, chemical pulps, thermochemical pulps, natural starch-based foams, plastic, paper, felt, non-woven mats, kraft linerboard and fiberboard, among other materials. The size, shape and composition of the layers 26, 24 is selected to provide a pliability of the resulting structure 22 that is sufficiently high to allow for formation of storage articles 20 such as at least one of a retail package and shipping package that have an attractive look and feel, while still being sufficiently sturdy and durable for at least one of shipping and retail use.

[0036] As known to those of ordinary skill in the art, a “composite” material is a material comprising two or more substances having different physical characteristics, in which each substance retains its identity while contributing desirable properties to the whole. The term “composite” may especially refer to those materials for which each substance contributes desirable properties to the whole that are greater than the otherwise additive contribution of each substance in the absence of the other, in effect creating a material that has properties greater than the mere sum of its parts. This is in contrast to, for example, the prior art non-composite product shown in FIGS. 1a-1c, as the two layers 24, 26 of the pliable composite structure 22 according to the present invention are bonded along substantially the entire interface between the layers 24, 26, such as along substantially an entire top surface 25 of the base layer 24, to form a single composite structure. Also, the characteristics and manufacture of the layers 24, 26 and composite structure 22 are selected such that the combined composite structure 22 has properties including pliability and machinability that go beyond the capabilities of either material alone and that are not achieved by the prior art product.

[0037] The pliable composite structure 22 can be formed using a number of different manufacturing techniques. For example, a method of forming the composite can comprise a milling step in which paperboard or another base layer material is formed into sheets having the desired base layer content and thickness, and the resulting sheets are gathered onto rolls. The milling step can also include a process of extruding the ground calcium carbonate material into sheets having the desired chemical content and thickness, and gathering the resulting sheets into rolls. The milling step can further comprise lamination of the base layer material with the ground calcium carbonate material to form the pliable composite structure 22 having the base layer 24 and ground calcium carbonate-containing layer 26. The base layer 24 may be laminated with the ground calcium carbonate-containing layer 26 on one or more surfaces of the layer 24, such as on top and bottom surfaces 25, 27, or on only a single surface, as show in FIG. 2. The base layer 24 can be laminated with the ground calcium carbonate-containing layer 26 by adhering the layers 24, 26 to one another, for example by applying heat or pressure to one or more of the materials forming the layers 24, 26, or by optionally applying an adhesive between the

layers 24, 26. In one version, the pliable composite structure 22 is formed without the use of added adhesive between the layers 24, 26.

[0038] In one embodiment, the pliable composite structure 22 that is used to form a storage article 20 such as at least one of a retail package 20 and shipping package 20 having printing formed on portions thereof, such as printed advertisements or information about the product contained therein. For example, the storage article 20 can have printing on one or both sides of the ground calcium carbonate-containing layer 26 and also or alternatively on one or both sides of the base layer 24. The printing can be carried out by well-known printing techniques, such as flexographic and lithographic printing. Storage articles 20 having pliable composite structures 22 with ground calcium carbonate-containing layers 26 can be attractively and brightly printed to increase consumer demand for the product as well as to convey important information about the product and contents to the customer. In this version, a printing step comprises feeding the base material or ground calcium-carbonate containing material through a printer. The printer can print on one or multiple surfaces of the material, and the same material can also be sent through the same or a subsequent printer.

[0039] The base layer material and ground calcium carbonate-containing material may also be subjected to a cutting step, either individually or as a part of the combined pliable composite structure, to form parts of the desired package shape. The cutting step can comprise die-cutting portions of the materials, or cutting portions of the material or composite sheets with a rolling blade, for example. The cutting step can also form smaller portions for multiple articles.

[0040] In further embodiments, the individual materials and/or pliable composite structure 22 are formed into a desired shape for the package 20 by molding under pressure, heat or vacuum. For example, in a vacuum molding process, the one or more of the material and composite is forced against a mold under the force of vacuum, such that the material or composite adopts a shape conforming to the mold. As another example, in a thermoforming process, the materials and/or composite are heated while pressed against a mold to deform the material until it adopts a desired shape. Such molding may allow the pliable composite structure 22 to adopt desired shapes, including even rounded or curved shapes. An example of a vacuum molding press 60 is shown in FIG. 11, which shows top and bottom press plates 62a, 62b and a mold 64, with the pliable composite structure 22 being placed between the presses 62a, 62b and mold 64 and then vacuum pressed onto the mold by application of a vacuum between the presses 62a, 62b. The pliability of the structure 22 may also allow various folding and creasing steps to be performed to form the final component shape, without requiring the application of heat or vacuum. A combination of various molding and/or shaping steps may also be performed to form the final storage article 20, as well as various cutting and shaping steps and steps to adhere additional decorative or functional parts. Also, one or more pliable composite structures 22 can be stacked or adhered to one another to form a desired storage article component 33.

[0041] In one version, the pliable composite structure 22 is formed into the shape of a component 33 comprising a box 28 for at least one retail and shipping, as shown for example in FIGS. 3a-3b. The box 28 may be in the form of a cube, rectangular or other box shape that is sized to contain a retail or shipping product 16. In one version, the box 28 is formed

by preparing a pliable composite structure 22 in the form of a pliable sheet, for example by performing the milling step described above, cutting the structure into the desired shape, and then folding and/or creasing the sheet, either manually or by machine, to form the final three dimensional box shape. In the version shown in FIG. 3a, the pliable composite structure 22 forms the walls 39 of the box, including bottom and side walls 39a, 39b as well as a fold-over lid portion 39c. The box 28 formed from the pliable composite structure 22 has a smooth and flexible tactile feel that is attractive and pleasing to the touch, while also being sturdy and durable enough to allow use in retail on store shelves and displays. In one version, the pliability of the box 28 is such that it can be readily folded and unfolded into the box shape 28, thereby allowing the user to store the box 28 in the unfolded state and then quickly fold the box into shape when needed for use. The box 28 is also desirably sturdy enough to withstand vertical or other stacking of the box 28 with other boxes, such as in pallets for shipping or storage of products, and may also provide substantial theft deterrence. In one embodiment, the attractive feel of the box 28 as well as the enhanced luster and shine of the box imparted by the ground calcium-carbonate-containing material makes the box 28 particularly suitable for the retail of high-end and luxury products where the appeal of the overall retail package is important, such as in the retail of perfumes, cosmetics and jewelry.

[0042] In another version, the pliable composite structure 22 is formed into the shape of a container liner 30 for at least one of retail and shipping use, as shown in FIGS. 4a and 4b. The liner 30 is used to line a shipping or retail container 32 to cushion and protect a product being held in the container 32, as well as to impart moisture resistance and deter infiltration of rodents and other pests. In the version shown in FIGS. 4a and 4b, the liner 30 formed of the pliable composite structure 22 that is sufficiently flexible such that it is capable of at least partially conforming to the shape of the container 32. In the version shown in FIG. 4a, the liner 30 is sufficiently flexible to conform to the shape of a rectangular-shaped container 32. In the version shown in FIG. 4b, the liner 30 is sufficiently flexible to conform to the shape of a cylindrically-shaped container 32. The liner 30 containing the pliable composite structure 22 provides an improvement over for example prior containers formed of unlined corrugated boxes, by reducing dust contamination of the product held therein from the corrugated material, and also provides moisture, heat, pest and rodent resistance that is an improvement over the prior unlined corrugated container materials.

[0043] In yet another version, the pliable composite structure 22 forms a part of a shipping mailer 34, such as an envelope used to ship documents and other objects through UPS, FEDEX, USPS, etc., as shown in FIG. 5. The pliable composite structure 22 may be used to form a part of or even all of the mailer structure, excluding sealing parts such as adhesive or attachment brads that seal the mailer opening for shipping, and may be fabricated by using a series of folding, creasing and adhesive steps to prepare the desired mailer shape. The pliable composite structure 22 is desirably sufficiently pliable such that documents and other objects can be readily accommodated in the mailer 34, while also being sufficiently durable to resist tearing, snagging and ripping of the shipping mailer 34. The shipping mailer 34 formed from the pliable composite structure 22 provides numerous advantages over prior mailers 34 not having the improved composite structure 22. For example, the shipping mailer 34 having

the pliable composite structure imparts improved moisture resistance while also allowing for highly attractive printing on the packages, so that instructions regarding the content, shipping instructions or advertisements can be printed on the mailer. This is in contrast to prior mailers such as paper mailers which are typically fabricated to be either water resistant or readily printable, but do not typically have a highly attractive and readily printable surface that is also moisture resistant and durable, as is the case for mailers having the ground calcium carbonate-containing composite layer.

[0044] Other versions of storage articles 20 having the pliable composite structure 22 include display trays 36 and other sales displays 38, as show in FIGS. 6a-6g. For example, in the embodiments shown in FIGS. 6a and 6f, the pliable composite structure is cut, shaped and folded into the shape of display trays 36 capable of holding and displaying products for retail. The trays 36 can have walls and a base sized to hold a desired number of objects, and can also contain cutouts, as shown in FIG. 6a, or other display arrangement that holds the objects in the tray 36. FIGS. 6b-6e and 6g show embodiments of displays 38 that are either formed from or contain the pliable composite structure 22 having the ground calcium containing material. For example, in the embodiments shown in FIGS. 6b-6d, the pliable composite structure 22 is formed or molded to form parts of the display 38. The pliable composite structure can be molded by bending or folded, as well as via thermo or vacuum-forming to form desired parts of the display 38. The embodiments shown in FIGS. 6b, 6d and 6e show display cases formed from portions of printed, folded and glued pliable composite structure 22, optionally with conventionally lithographed parts. The embodiment shown in FIG. 6c shows a display 38 that has been molded into a desired shape by vacuum forming front and back halves of the display that are formed of the pliable composite structure 22. The pliable composite structure 22 is desirably sufficiently flexible such that it can be molded with vacuum or thermoforming techniques to form rounded parts 40, such as those shown in the embodiment of FIG. 6c, which may be particularly desirable for attractive displays 38, as well as in other products. FIG. 6g shows an embodiment in which the pliable composite structure 22 has been used to form a display 38 having display trays 36. The display 38 and display trays 36 that are formed from or otherwise contain the pliable composite structure 22 provide highly attractive and moisture resistant displays and trays, that can be brightly and attractively printed for retail and advertisement purposes and are highly scuff resistant. The pliable composite structure 22 is advantageously shapeable into the desired retail form, such as by folding or molding of the structure 22, and thus provides a highly adaptable material for use in improved retail displays.

[0045] Other uses of the pliable composite structure 22 include its use to form corrugated structures 42, embodiments of which are shown in FIGS. 7a-7b, as well as in the formation of slip or tear sheets or protective top pallet covers 44, an embodiment of which is shown in FIG. 8, as an interior protective packaging component 48, an embodiment of which is shown in FIG. 9, and also molded interior protective packaging components 48, embodiments of which are shown in FIGS. 10a-10b. In the embodiment shown in FIGS. 7a-7b, corrugated flutes 50 are sandwiched in between top and bottom sheets 52a, 52b to form corrugated structures 42 suitable for the formation of corrugated boxes and other similar applications. One or more of the flutes 50 and sheets 52a, 52b, may be formed of the pliable composite structure 22, to form a

corrugated structure **42** having enhanced pliability as well as moisture and pest resistance. Additionally and/or alternatively, the pliable composite structure **22** may contain a ground calcium carbonate-containing layer **26** that covers a base layer **24** that contains the corrugated parts such as flutes **50** and top and bottom sheets **52a**, **52b**. For example, as shown in FIG. **7a**, the pliable composite structure **22** may comprise a base layer **24** that is a corrugated material containing flutes **50** and inner top and bottom sheets **51a**, **51b**, with the base layer **24** being covered by top and bottom sheets **52a**, **52b** comprising the ground calcium carbonate-containing layer **26**.

[0046] In the embodiment shown in FIG. **8**, the pliable composite structure **22** is formed into slip sheets or tear sheets **44** for storing or shipping products, which sheets **44** can also be scored or folded for use as protective top pallet covers. As is also shown in FIG. **8**, a plurality of pliable composite sheets **44** can be adhered together to form a multi-layer structure **68**, such as a multi-layer tear sheet **44**.

[0047] In the embodiment shown in FIG. **9**, an interior protective packaging component **48** contains upper and lower sheets **54a**, **54b** that are adhered to one another along the periphery **55** of the component, with one or more of the upper and lower sheets **54a**, **54b** being formed from the pliable composite structure **22**. The interior protective packaging component **48** is filled with shock absorbing material **56** such as EPS, foam, natural starch based form, pulp, fiberboard, and the like, to form a component that can be placed in packages for shipping or retail to protect the product contained in the package.

[0048] In the embodiment shown in FIG. **10**, the interior protective packaging component **48** comprises a pliable composite structure **22** that is molded into a shape suitable for conforming to or otherwise holding and protecting an object within a shipping package, or to fill voids in a package, to stabilize and protect fragile items for shipping. The pliable composite structure **22** may be molded into a desired shape and then placed overtop of a shock absorbing material **56**, such as any of those described above. The pliable composite structure **22** used in these embodiment imparts those advantages as describes above, including increased pliability to allow for the formation of the desired structures as well as to improve the look and feel of the structure. The structure **22** also has improved moisture, theft and pest resistance, while also maintaining good fire and heat resistance. The structure **22** further allows high quality printing thereon to allow for user instructions or advertisements to be printed on the products.

[0049] Additional modifications and improvements of the present invention may also be apparent to those of ordinary skill in the art. Thus, the particular combination of components and steps described and illustrated herein is intended to represent only certain embodiments of the present invention, and is not intended to serve as limitations of alternative devices and methods within the spirit and scope of the invention. Along these lines, it should be understood that the storage articles **20** having the pliable composite structure **22** may take any of a variety of forms that are known or later developed in the art, and further contemplates that existing or newly formed storage articles **20**, such as newly formed retail and/or shipping packages, should fall within the scope of the present invention. Also, it should be understood that the base layer **24** and calcium carbonate-containing layer **26** can com-

prise various different materials such as other packaging materials and bonding agents that are other than those specifically described.

What is claimed is:

1. A storage article comprising:
 - a pliable composite structure comprising:
 - (a) a base layer; and
 - (b) a ground calcium carbonate-containing layer covering the base layer;
 wherein the base layer and ground calcium carbonate-containing layer are shaped, sized and manufactured such that the pliable composite structure formed therefrom is sufficiently pliable and flexible to form the storage article.
 2. The storage article of claim **1** wherein the pliable composite structure is formed into the shape of at least one of a retail box and shipping box.
 3. The storage article of claim **2** wherein the pliable composite structure is sufficiently pliable to allow for formation of the box shape by at least one of folding and creasing of the pliable composite structure.
 4. The storage article of claim **1** wherein the pliable composite structure contains a prescribed amount of a thermoformable bonding agent in the ground calcium carbonate-containing layer that is sufficient to form the storage article shape via thermoforming or vacuum forming.
 5. The storage article of claim **1** wherein the base layer is formed from at least one of cellulosic fibers, chemical pulps, thermochemical pulps, natural starch-based foams, plastic, paper, paperboard, felt, non-woven mats, kraft linerboard and fiberboard.
 6. The storage article of claim **1** wherein the ground calcium carbonate-containing layer is of a thickness in the range of from about 2 to about 30 mils.
 7. The storage article of claim **1** wherein the pliable composite structure is in the shape of a shipping mailer.
 8. The storage article of claim **1** wherein the pliable composite structure is in the shape of at least one of a retail box liner and a shipping box liner.
 9. The storage article of claim **1** wherein the pliable composite structure is in the shape of at least one of a retail display and display tray.
 10. The storage article of claim **1** wherein the pliable composite structure comprises a portion of a corrugated structure.
 11. The storage article of claim **1** wherein the pliable composite structure comprises a portion of a protective interior packaging component.
 12. A method of making a component for a storage article, comprising the steps of:
 - (a) preparing a pliable composite structure by adhering a ground calcium carbonate-containing layer to a base layer; and
 - (b) shaping the pliable composite structure to form the component for the storage article;
 - wherein the ground calcium carbonate-containing layer and base layer are shaped, sized and manufactured such that the pliable composite structure formed therefrom is sufficiently pliable and flexible to form the component for the storage article.
 13. The method according to claim **12** wherein the component comprises at least one of a retail box and shipping box, and wherein step (b) comprises shaping the pliable composite structure to form the component by at least one of folding and

creasing of the pliable composite structure into a shape corresponding to the at least one retail box and shipping box.

14. The method according to claim **12** wherein step (a) comprises providing a prescribed amount of a bonding agent in the ground calcium carbonate-containing layer that is sufficient to allow for vacuum forming or thermo-forming of the pliable composite structure, and step (b) comprises shaping the pliable composite structure into the component by thermo-forming or vacuum-forming of the pliable composite structure.

15. The method according to claim **12** wherein step (a) comprises preparing a pliable composite structure having a ground calcium carbonate-containing layer having a thickness of from about 2 to about 30 mils.

16. A method of shipping a product or displaying a product for retail, the method comprising the steps of:

- (a) providing a storage article comprising:
 - a pliable composite structure comprising;
 - (i) a base layer; and
 - (ii) a ground calcium carbonate-containing layer covering the base layer;

wherein the base layer and ground calcium carbonate-containing layer are shaped, sized and manufactured such that the pliable composite structure formed therefrom is sufficiently pliable and flexible to form the storage article;

- (b) placing the product within the storage article; and
- (c) shipping the storage article or displaying the storage article for retail.

17. The method of shipping a product or displaying a product for retail according to claim **16**, wherein step (a) comprises providing a storage article comprising a pliable composite structure that is formed into the shape of at least one of a retail box and shipping box.

18. The method of shipping a product or displaying a product for retail according to claim **17**, wherein step (a) comprises providing a storage article comprising a pliable composite structure that is sufficiently pliable to allow for formation of the box shape by at least one of folding and creasing of the pliable composite structure.

19. The method of shipping a product or displaying a product for retail according to claim **16**, wherein step (a) comprises providing a pliable composite structure containing a prescribed amount of a thermo-formable bonding agent in the ground calcium carbonate-containing layer that is sufficient to form the storage article shape via thermoforming or vacuum forming.

20. The method of shipping a product or displaying a product for retail according to claim **16**, wherein step (a) comprises providing a pliable composite structure having a ground calcium carbonate-containing layer having a thickness of from about 2 to about 30 mils.

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