



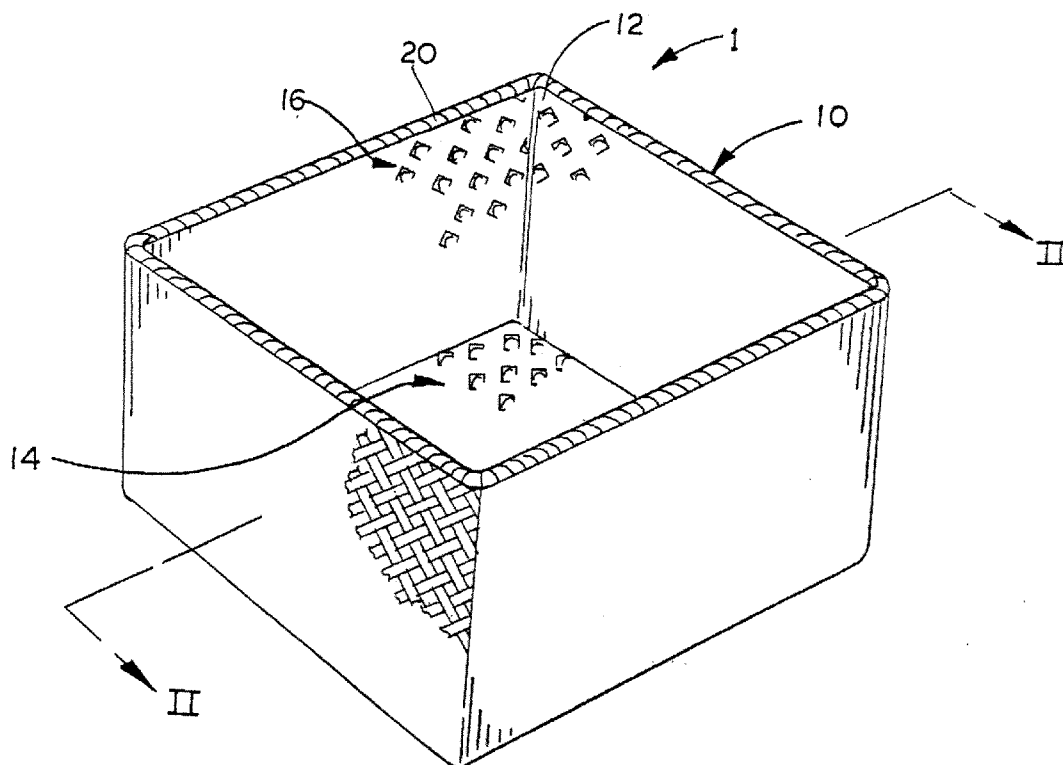
US 20070056970A1

(19) **United States**(12) **Patent Application Publication**
Scherer et al.(10) **Pub. No.: US 2007/0056970 A1**(43) **Pub. Date: Mar. 15, 2007**(54) **PLASTIC LINER FOR HOME
ORGANIZATIONAL ITEMS**(76) Inventors: **Thomas W. Scherer**, Mansfield, OH
(US); **Kevin R. Shinn**, Smithville, OH
(US); **Radu Ghiorghie**, Mogadore, OH
(US); **Matthew J. Paquette**, Medina,
OH (US); **Joseph D. Musser**, Wooster,
OH (US)

Correspondence Address:

MARSHALL, GERSTEIN & BORUN LLP
233 S. WACKER DRIVE, SUITE 6300
SEARS TOWER
CHICAGO, IL 60606 (US)(21) Appl. No.: **11/380,311**(22) Filed: **Apr. 26, 2006****Related U.S. Application Data**(60) Provisional application No. 60/688,598, filed on Jun.
8, 2005. Provisional application No. 60/688,562, filed
on Jun. 8, 2005.**Publication Classification**(51) **Int. Cl.**
B65D 3/22 (2006.01)(52) **U.S. Cl.** **220/62.22**(57) **ABSTRACT**

A home product includes a container and a plastic liner. The container includes an interior surface. The plastic liner is integrally conformed and attached to a substantial portion of the interior surface of the container to seal and protect the container. The plastic liner is conformed and attached to the container via a thermoforming or blow molding-process.



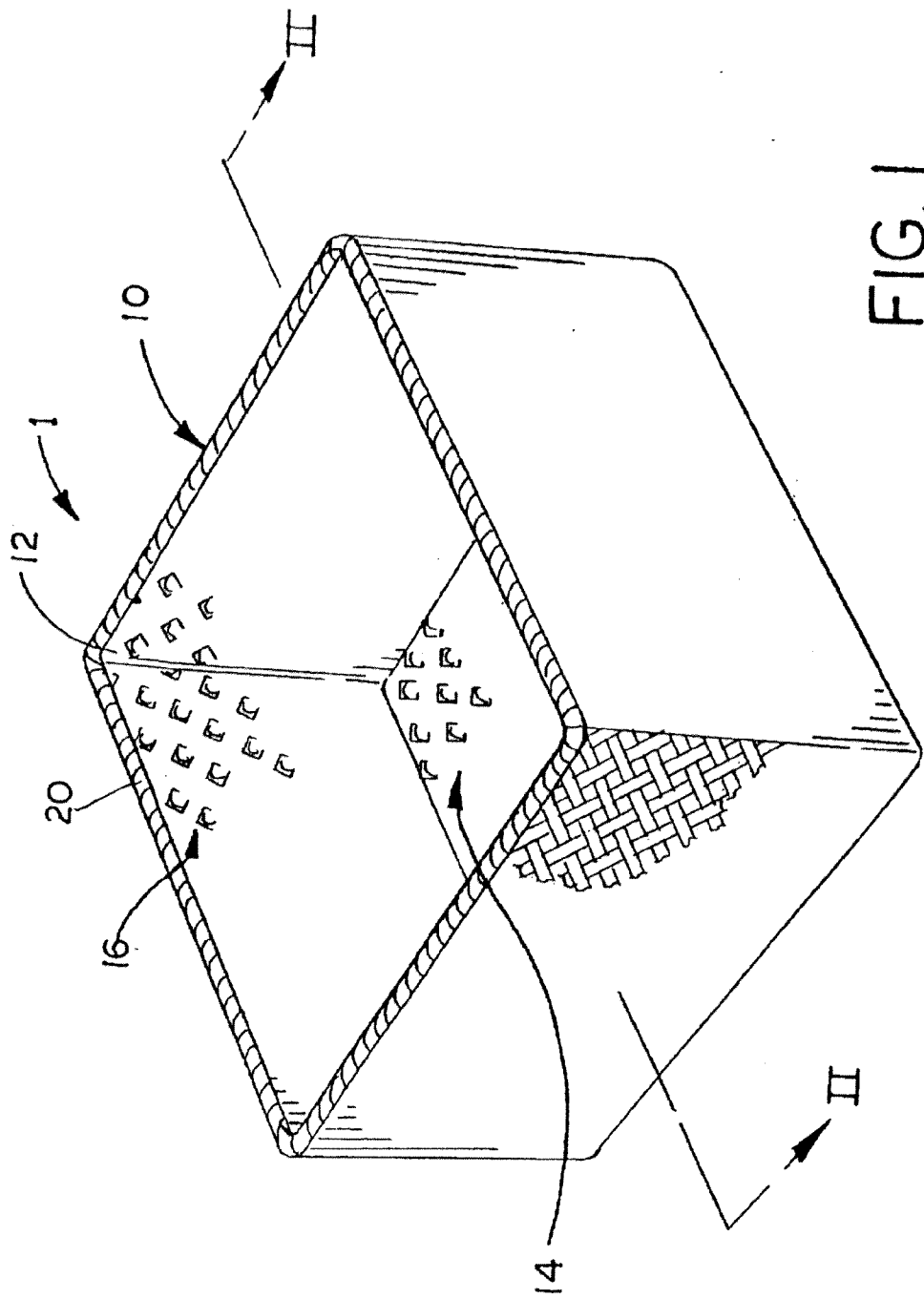


FIG. 1

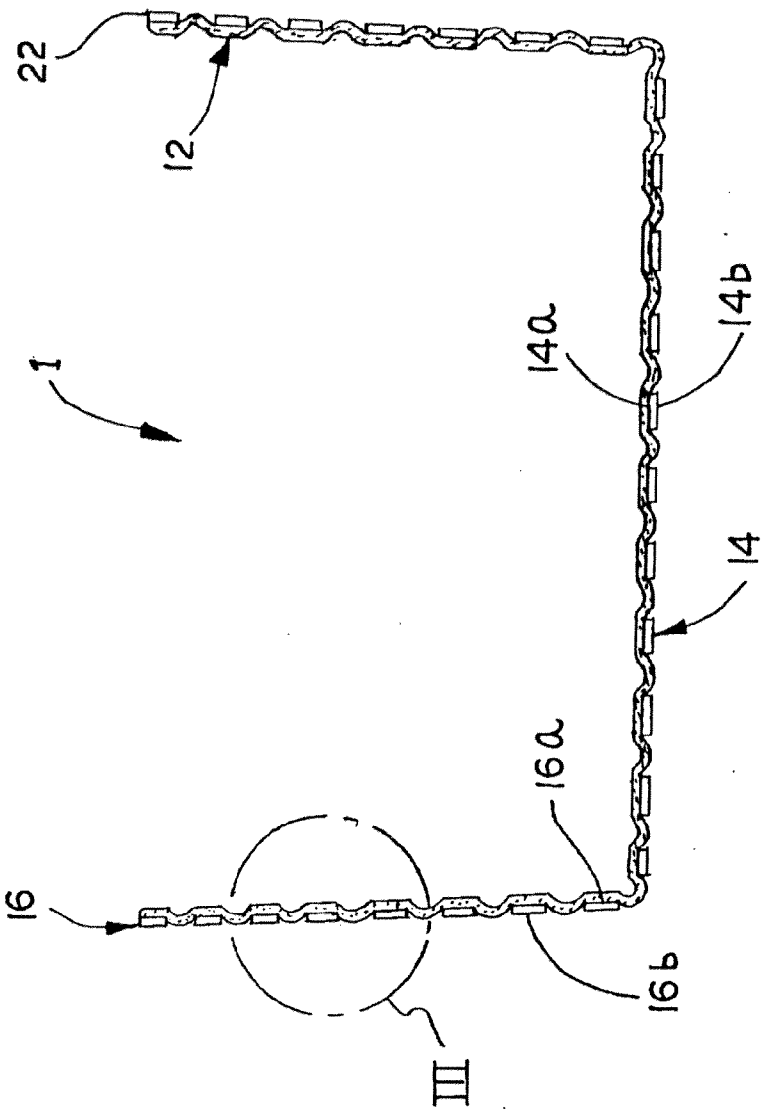


FIG. 2

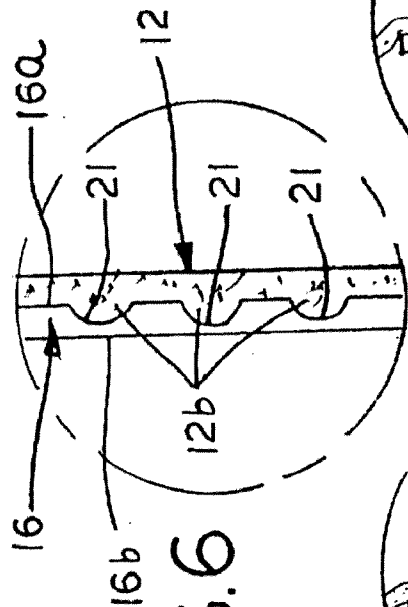


FIG. 6

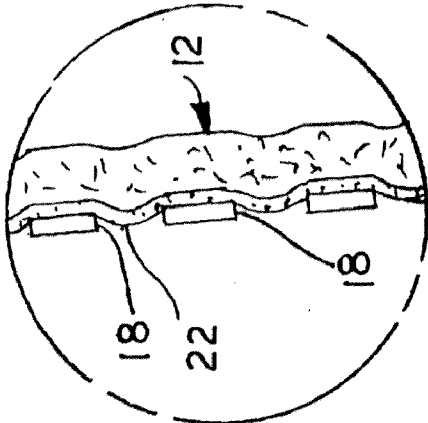


FIG. 5

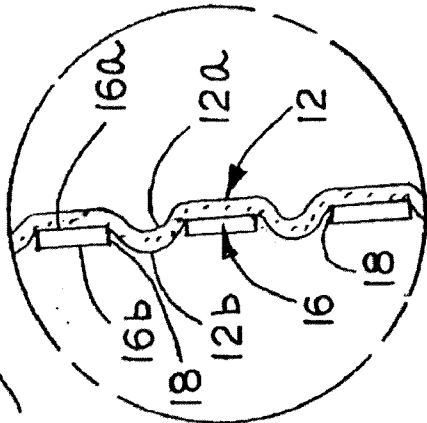


FIG. 4

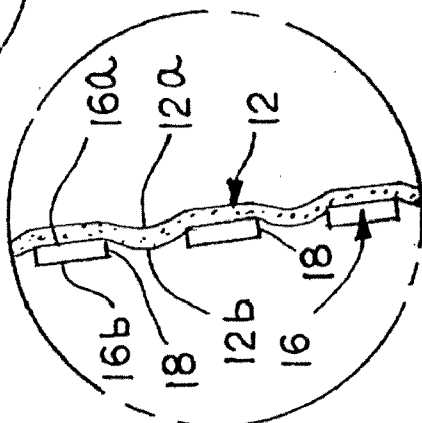


FIG. 3

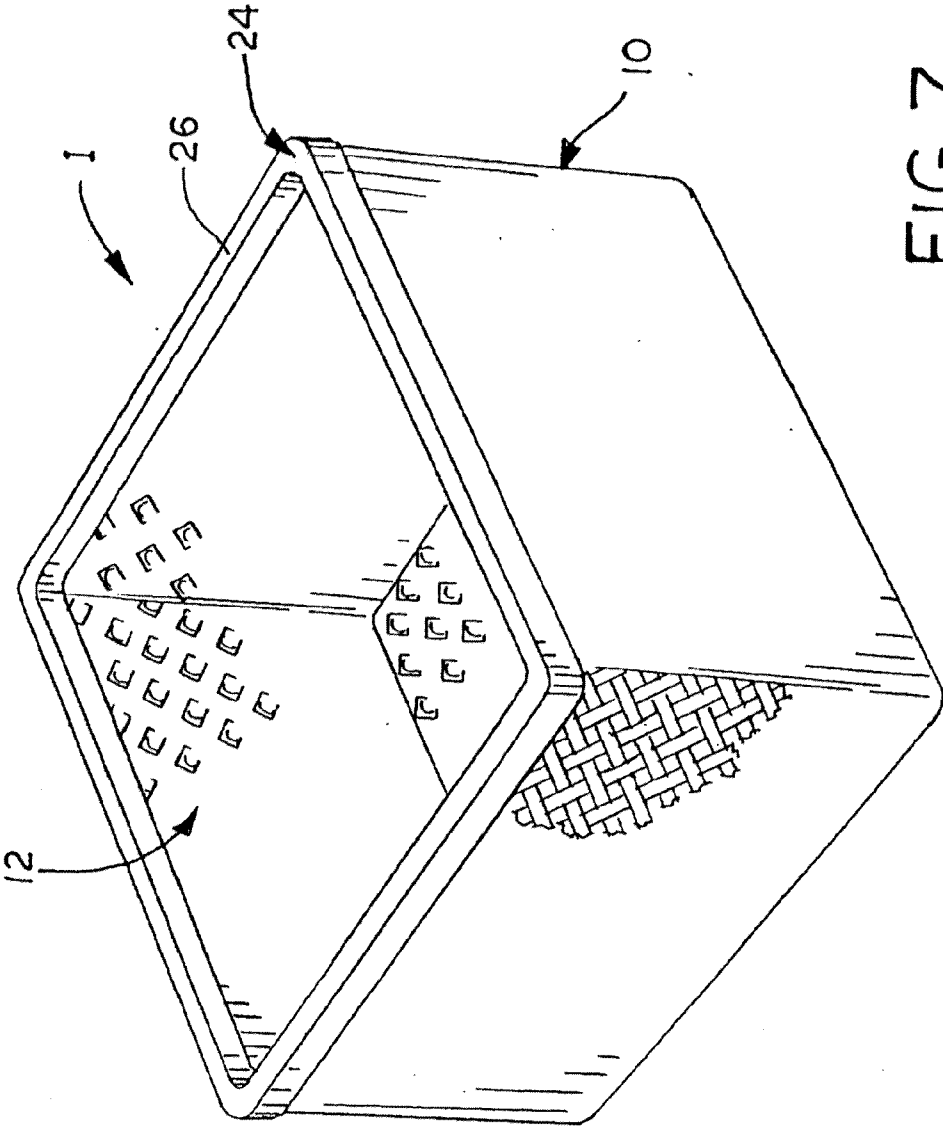


FIG. 7

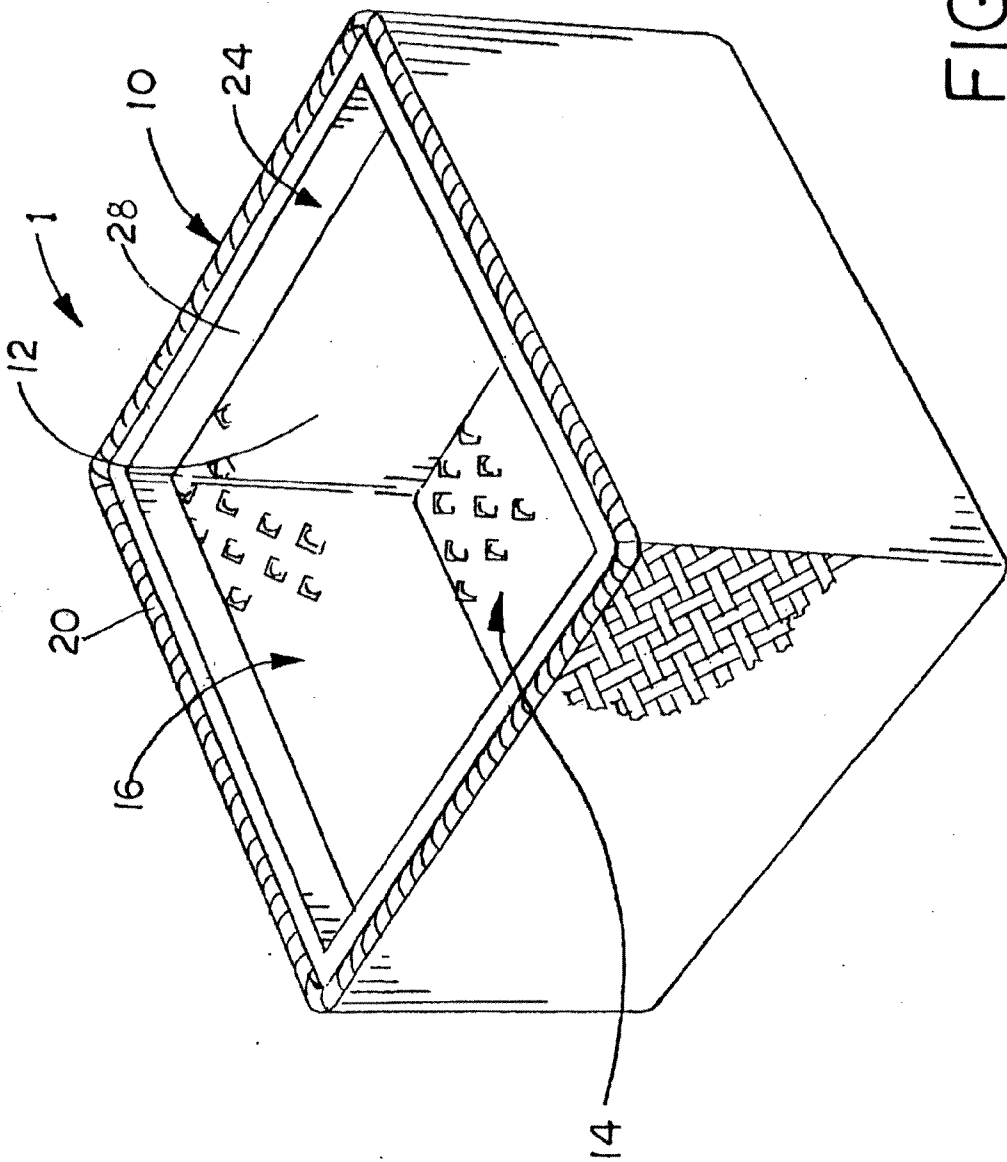


FIG. 8

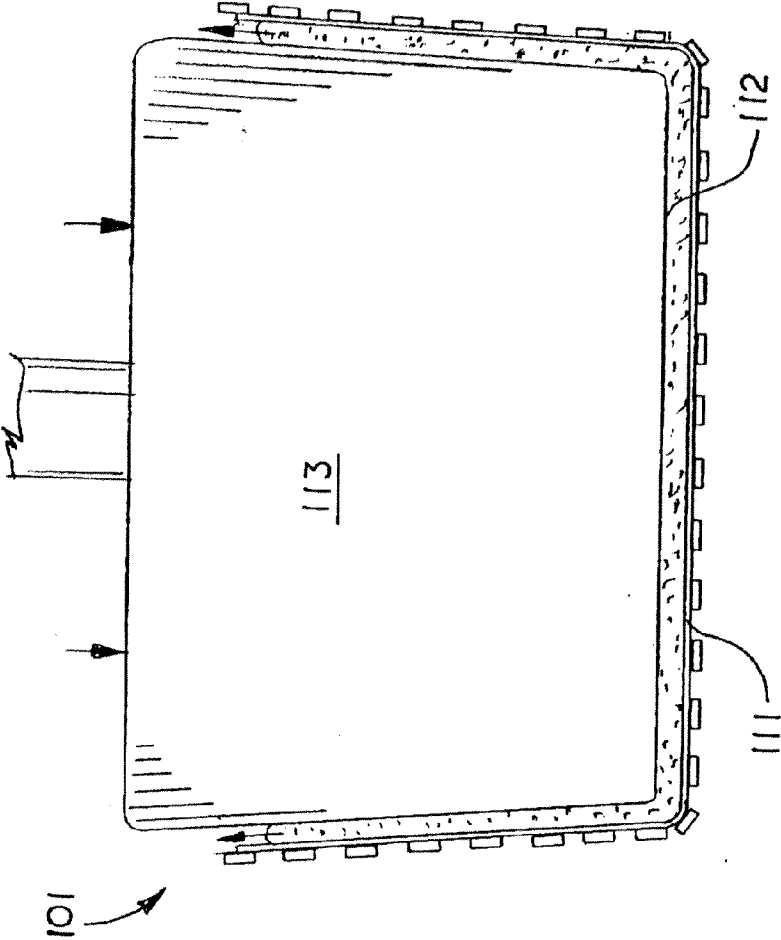


FIG. 9

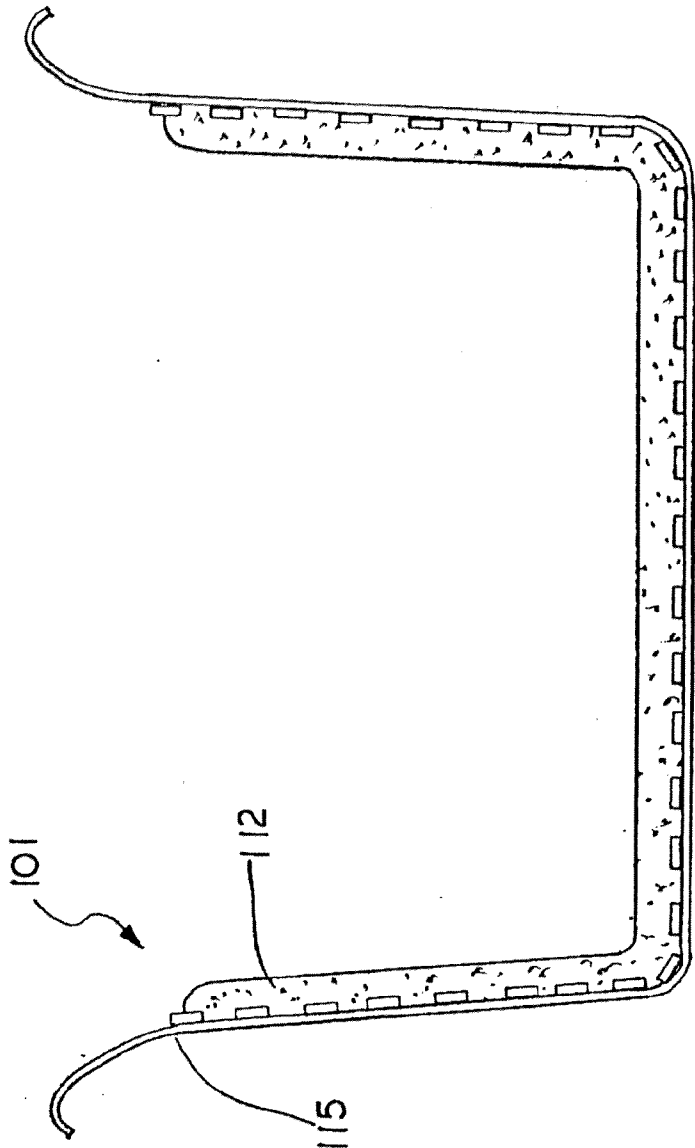


FIG. 10

PLASTIC LINER FOR HOME ORGANIZATIONAL ITEMS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is based on and claims priority to U.S. Provisional Patent Application Ser. No. 60/688,598, filed Jun. 8, 2005, and U.S. Provisional Patent Application Ser. No. 60/688,562, filed Jun. 8, 2005, the contents of each of which are hereby expressly incorporated herein by reference.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Disclosure

[0003] The present disclosure is generally directed to storage containers and, more particularly, to containers with plastic liners.

[0004] 2. Description of Related Art

[0005] Consumers use woven or non-woven storage containers such as baskets, storage cubes, hampers, and the like to decorate and organize their houses. Additionally, consumers use woven or non-woven containers as trash cans, picnic baskets, planters and the like. Typically, woven containers are made primarily of natural or other decorative materials including but not limited to wicker, rattan, seagrass, water hyacinth, banana leaf, wood, metal, plastic and bamboo. Many consumers prefer the appearance of these woven containers to non-woven alternatives such as solid plastic, chipboard, or cardboard containers. Woven products typically have an open pattern defining spaces or interstices due to their woven nature. This often results in a container that is unable to hold small items. Additionally, the interiors of these containers are difficult to clean because the woven construction creates small, hard to clean crevices that trap dust or dirt. Moreover, woven containers made of cellulosic natural materials are often subject to water absorption and prone to mildew growth.

[0006] Some of these woven and non-woven containers are paired with a pre-formed, drop-in plastic liner made of a synthetic material such as polyester or PVC. These liners are manufactured independently of the container by various types of molding and forming operations. After they are manufactured, the pre-formed liners are later placed inside of the containers in a separate assembly operation. The pre-formed plastic liners provide a cleanable and solid or non-perforated surface able to hold small items. However, the pre-formed liners do not match or integrate with the material of the outer walls of the container and may impair the container's overall appearance. Additionally, tooling costs associated with creating a pre-formed plastic liner can be expensive due to the need for a separate liner tool unique to each shape and size of container.

[0007] Furthermore, the use of pre-formed plastic liners may create difficulties fitting the plastic liner to a woven storage container. Specifically, woven containers have inherently variable dimensions from container to container, thereby frustrating any attempt to pre-form a generic liner. While a pre-formed plastic liner produced from independent tooling may flex minimally to adapt to its container, these liners are generally unable to accommodate significant variations in height, width, and/or length. Additionally, these

dimensional variations may result in a height differential between the woven container and the liner, a gap between the walls of the woven container and the liner or, conversely, an interference between the liner and container.

[0008] Other known containers are lined with fabric. Fabric liners typically provide more aesthetic appeal than plastic liners. However, fabric liners typically lack the cleanability and/or water resistance of a plastic liner. Furthermore, fabric is typically less durable than plastic. Moreover, fabric liners are generally stitched or sewn onto woven containers or adhered to non-woven containers, both of which add cost to the manufacturing process. One known product for increasing the durability and cleanability of fabric liners includes coated fabric liners. Coated fabric liners often include some stain resistant coating applied with a sprayer or roller. While these coated fabric liners may have some degree of improved durability and cleanability, they still require the added attachment process and are not aesthetically pleasing to many consumers.

[0009] Still further known container liners include plastic film liners. Known plastic film liners typically include plastic bag-like components deposited directly into a container such as a fabric container, a woven container, or any other container and fixed to a rim thereof. The fixation is generally achieved with an adhesive or other means. While these plastic film liners tend to repel most stains and are capable of retaining small items, they are also prone to tearing and are rarely re-usable. Additionally, such plastic film liner products are often not very aesthetically pleasing as they do not match or integrate well with the containers they are associated with. Accordingly, such plastic film liners are typically used in gardening with planters, pots and other containers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Objects, features, and advantages of the present invention will become apparent upon reading the following description in conjunction with the drawing figures, in which:

[0011] FIG. 1 is a perspective view of a home décor product with an integrated plastic liner constructed in accordance with the teachings of the present disclosure;

[0012] FIG. 2 is a cross sectional view of the container depicted in FIG. 1 taken along line II-II;

[0013] FIG. 3 is a magnified cross-sectional view of a wall of the container taken from Circle III in FIG. 2;

[0014] FIG. 4 is a magnified cross-sectional view of an alternate embodiment of a wall of a container constructed in accordance with the teachings of the present invention and taken from Circle III in FIG. 2;

[0015] FIG. 5 is a magnified cross-sectional view of yet another alternate embodiment of a wall of a container constructed in accordance with the teachings of the present invention and taken from Circle III in FIG. 2;

[0016] FIG. 6 is a magnified cross-sectional view of yet another alternate embodiment of a wall of a container constructed in accordance with the teachings of the present invention and taken from Circle III in FIG. 2;

[0017] FIG. 7 is a perspective view of an alternate embodiment of a home décor product with an integrated plastic liner

and one form of a rim component constructed in accordance with the teachings of the present disclosure;

[0018] FIG. 8 is a perspective view of another alternate embodiment of a home décor product with an integrated plastic liner and another form of a rim component constructed in accordance with the teachings of the present disclosure;

[0019] FIG. 9 is a cross sectional view of a home décor product according to the teachings of the present disclosure and illustrating a manufacturing process implementing a plug and a barrier layer; and

[0020] FIG. 10 is a cross sectional view of a home décor product according to the teachings of the present disclosure and illustrating a manufacturing process implementing an exterior mask.

DETAILED DESCRIPTION OF THE DISCLOSURE

[0021] Referring to FIG. 1, a home décor product 1 including a container 10 with a plastic liner 12 is shown. The container 10 has a base 14 and a sidewall 16 extending up from the base 14. The sidewall 16 and base 14 both have interior surfaces 16a, 14a, respectively, and exterior surfaces 16b, 14b, respectively. In the example shown, the sidewall 16 has four panels, thereby defining a container 10 with a generally square cross-section. The cross-section of the container 10, however, may be of any geometry or size including but not limited to square, rectangular, circular, cylindrical, partially spherical, or any other polygonal or non-polygonal geometry and may or may not have a lid. The walls 16 and base 14, as depicted, are constructed in a woven configuration from natural or other decorative materials including, but not limited to, wicker, rattan, seagrass, water hyacinth, banana leaf, wood, bamboo, metal, fabric wrapped cardboard, woven plastic or composite straps, or any combination of such materials with each other or with others. The walls 16 and base 14 of the disclosed container 10 may be constructed of multiple interwoven components as an open weave, knit, or mesh defining openings or spaces 18 (shown in FIGS. 3-5) between its various interwoven components. It should be appreciated, however, that the container 10 may be any foreseeable container including a solid or substantially solid container constructed of plastic, metal, chipboard, leather-wrapped chipboard, cardboard, fabric, or any other suitable material for containing items.

[0022] As stated above, the disclosed container 10 has an integrated plastic liner 12 that conforms to the interior surfaces 16a, 14a of the walls 16 and base 14 of the container 10, as shown in FIGS. 1-6. The liner 12 provides a solid impermeable layer. Additionally, in one form, the liner 12 includes dimples 12a on its interior surface and protrusions 12b on its exterior surface, as shown in FIGS. 2-5. In the form depicted, the protrusions 12b at least partially extend into the spaces 18 in the walls 16 and base 14 of the container 10, as shown in FIGS. 3-5. The protrusions 12b frictionally engage the container 10 at the sides of the spaces 18. The shear forces resulting from this frictional engagement mechanically interconnect and secure the liner 12 to the container 10. Additionally, the plastic liner 12 may be bonded or adhered to the walls 16 and base 14 of the woven container 10, as will be discussed in greater detail below. The liner may 12 cover as much or as little of the

container 10 as desired. Furthermore, the thickness of the liner 12 may be selected as desired. While the home décor product 1 has just been described as including a container 10 defining spaces 18, it should be appreciated that the container 10 may alternately be formed to be solid or substantially solid, as mentioned above. A solid or substantially solid container 10 may include a tightly woven container or simply a container made of solid material such as plastic, metal, wood, or any other material with or without openings formed in the interior surface thereof. FIG. 6 depicts a sidewall 16 of one such solid container 10 including an interior surface 16a with openings or pockets 21. In this form, the liner 12 includes only protrusions 12b. The protrusions 12b interlock with the pockets 21 to secure the liner 12 and the container 10 together. In another form, the container 10 may not include openings at all, but may have substantially smooth interior surfaces 14a, 16a. In such a case, the liner 12 attaches to the container 10 via shear stresses or adhesive or a combination of both.

[0023] To achieve any of the above-described home décor products 1, the integrated plastic liner 12 may be constructed through a vacuum thermoforming process for forming molten or semi-molten plastic to the shape of the container walls 16 and base 14. During this process, a nest, die, or cavity is used to hold the container 10 securely in place and to affect the container's shape if needed. Next, the molten or semi-molten plastic sheet is placed over the opening of the container such that the plastic sheet is adjacent to or in contact with a rim 20 of the container 10. Alternately, the molten or semi-molten plastic sheet may be directly inserted into the container 10. During the vacuum thermoforming process, the plastic sheet is then drawn via vacuum pressure, which will be discussed in greater detail below, to deform and conformingly engage the interior surfaces 14a, 16a of the container 10. The vacuum may be created using vacuum ports located in the nest, die, or cavity used to secure the container 10. It should be understood that in the case of a solid container 10, the container 10 should include one or more vent holes for allowing air to escape during the vacuum process.

[0024] Upon contacting the interior container surfaces 14a, 16a, the molten or semi-molten plastic sheet conforms to the geometry of the container 10. In one form, the plastic inherently adheres to the interior surfaces 14a, 16a. In other forms, the plastic may not adhesively bond with the material of the container 10. As mentioned above, however, the plastic liner 12 may be drawn into the spaces 18 or pockets 21 of the container wall 16 and base 14 to create the protrusions 12b and, if applicable, the dimples 12a. As stated above, the protrusions 12b mechanically interconnect and secure the container 10 to the plastic liner 12 by frictionally engaging the container 10 adjacent to the spaces 18 or in the pockets 21, thereby preventing the liner 12 from easily slipping out of the container 10.

[0025] Alternately, as stated above and depicted in FIG. 5, the outer surface of the liner 12 may have an adhesive layer 22. The adhesive layer 22 may be active or at least activated during the above-described forming process to adhere the liner 12 to the container 10. It should be appreciated that, in one form, the adhesive layer 22 is utilized in combination with the interlocking protrusions 12b and spaces 18 to retain the liner 12 inside the container 10. In another form, however, the liner 12 may not include the protrusions 12b

and, therefore, the adhesive layer 22 is used as the sole device for retaining the liner 12 within the container 10. Additionally, while FIG. 5 depicts the adhesive layer 22 coating substantially the entire exterior surface of the liner 12, an alternate form may include the adhesive layer 22 coating less than the entire exterior surface of the liner 12. For example, the adhesive layer 22 may coat the exterior surface of the liner 12 in parallel or cross-hatched bands intended to adheringly engage corresponding parallel or cross-hatched components of the woven container 10.

[0026] Additionally, if the rim 20 of the container 10 has a rough surface, a manufacturing collar may be applied to the rim 20 prior to the molten sheet being positioned on the rim 20 or inserted into the container 10. In one form, the collar may have a smooth surface for creating a seal between the molten plastic and itself. In another form, such a smooth surface may not be required. Thus, the collar will assure that the vacuum is able to create a sufficient suction to draw the molten plastic sheet into engagement with the interior surfaces 14a, 16a of the container 10, as well as into the spaces 18 or pockets 21 to create the protrusions 12b and, if applicable, the dimples 12a. While the use of such a collar may be beneficial in some applications, it should be appreciated that it need not be used in all applications.

[0027] In another form, the thermoforming method uses a one-piece pre-formed plastic liner. The pre-formed liner is created by heating a plastic sheet to a molten or semi-molten state and then molding the sheet using a male pre-forming tool such as a plug. This molding may be accomplished inside or outside of the container. After the sheet is heated, the exterior surface of the forming tool is brought into engagement therewith. The sheet then deforms and takes the shape of the forming tool. It should be understood that the preforming tool is dimensioned such that it creates a plastic pre-form having external dimensions slightly smaller than the internal dimensions of the container 10. In the case where the pre-form is preformed outside of the container and while still in its molten or semi-molten state, it is then placed into the container 10 and thermoformed to the interior surfaces 14a, 16a, as described above. This method may be useful to create liners 12 for containers 10 with steep walls or to assist in controlling the thickness of the liner 12 throughout the thermoforming process. It should be appreciated that while the process just described includes placing the pre-formed liner into the container 10 still in its molten or semi-molten state, an alternate process may include allowing the pre-form to cool outside of the container 10. The cooled pre-form may then be placed into the container 10 and reheated to the molten or semi-molten state prior to performing the thermoforming operation.

[0028] In yet another form, a blow-molding process is used to form the liner 12. Variations on this method include applying extrusion blow-molding, injection blow-molding, or injection stretch blow-molding techniques. Generally, during the application of any of these blow molding techniques, a fixture or adjustable table may be required to hold the container 10 steady.

[0029] During the application of an extrusion blow-molding technique, an extruded parison of molten plastic with a pinched-off bottom end is lowered into the container 10. Once the parison reaches the base 14 of the container 10, hot air is blown into the interior of the parison. The force created

by the hot air creates a pressure that is applied substantially uniformly to the interior surfaces of the parison and stretches the parison outward until it conformingly engages the interior surfaces 14a, 16a of the container 10. After the parison has stretched to conform to the inner surfaces 14a, 16a of the container 10, the plastic is allowed to cool. Additionally, similar to that described above regarding the thermoforming vacuum process, one form of this process may include placing a collar on top of the container 10 prior to applying the hot air. In such a case, the collar may serve to provide a compressive load to the parison at the rim 20 of the container 10, thereby securing the parison in place. Additionally, the collar may prevent or restrict the flow of the molten or semi-molten parison during the molding process relative to the rim 20.

[0030] Alternatively, in the case of an injection blow-molding or injection stretch blow-molding process, an injection molded pre-form is made prior to beginning the thermoforming process. In one form, the pre-form is then placed inside of the container 10, heated to a molten or semi-molten state, and subsequently blown or stretched until the plastic engages and forms to the walls 14a, 16a of the container 10, as described above. In another form, the pre-form is heated prior to being placed inside of the container 10.

[0031] It should be appreciated that in any of the above-described forming processes, an excess portion of the liner 12 may remain extending beyond the rim 22 of the container 10 after cooling. In such a case, the excess portion should be trimmed with a trimming tool to provide a clean and aesthetically pleasing finish to the home décor product 1. In some situations, the rim 20 of the container 10 may not provide a sufficiently uniform or rigid surface along which the trimming tool may travel for trimming the excess liner. Therefore, in one form, the manufacturing collar discussed in either of the above-described processes may be used to guide the trimming tool. In such cases, the trimming tool may travel directly along a rigid external surface of the manufacturing collar around the rim 20 of the container 10 to remove the excess liner 12. Alternately, the manufacturing collar may include an elongated recess or groove formed on an interior surface thereof. The recess or groove would then receive the trimming tool and guide it adjacent the rim 20 to trim the excess liner. In another alternative form, the container 10 itself may include an elongated recess formed in its interior surface 16a near the rim 20 for receiving and guiding the trimming tool. In any of these cases, the liner 12 is formed to extend beyond the rim 20 of the container 10 and is subsequently trimmed.

[0032] In yet further forms, the liner 12 may be formed with the excess serving as a top flare that is rolled or folded over the rim 20. Subsequent to cooling, the top flare is rolled over the rim 20 and adhered or otherwise secured to the container 10. Alternatively, the top flare may be rolled or folded over the rim 20 while the liner 12 is still in a semi-molten state and then allowed to cool.

[0033] In still another form, a trim jig may be used to trim the excess liner. In such a case, the trim jig would include both a trimming tool and a guiding surface, against which the liner 12 is to be trimmed. The trim jig may be configured to engage the excess liner in slight tension, travel around the container 10 at some predetermined distance from the rim 20, and simultaneously trim the liner 12.

[0034] In still yet another form, it is foreseeable that the container 10 may include a foldable rim portion including, for example, the top one or two inches of the container 10 adjacent the rim 20. In such a case, subsequent to forming the liner 12, the rim portion is folded outward, any excess liner is trimmed with a trimming tool, and the rim portion is returned to its original position.

[0035] It should be appreciated that the various processes described herein are merely examples and foreseeable alternatives are intended to be within the scope of the present disclosure. Additionally, it should be appreciated that while the processes have been described as including various sequences of actions, alternative sequences of the disclosed actions and sequences including supplemental actions not explicitly described herein are intended to be within the scope of the present disclosure. Furthermore, while some of the above-described processes have been disclosed as alternatives, variations and combinations thereof are also intended to be within the scope of the present disclosure.

[0036] FIGS. 7 and 8 depict alternative forms of the home décor product 1 of the present disclosure. The home décor products depicted in FIGS. 7 and 8 may be manufactured in any of the foregoing molding processes and are identical to the home décor product 1 depicted in FIG. 1, with the exception that they further include a rim component 24. The rim component 24 is fixed to the rim 20 to provide a clean aesthetically pleasing finish to the home décor product 1. For example, as stated above, some manufacturing processes may produce excess liner 12 extending beyond the rim 20 that needs to be trimmed away. In such cases, the component 24 serves to cover any inconsistencies or roughness in the trimmed liner 12 and/or rim 22. In another form, the rim component 24 may actually serve to increase the rigidity or durability or some other structural characteristic of the home décor product 1.

[0037] Specifically, FIG. 7 depicts a rim component 24 including a rim cap 26. The rim cap 26 generally includes a one-piece component constructed of the same general geometry of the rim 20 of the container 10. It should be appreciated, however, that, as stated above, the container 10 may take on virtually any form and therefore, so might the rim 20 and the rim cap 26.

[0038] According to one form, the rim cap 26 may include a wooden cap 26 fixed to the rim 20 with an adhesive. The adhesive may be wood glue, silicone caulk, rubber cement, epoxy, or any other type of adhesive. Accordingly, during manufacture of the home décor product 1 depicted in FIG. 7, adhesive is applied to one or both of the rim 20 and the rim cap 26 after the liner 12 is thermoformed. Thereafter, the rim cap 26 is placed onto the rim 20, or vice versa, and secured in place with a clamp or some other device until the adhesive cures, thereby fixing the two components together. Although the rim cap 26 has been described as being fixed to the rim 20 of the container 10 with an adhesive, it should be appreciated that any device for fixing the two components together is intended to be within the scope of the present disclosure. For example, the rim cap 26 may be fixed to the rim 20 with nails, threaded fasteners, double-sided adhesive strips, staples, or any other device capable of serving the intended purpose. Additionally, while the rim cap 26 has been described as being manufactured of wood, it may alternatively be manufactured of metal, plastic, cardboard,

wicker, rattan, seagrass, water hyacinth, banana leaf, bamboo or any other material capable of serving the intended purposes. Furthermore, although the rim cap 26 has been disclosed as being a one-piece rim cap 26, it may alternately be constructed of multiple pieces that are fixed independently or dependently to the container 10. Finally, while the rim cap 26 and manufacturing collar discussed above have been described as being distinct components, the two may foreseeably be the same component.

[0039] Alternatively, as mentioned above, FIG. 8 depicts an alternate rim component 24 including an internal trim component 28. The internal trim component 28 serves generally the same purpose as the rim cap 26, but instead of being attached directly to the rim 20, it is attached to the interior surface 16a of the sidewall 16 adjacent the rim 20. It should be understood that the internal trim component 28 may be constructed of any of the materials listed above for the rim cap 26 and may be fixed to the container 10 by any of the devices discussed above regarding the rim cap 26. In one form, the internal trim component 28 is stapled to the interior surface 16a of the container 10. Furthermore, while FIG. 8 depicts the internal trim component 28 as being a one-piece rim component 24, it may alternatively include multiple pieces secured together or to the container 10 in any desirable fashion. Further yet, while the rim component 24 has been described herein as including either a rim cap 26 or an internal trim component 28, it may foreseeably include any type or configuration of a rim component 24 located adjacent to or in proximity to the rim 20 of the container to thereby increase at least one of the aesthetic appeal of the home décor product 1, the structural integrity of the home décor product 1, or any other feature. For example, in one alternate form, the rim component 24 may be attached to the exterior surface 16b of the sidewall 16 of the container 10 or any combination of attachment to the interior surface 16a, the rim 20, and the exterior surface 16b so as to serve the principles of the present disclosure.

[0040] While the liner 12 has been generally disclosed as being plastic, it should be appreciated that, in light of the disclosure provided herein, any melt-processable material may be used to construct the liner 12. To maintain the aesthetic value of the container 10, however, a suitable material is a flexible thermoplastic elastomer which provides a rubber-like appearance or a polymer that produces a transparent, semi-transparent, or opaque glass-like appearance such as poly-vinyl chloride, polyester, or polystyrene. However, any material capable of being thermoformed or blow-molded may be used including olefins such as, for example, polyethylene and polypropylene.

[0041] Additionally, while the liner 12 has, thus far, been disclosed as including a single layer liner, in other forms, the liner 12 may include multiple layers. These multiple layers may be provided in the form of, for example, co-extruded plastic sheets or thermoformable laminates. In one example, a two-color co-extruded sheet is thermoformed to construct the liner 12. The two-color plastic sheet has two layers of different colors creating a top color and a bottom color. When the plastic sheet is thermoformed to construct the liner 12, the interior surface of the liner 12 is defined by the top color of the sheet and the exterior surface of the liner 12 is defined by the bottom color of the sheet. In another example, the liner 12 includes a plastic sheet with a soft material top layer and hard material bottom layer. The soft material top

layer forms the interior surface of the liner 12 and the hard material bottom layer forms the exterior surface of the liner 12. Alternately, the hard material may serve as the internal layer and the soft material may serve as the external layer, if desired. If this is the case, during thermoforming, the soft external layer may deform and protrude through the spaces 18 in the container 10, while the hard internal layer may remain smooth. This may further enhance the cleanability of the liner 12. Further, it should be understood from the description provided that thermoformable co-extruded materials or laminates not expressly disclosed herein may be used to construct the liner 12.

[0042] In light of the foregoing, the disclosed plastic lined home décor product 1 provides a number of advantages. The liner 12 is durable and cleanable and enables a woven container to accommodate small items. The liner 12 further provides a durable protectant for the container material, whether it is woven material or non-woven material. This protectant serves to extend the useful life of the home décor product, thereby increasing its consumer appeal. The disclosed invention guarantees a tight-fitting liner, since the process inherently accounts for dimensional variation, which is common to woven containers. In contrast, pre-formed plastic liners such as die cut plastic or traditional liners will not conform to the shape of the container walls. Furthermore, because such containers are often manufactured in a multitude of shapes and sizes, a multitude of unique tools or dies are required to manufacture the pre-formed plastic liners off-line. Producing this multitude of tools and dies can be costly and inefficient. The present disclosure eliminates the cost of producing these tools by providing at least one process for forming a plastic liner into a container using thermoforming processes. These processes, as should be understood from the description herein, are readily adaptable to be performed on generally any shape or size container. Additionally, use of the disclosed processes with woven or non-woven containers creates a novel and desirable appearance. In one form, the disclosed home décor product using a clear plastic liner material, the process produced rounded protrusions that protrude from the openings in the weave, giving the aesthetically pleasurable appearance of blown glass, as shown in FIGS. 2-5.

[0043] With reference to FIGS. 9 and 10, a yet further home décor product 101 according to the principles of the present disclosure and various processes for manufacturing the home décor product 101 are described. Because the product and processes disclosed in FIGS. 9 and 10 include features similar to those described above, like features are assigned like reference numerals increased by one hundred. The home décor product 101 includes a container 110 and a liner 112.

[0044] The liner 112 can be created by a number of methods using a variety of materials. In a first example, as shown in FIG. 9, the container liner 112 is manufactured using a casting process. In this example, foam or casting resins are poured into the woven container 110 and cured to form the liner 112. The woven container 110 may be placed in a nest, die, or cavity to securely locate the container 110 and to affect its shape if needed.

[0045] A barrier layer 111 may be needed for containers constructed with a more porous weave or from certain materials. In one example, as shown in FIG. 9, the barrier

layer 111 is applied to the inside of the container 110 prior to the application of a resin, plastic or foam liner 112 to prevent material from seeping through the woven material. This barrier 111 can be a cellulosic material with an adhesive backing, a polypropylene film, or any solid adhesive backed substrate or other material that can provide a substantially foam or resin impermeable barrier to prevent the foam or casting resins from penetrating the weave of the container 110.

[0046] Once the container 110 is secured in the nest and any necessary barrier layer 111 is in place, a predetermined amount of casting material is poured into the bottom of the container 110. A plug 113, as shown in FIG. 9, is lowered into the cavity of the container and clamped in place to hold a fixed position relative to the container 110. The plug 113 may be made of wood, aluminum, or other suitable material and may be coated with a release coating such as a silicone boot or silicone spray. The plug 113 is dimensioned to reflect the interior shape desired of the liner 112 in the container 110. The plug 113 is also dimensioned such that it is smaller than the inside walls of the container 110. The difference in size creates a cavity between the interior walls of the container 110 or surfaces of the barrier layer 111 and the outer surface of the plug 113. The poured foam expands or the liquid resin rises to fill this cavity. The resin is then cured for a predetermined time period dependant upon material selection, liner thickness, and other factors before the plug 113 is removed. The use of a barrier layer 111 may not be needed if the weave of the container is tight enough to prevent the casting material from seeping through the interstices in the woven container 10 or if the casting material is viscous enough such that it does not seep through the interstices in the woven container 110.

[0047] Another method to create an integrated lined container 101 is to spray coat the interior of the container 110 with the desired liner material. In this example, materials such as elastomers, powder coats, adhesives, urethanes or other similar materials can be sprayed to construct the liner. The interior of the container 110 is sprayed to create a network of layers to form the liner 112 on the interior walls of the container 110. This method works well for tightly-woven or solid-wall containers, and also where an initial barrier layer 111 has been applied.

[0048] For loose-weave containers, construction of a sprayed liner may require the use of either an outer mask 115 (shown in FIG. 10) or inner barrier 111. To construct a liner 112 with an outer mask 115, the exterior surfaces of the walls and base of the container 110 are coated with a release coating such as a wax label, low surface energy plastic, silicone, or other such material. Then, the interior surface of the walls and base of the container 110 is sprayed with the liner material. Material that passes through the weave of the container 110, bonds to itself to create a solid wall, but releases from the outer mask 115 when the mask is removed. The mask 115 may be either physically removed, or it may be made from a soluble material and dissolved.

[0049] Alternately, to construct a sprayed coated lined container using an inner barrier 111, an inner barrier 111 is placed on the interior surfaces of the container 110, as shown in FIG. 9. The inner barrier 111 is adhered or otherwise affixed to the interior container surfaces. Once the inner barrier 111 is in place the liner material is sprayed on top of

the barrier **111**. A layer of liner material can be sufficiently thick to cover the natural defects found in the hand-woven containers and seal the interstices in the weave.

[0050] Numerous materials are suitable for construction of the liner **112**. In one example, liners have been constructed using a 2-part urethane material that is mixed immediately prior to pouring into the container **110**. Any other suitable urethane system can be used instead. Furthermore, other multi-part reactive materials may be used instead of urethane. Additionally, colorants may be added to one or more of the components prior to mixing to achieve a desired visual effect. Moreover, numerous other materials are suitable for construction of the liner including, but not limited to, rigid or flexible foam, cast flexible urethane, rubber, cast stiff urethane, or the like.

[0051] When forming the liner **112** from urethane foam, it is desirable to select a foam that will generate a solid, sufficiently thick skin on the interior surface of the container **110**. This will provide an easy to clean, durable, non-permeable surface. Often, the best way to create a durable non-permeable skin on the interior surface of a foam liner is to use an aluminum plug **113** with internal water cooling to achieve maximum heat transfer at the surface of the foam in contact with the plug **113**. Alternatively, self-skinning foams can also be used in place of the aluminum tooling.

[0052] The interior barrier layer **111** used for containers with loose weave or for less viscous liner materials may be made from any material that can provide a substantially foam or resin impermeable barrier to prevent the uncured liner material from penetrating the barrier layer **111**. In one example of an interior barrier layer **111**, a cellulosic material with an adhesive backing is applied to the interior of the container **110** such that the adhesive surface of the barrier layer contacts the interior surface of the container **110** to hold the barrier layer **111** in place prior to application of the uncured liner material. The interior barrier layer **111** may be relatively thin in comparison to the thickness of the liner **112**. The barrier layer **111** may be a polypropylene film, or any other material that can provide a substantially foam or resin impermeable barrier to prevent the uncured liner material from penetrating the weave of the container **110**.

[0053] The exterior mask **115** used for containers with loose weave or for less viscous liner materials may be constructed from a low surface energy material that will not adhere to the liner material. The exterior mask **115** may be formed using a coating such as low surface energy plastic, silicone, or other such material. Alternately, the exterior mask **115** may be constructed from a wax coated paper or other sheet of material used to cover the exterior surface of the container **110**, as shown in FIG. 10. After the liner material has cured, the mask layer **115** may be physically peeled away from the woven container **110** or, in the case of a mask **115** made from soluble material, may be dissolved.

[0054] The disclosed coating lined woven storage container **101** has a number of advantages. The disclosed liner **112** is cleanable and moisture resistant while economical to manufacture. Unlike separately tooled plastic liners the disclosed manufacturing processes can easily be adapted to accommodate different sizes and shapes of containers. Moreover, the process for creating the integrated liner **112** readily adapts to and accommodates dimensional variation commonly found in woven containers and ensures a tight fit

between the liner and the container wall. The lining process is robust because the disclosed liners and methods easily adapt to container variation in a way that pre-formed plastic liners can not. It is also likely that this invention provides economic advantages over the current methods, depending on the selection of liner materials.

[0055] Additionally, the disclosed processes create a tight-fitting or even permanent liner. In contrast, traditional plastic liners are loose fitting, removable, and often contain gaps between the liner and the surrounding container.

[0056] Although certain lined containers, materials, and methods for manufacturing such lined containers have been described herein in accordance with the teachings of the present disclosure, the scope of coverage of this patent is not limited thereto. On the contrary, this patent covers all embodiments of the teachings of the disclosure that fairly fall within the scope of permissible equivalents.

What is claimed is:

1. A home product, comprising:

a container having an interior surface; and

a plastic sheet integrally conformed and attached to a substantial portion of the interior surface of the container.

2. The home product of claim 1, wherein the plastic sheet is a thermoformed plastic liner formed directly onto the interior surface of the container.

3. The home product of claim 1, wherein the container is a woven container.

4. The home product of claim 1, wherein the container includes a plurality of openings.

5. The home product of claim 4, wherein the plastic sheet includes a plurality of protrusions extending at least partially into the plurality of openings to mechanically interconnect the plastic sheet and the container.

6. The home product of claim 5, wherein the plurality of protrusions extend entirely through the plurality of openings.

7. The home product of claim 5, wherein the plastic sheet includes a plurality of dimples opposite the plurality of protrusions.

8. The home product of claim 1, further comprising an adhesive layer disposed between the plastic sheet and the interior surface of the container to adhere the plastic sheet to the interior surface of the container.

9. The home product of claim 8, wherein the adhesive layer includes a plurality of adhesive bands disposed between the plastic sheet and the container.

10. The home product of claim 9, wherein the plurality of bands include at least one of a plurality of parallel bands and a plurality of cross-hatched bands.

11. The home product of claim 1, further comprising a rim component fixed to a rim of the container.

12. A home product, comprising:

a woven container having an interior surface;

a liner thermoformed onto the interior surface of the woven container such that the liner and the woven container form an integral product.

13. The home product of claim 12, wherein the liner is a plastic liner.

14. The home product of claim 12, wherein the container includes a plurality of openings and the liner includes a

plurality of protrusions that extend at least partially into the plurality of openings to integrally connect the liner and the container.

15. The home product of claim 14, wherein the liner includes a plurality of dimples opposite the plurality of protrusions.

16. The home product of claim 12, further comprising an adhesive layer disposed between the liner and the container to adhere the liner to the container.

17. The home product of claim 16, wherein the adhesive layer includes a plurality of adhesive bands disposed between the liner and the container.

18. The home product of claim 17, wherein the plurality of bands include at least one of a plurality of parallel bands and a plurality of cross-hatched bands.

19. The home product of claim 12, further comprising a rim component fixed to a rim of the container.

20. A method of manufacturing a lined container, comprising:

heating a plastic material to at least a semi-molten state;
positioning the plastic material adjacent the container; and
deforming the semi-molten plastic material into a plastic liner integrally conformed to an interior surface of the container.

21. The method of claim 20, wherein deforming the plastic material includes applying a substantially uniform positive force to a substantial portion of the plastic material.

22. The method of claim 21, wherein applying a substantially uniform positive force includes performing a blow-molding operation on the plastic material.

23. The method of claim 21, wherein deforming the plastic material includes extruding a plurality of portions of the plastic material at least partially into a plurality of openings in the container to mechanically secure the plastic liner to the container.

24. The method of claim 20, wherein deforming the plastic material includes applying a substantially uniform negative force to a substantial portion of the plastic material.

25. The method of claim 24, wherein applying a substantially uniform negative force includes performing a vacuum thermoforming operation.

26. The method of claim 24, wherein deforming the plastic material includes drawing a plurality of portions of the plastic material at least partially into a plurality of openings in the container to mechanically secure the plastic liner to the container.

27. The method of claim 24, further comprising at least temporarily fixing a manufacturing collar to a rim of the container prior to positioning the plastic material adjacent the container, the manufacturing collar selectively sealingly engaging a portion of the plastic material for maximizing the negative force applied to the plastic material.

28. The method of claim 20, wherein positioning the plastic material adjacent the container includes positioning a substantially two-dimensional plastic sheet adjacent a rim of the container.

29. The method of claim 20, wherein positioning the plastic material adjacent the container includes positioning a parison within the container.

30. The method of claim 20, further comprising adhering the plastic liner to the interior surface of the container while deforming the plastic material.

31. The method of claim 30, further comprising applying an adhesive layer to the plastic material prior to deforming the plastic material such that the adhesive layer adheringly engages the container upon deforming the plastic material.

32. The method of claim 20, further comprising trimming excess plastic from the plastic liner at a location adjacent a rim of the container subsequent to deforming the plastic material.

33. The method of claim 20, further comprising fixing a rim component to the container at a location that is one of adjacent to a rim of the container and on the rim of the container subsequent to deforming the plastic material.

34. The method of claim 20, further comprising deforming the plastic material to a geometry similar to the container prior to deforming the plastic material into a plastic liner.

* * * * *