



US 20060185998A1

(19) **United States**

(12) **Patent Application Publication**  
**McGrail et al.**

(10) **Pub. No.: US 2006/0185998 A1**

(43) **Pub. Date: Aug. 24, 2006**

(54) **INFLATABLE SHIPPING DEVICE AND METHOD OF FORMING AND USING SAME**

**Related U.S. Application Data**

(60) Provisional application No. 60/648,294, filed on Jan. 29, 2005.

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**Publication Classification**

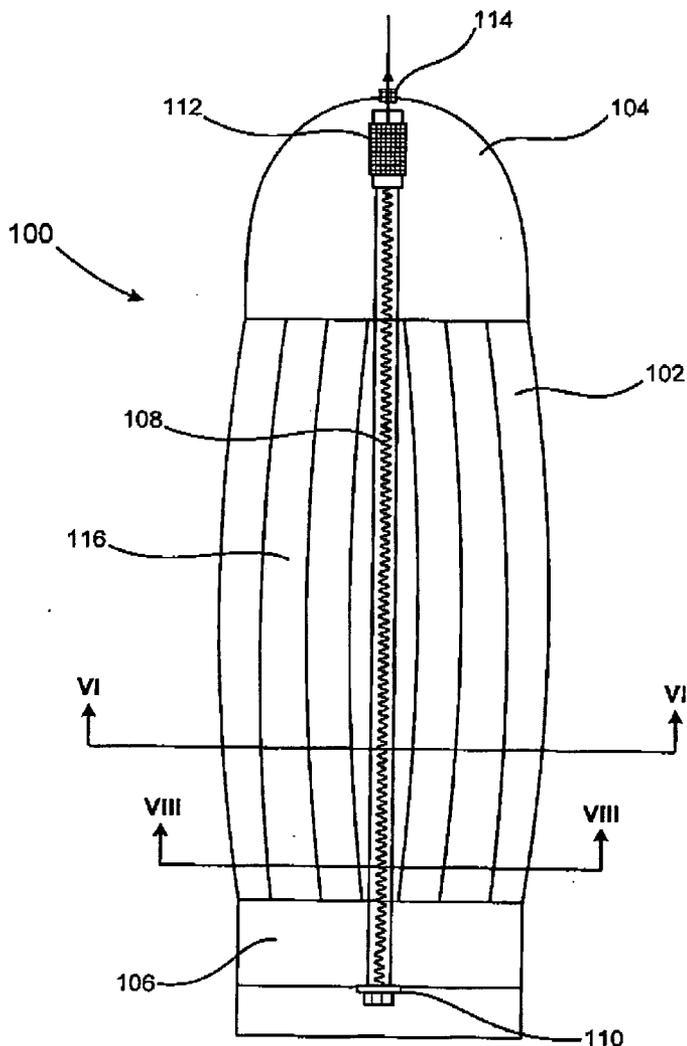
(51) **Int. Cl.**  
*A63B 55/00* (2006.01)  
(52) **U.S. Cl.** ..... **206/315.3**

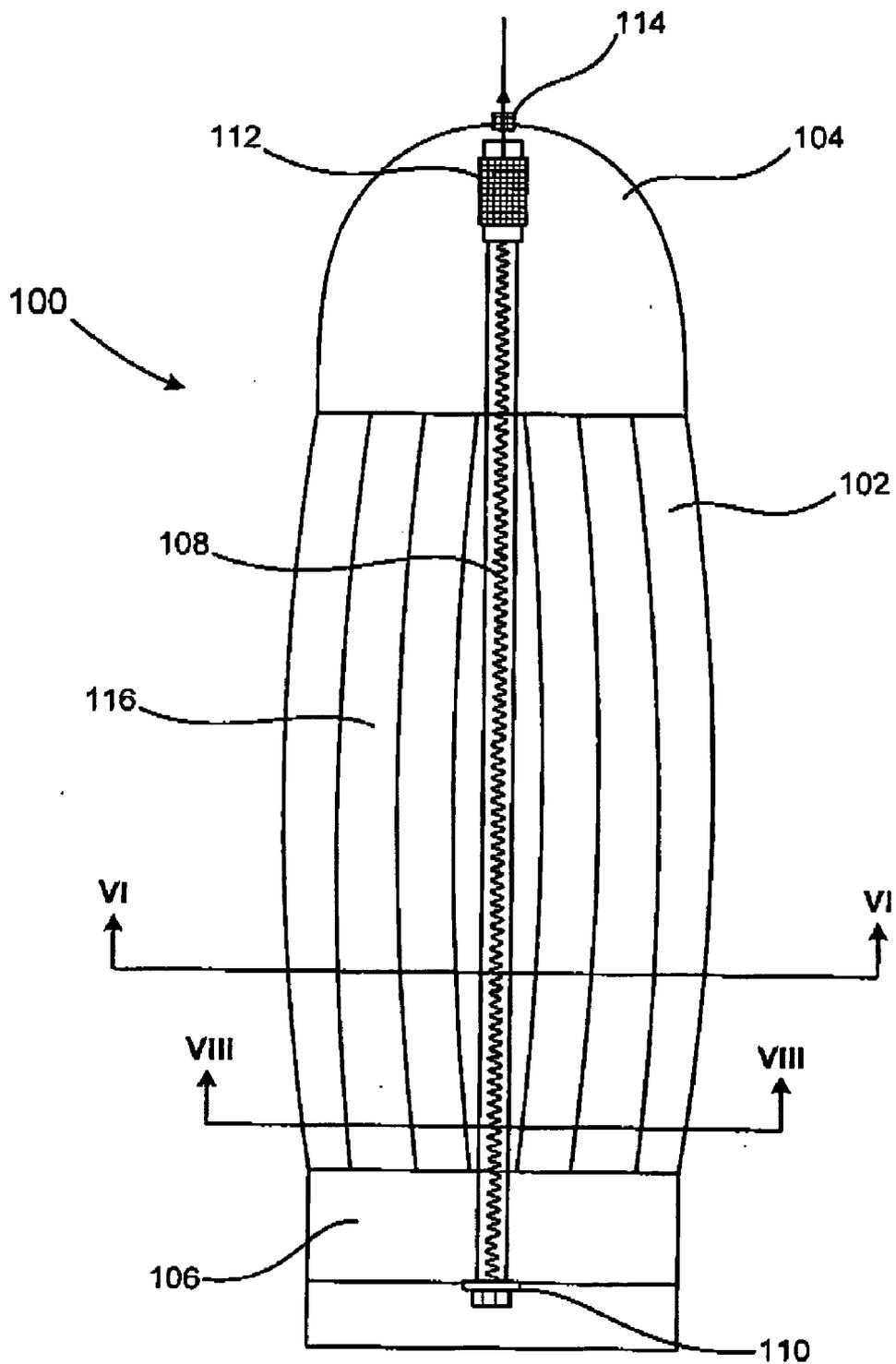
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(57) **ABSTRACT**

An assembly, carrier, and method configured to protect items during shipping and storage is disclosed. The assembly includes inflatable cells to protect the items. The assembly may also include additional protective layers to prevent puncture of the cells.

(21) Appl. No.: **11/275,813**  
(22) Filed: **Jan. 30, 2006**





**FIG. 1**

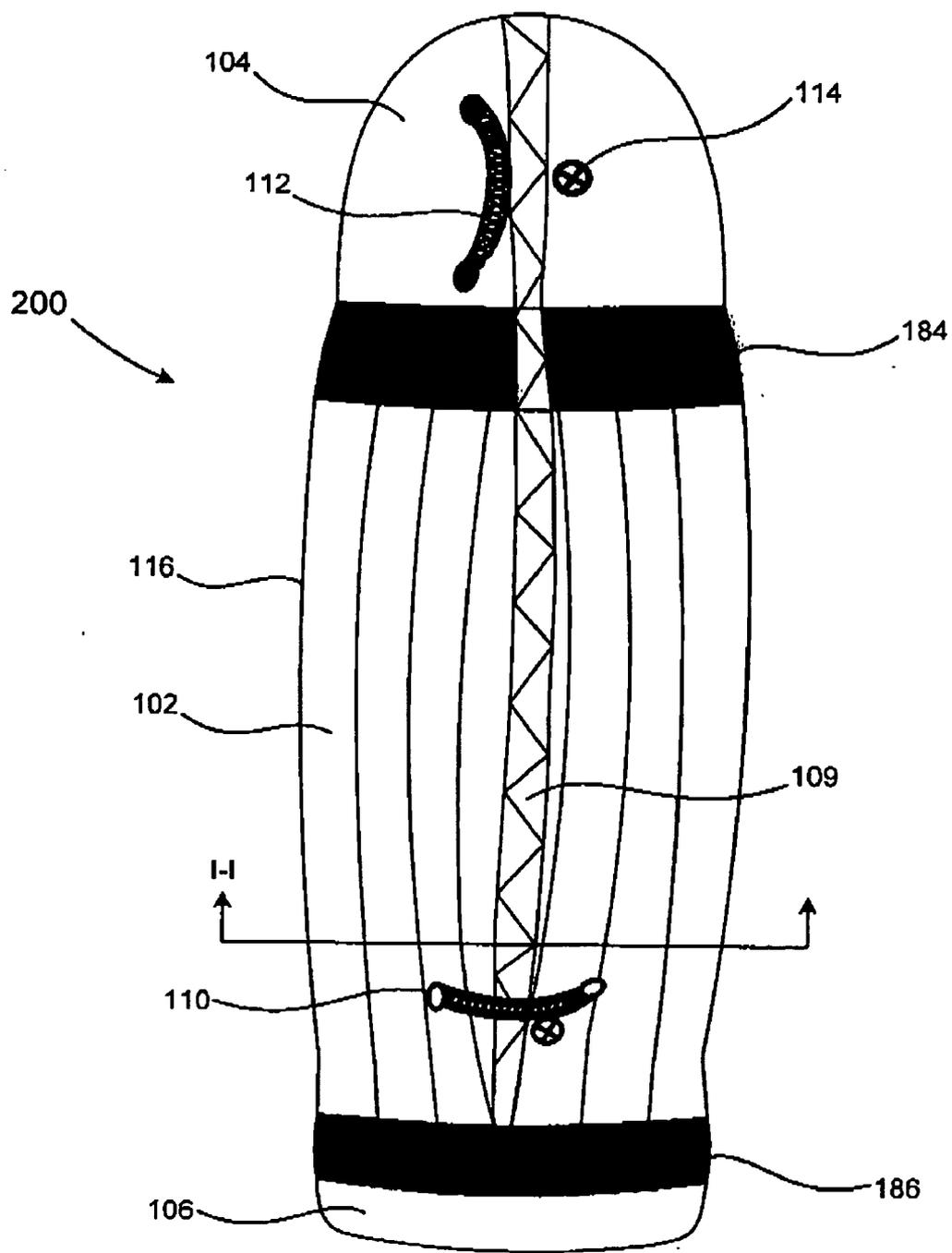


FIG. 2

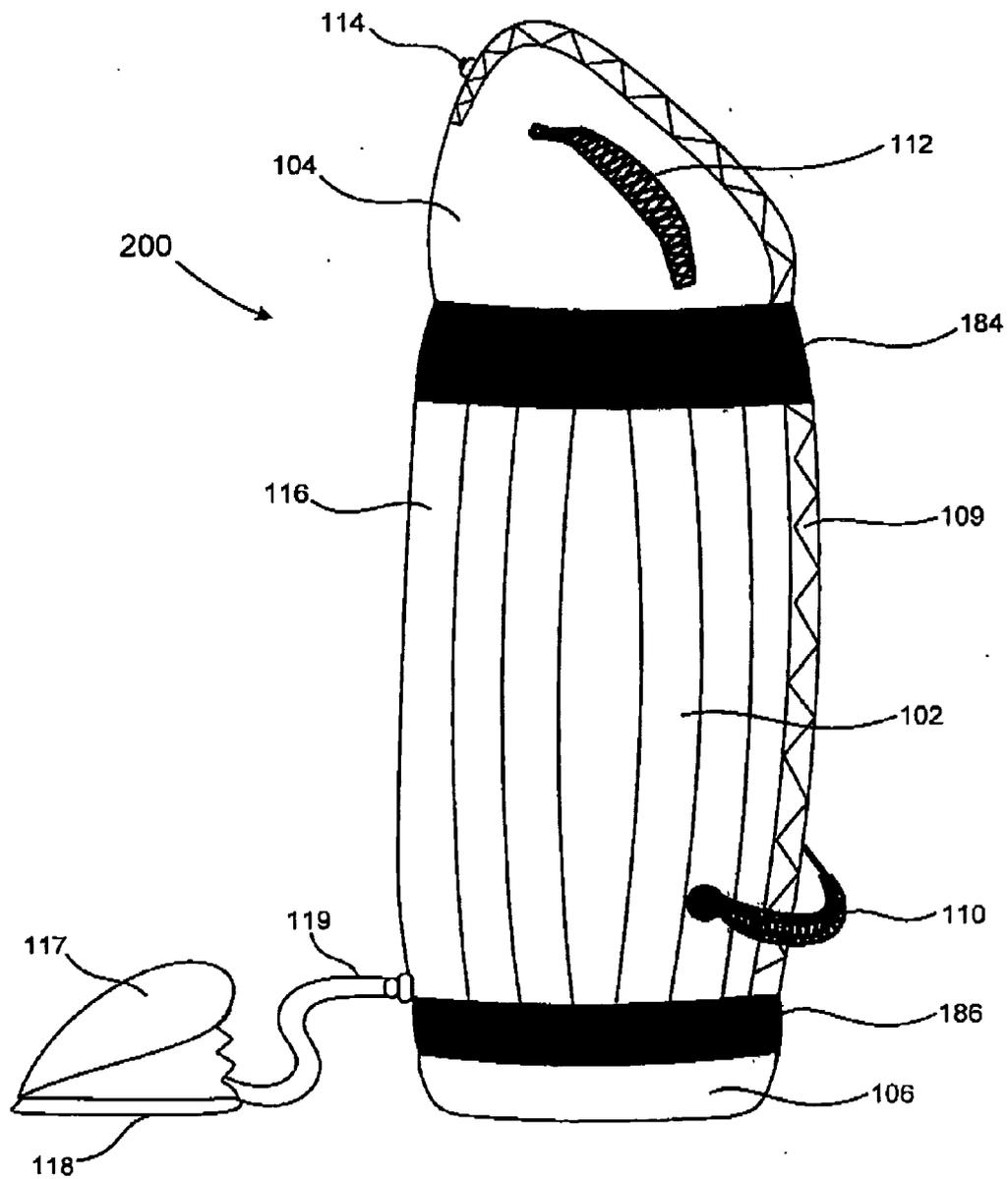
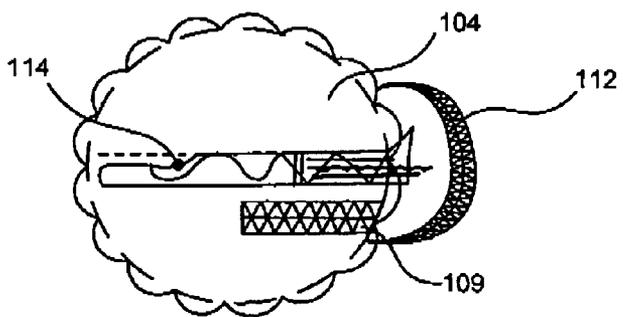
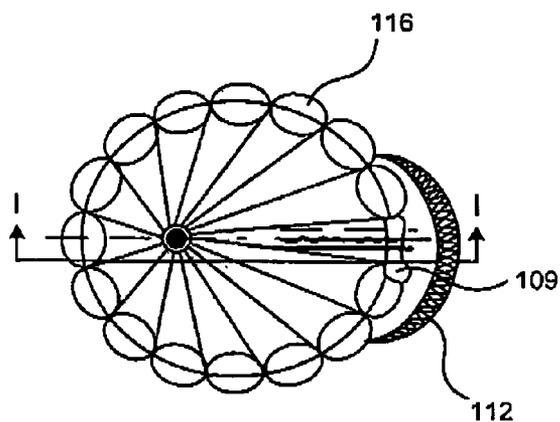


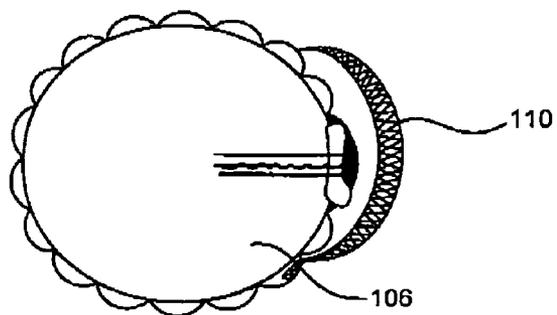
FIG. 3



**FIG. 4**



**FIG. 5**



**FIG. 6**

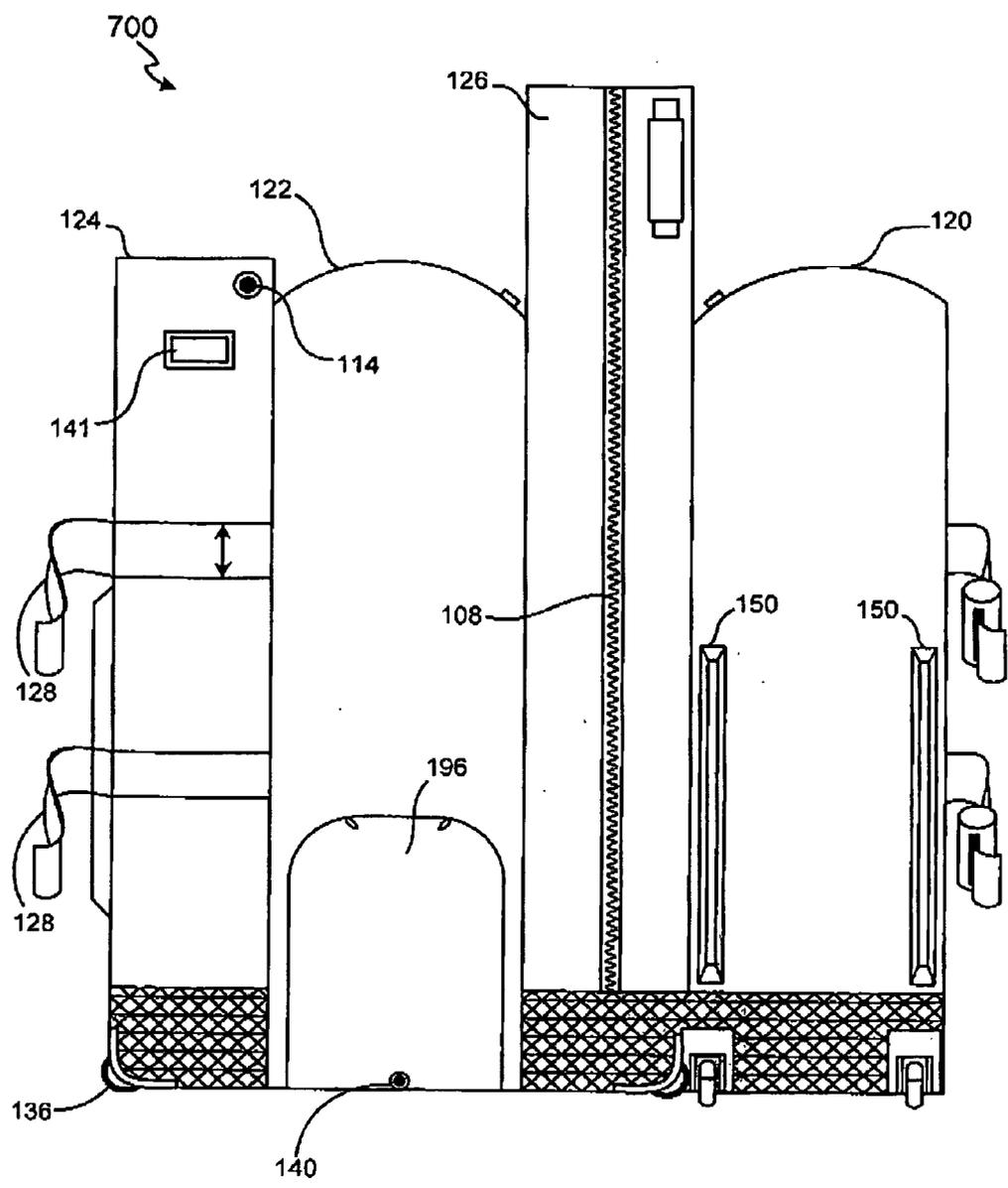


FIG. 7

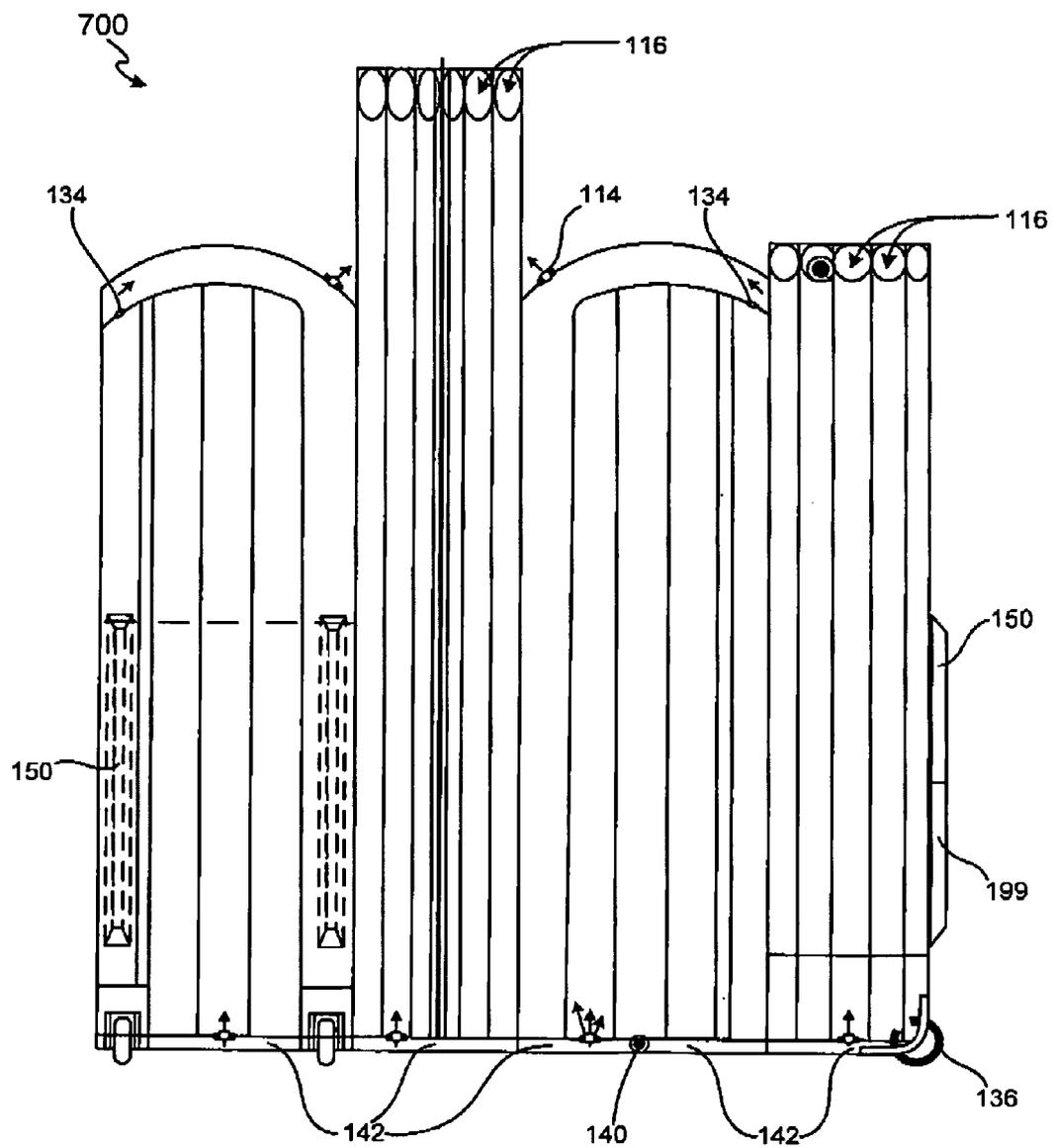
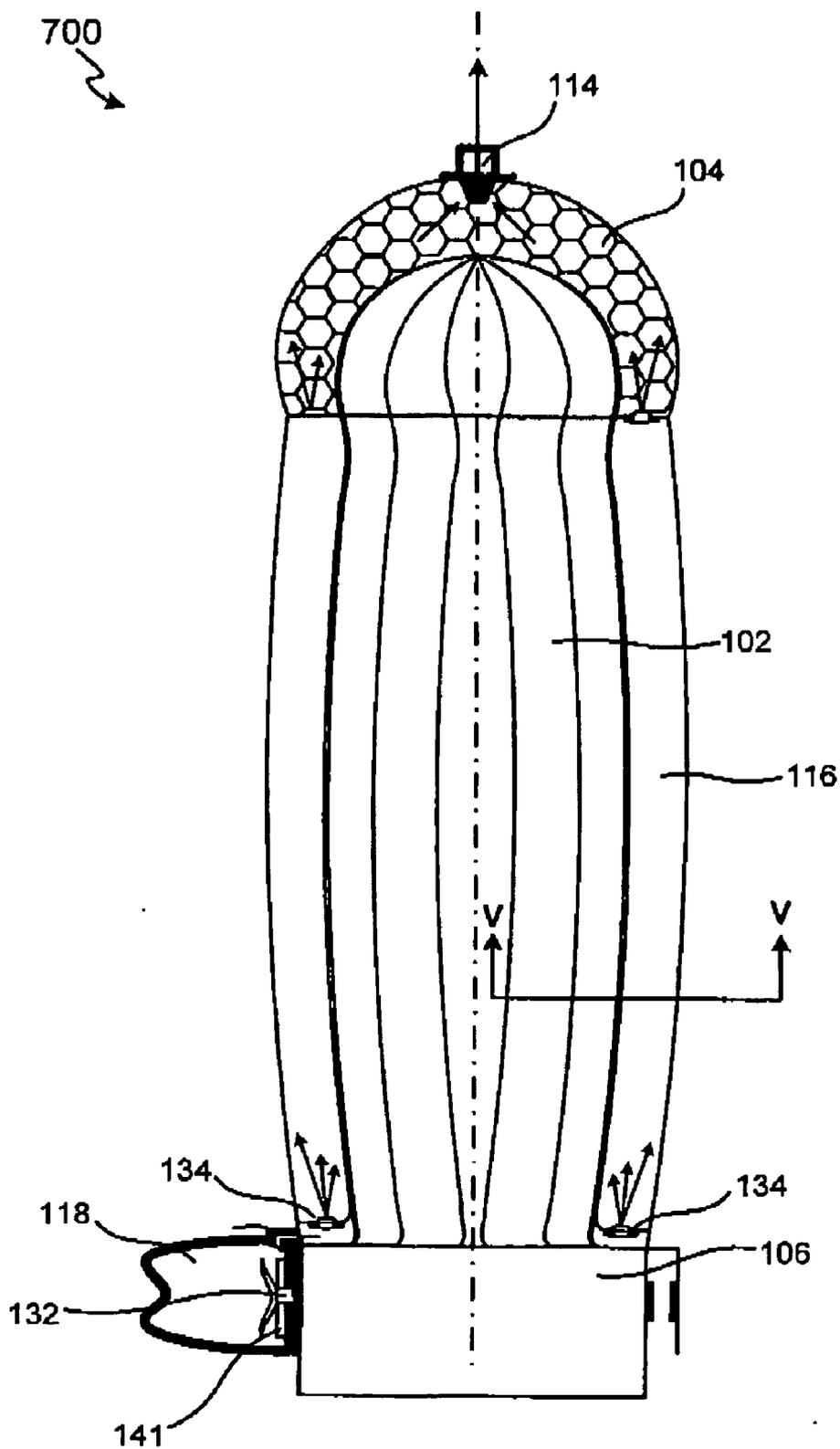
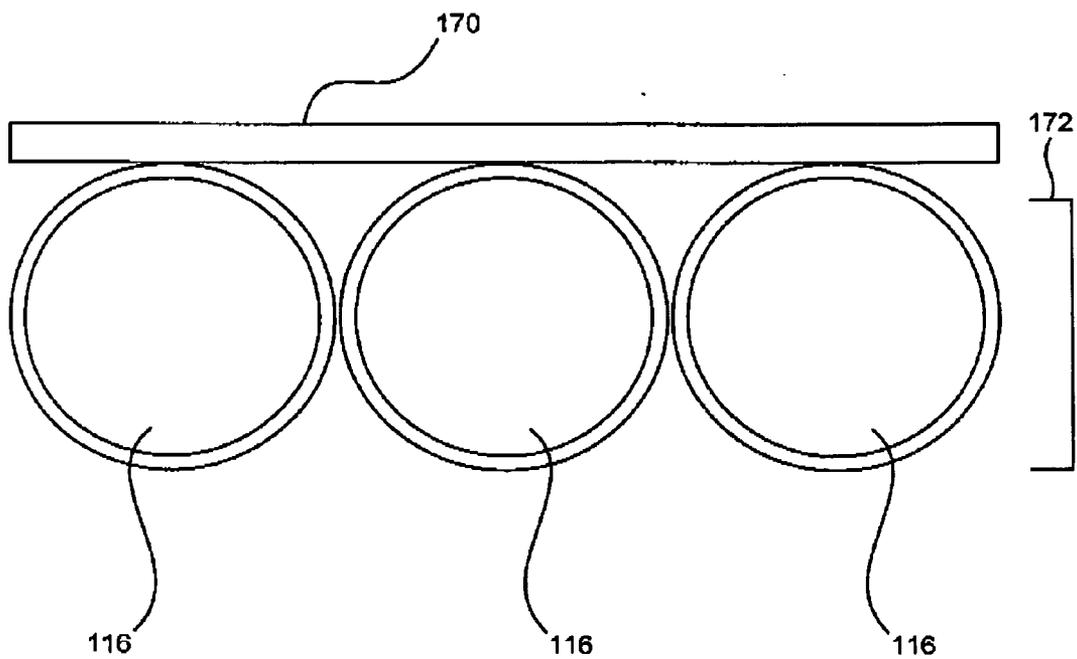


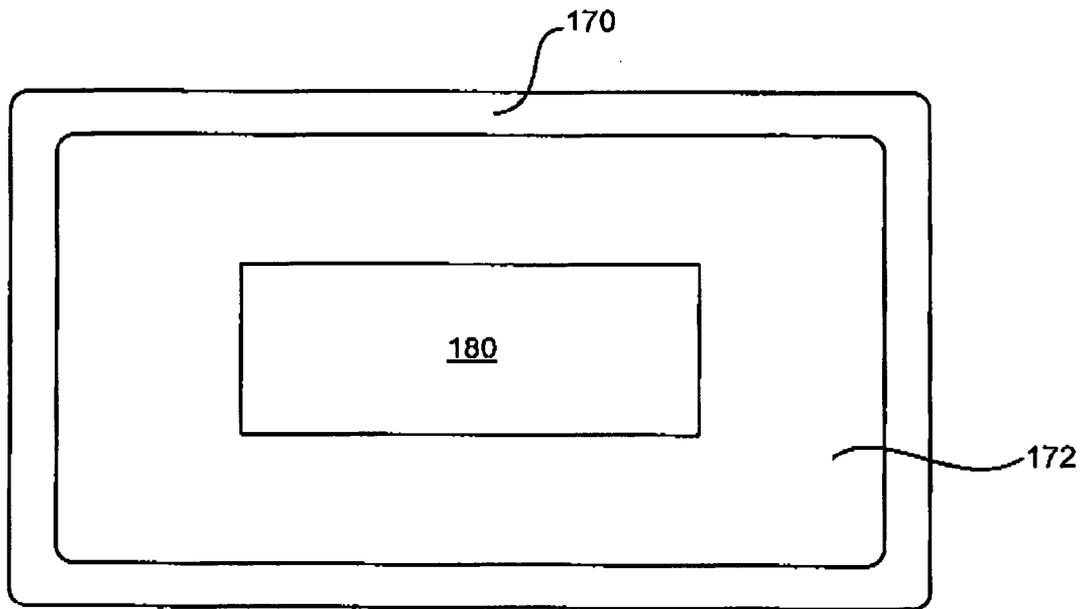
FIG. 8



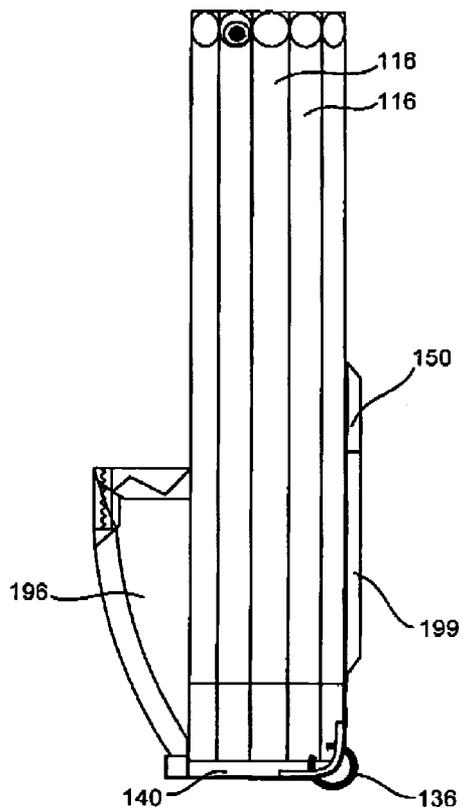
**FIG. 9**



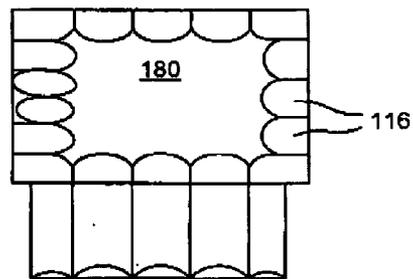
**FIG. 10**



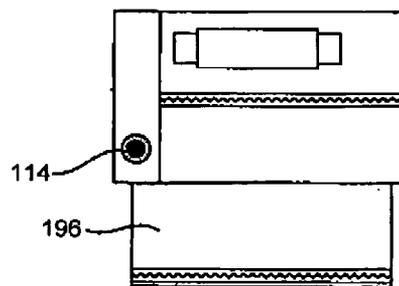
**FIG. 11**



**FIG. 12**



**FIG. 13**



**FIG. 14**

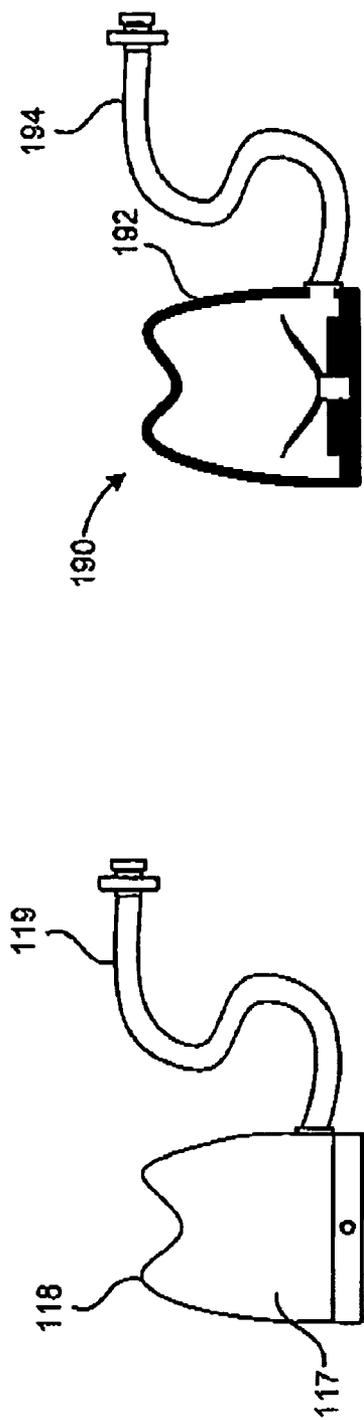


FIG. 15

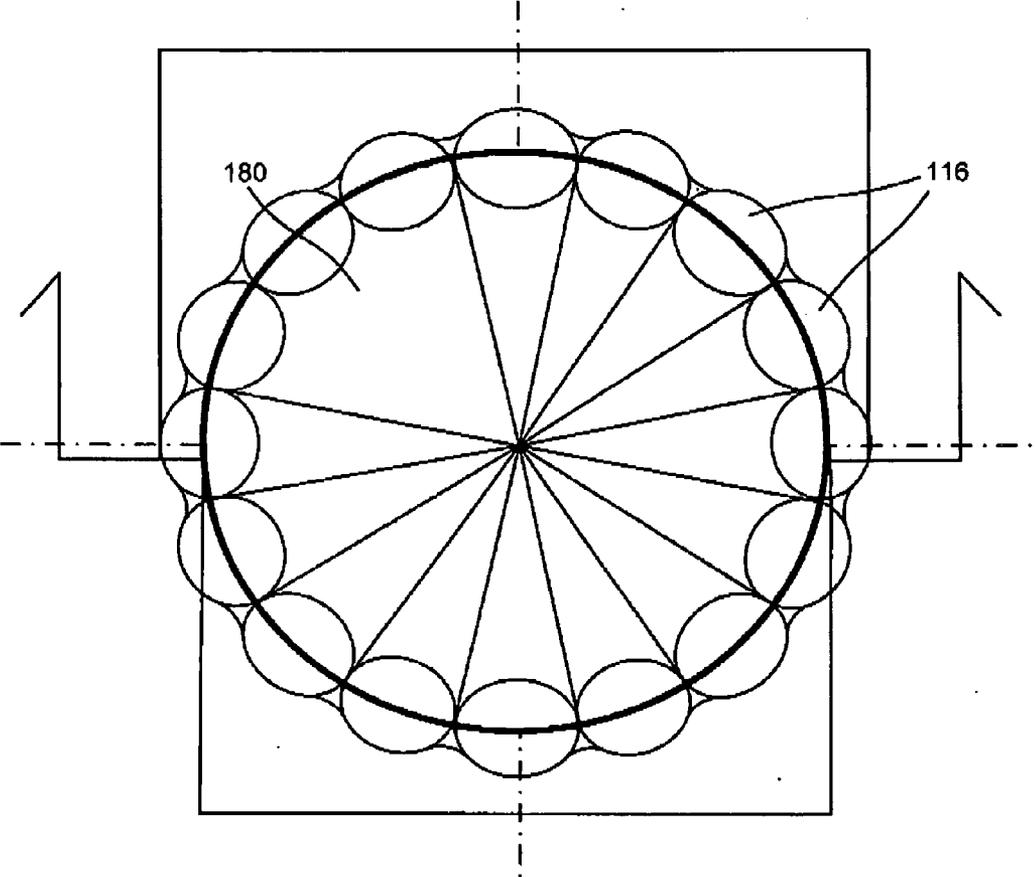
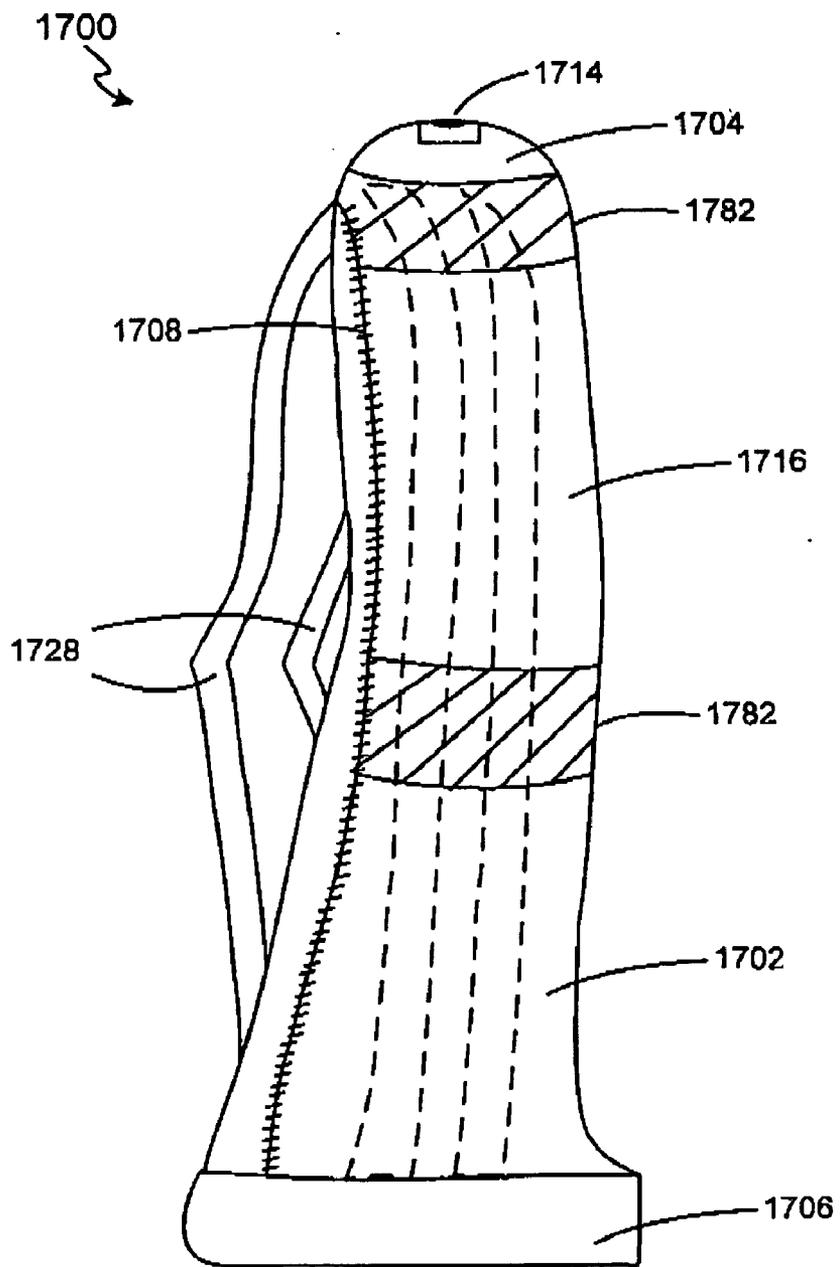
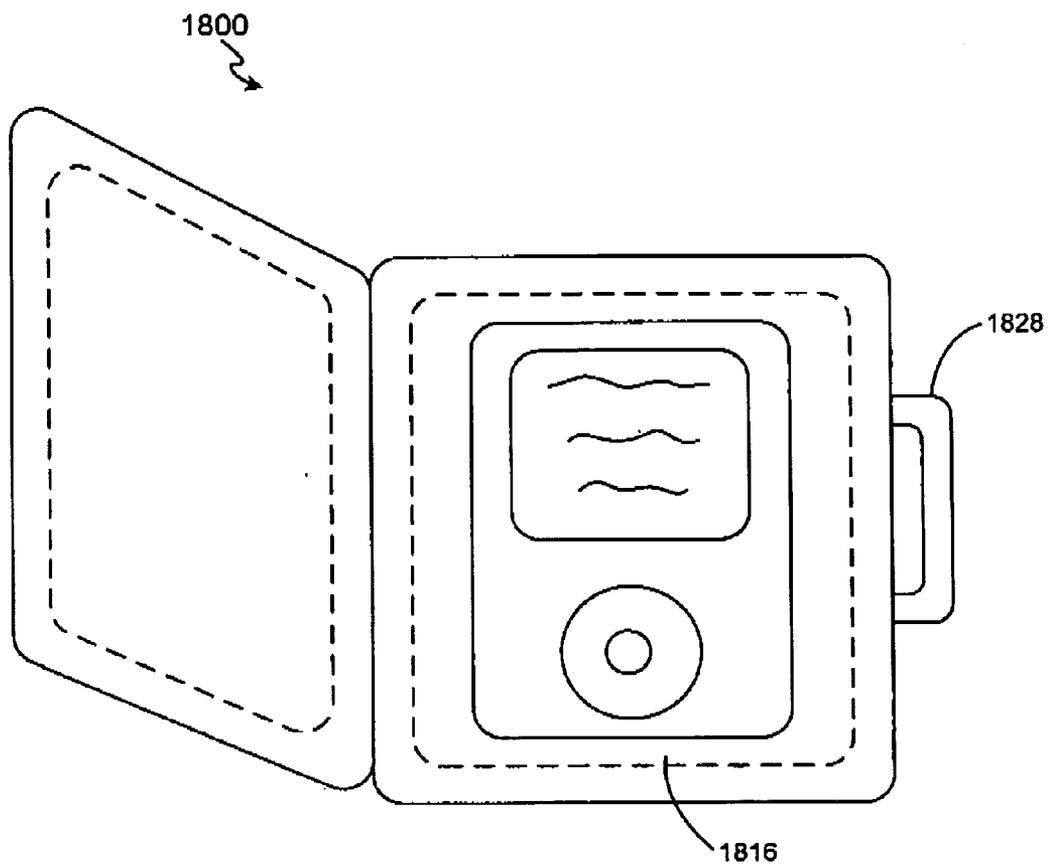


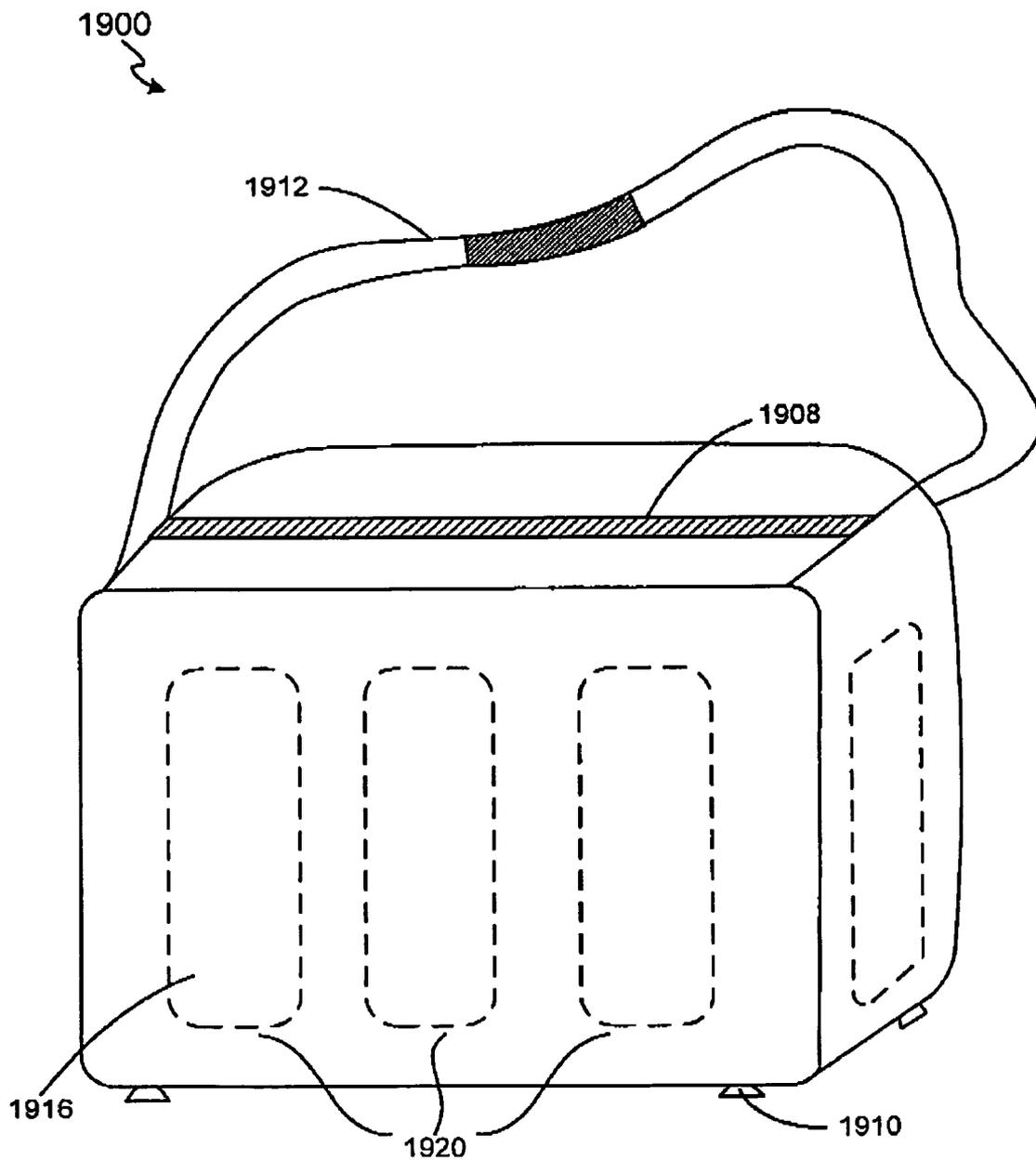
FIG. 16



**FIG. 17**



**FIG. 18**



**FIG. 19**

**INFLATABLE SHIPPING DEVICE AND METHOD OF FORMING AND USING SAME**

**CROSS-REFERENCE TO RELATED APPLICATIONS**

[0001] This application claims the benefit of U.S. Patent Application Ser. No. 60/648,294 entitled INFLATABLE SHIPPING CONTAINER AND METHOD OF FORMING AND USING SAME, filed Jan. 29, 2005.

**FIELD OF THE INVENTION**

[0002] The invention relates generally to inflatable shipping containers and containers having an inflatable liner. More particularly, the invention relates to fluid-cushioned devices for providing protection to objects from damage during transportation and/or storage, and to methods of making and using the shipping devices.

**BACKGROUND**

[0003] When transporting cargo, it is often desirable to provide temporary protection to prevent or mitigate any damage that may occur during shipment. When objects arrive at a desired location, the shipping container, or other protective apparatus, is often unnecessary, adding unwanted bulk and weight to the objects. For example, in the case of golf clubs, a hard "shell" type container, allows an entire golf bag containing a set of clubs to be placed within the shell, to transport (e.g., via commercial airline) the clubs from one location to another. Such containers are desirable during transportation because the hard shell casing provides protection to the club heads as well as the club shafts. Upon arrival at the desired location, however, the hard containers are generally unnecessary and relatively heavy and bulky, making it difficult for an individual to move the clubs from one location to another. Soft bags, on the other hand are relatively light and easy to move, but provide little to no protection for the clubs during transport. Other presently known containers include a "shell" type hood which fits over the top of a typical golf bag and also provides protection for the club heads. Such protection is provided, generally, at less cost and lower physical bulk than the aforementioned hard shell cases that envelop the entire bag; however, this type of protective apparatus is not effective against damage to the club shafts during shipment.

[0004] Similar problems are encountered during transportation of other items such as artwork and museum pieces, skis, snowboards, fishing rods and other athletic and leisure equipment, cosmetic items, antiques, glassware, furniture, and other fragile or valuable goods. Accordingly, improved apparatus and methods for providing protection to goods to mitigate damage during shipment are desired.

**SUMMARY OF THE INVENTION**

[0005] The present invention relates, generally, to protective liners, containers, and to containers that include liners. The liners and containers of the invention can be used to protect items during shipment and/or storage of the items. While the manner in which the invention addresses the various drawbacks of the prior art will be discussed in greater detail below, in general, the invention provides a reusable device (e.g., a container or liner) having a portion

or portions that are inflated to increase protection to items and deflated when reduced bulk and storage is desired.

[0006] In accordance with various embodiments of the invention, a device includes one or more inflatable cells formed of resilient material. The cells may be formed by sealing portions of the resilient material onto itself or onto additional material.

[0007] In accordance with one embodiment of the invention, the device is a liner, which includes an inflatable burst-resistant portion, and optionally includes a puncture-resistant portion attached to the burst resistant portion. In accordance with various aspects of this embodiment, the inflatable portion is made of a resilient material such as rubber or plastic. The inflatable portion may be formed of a single inflatable cell or may include multiple inflatable cells. In accordance with other aspects of the invention, the puncture-resistant portion includes a resilient material such as plastic, natural or synthetic fibers, or a combination of such materials. The puncture-resistant portion may be attached to the inflatable portion by, for example, hermetically sealing sections of the portions together, an injection or other molding process, adhesives, stitching, mechanical coupling, or by any other suitable means.

[0008] In accordance with another embodiment of the invention, a container includes an outer casing and an inflatable liner. The casing may be either soft—such as a nylon bag—or hard—such as a hard case.

[0009] In accordance with yet another embodiment of the invention, a system for providing protection against damage to items includes an inflatable liner, a pump, and a release valve. The pump allows a user to inflate portions of the liner as needed, and the release valve allows a user to deflate the liner when increased portability or less bulk for storage is desired.

[0010] In accordance with a further embodiment of the invention, the size, shape and operational characteristics of the shipping container and/or liner may be adapted to the particular item being transported. For example, in the context of transporting golf clubs, some golfers may desire to protect the club heads, so that the shipping container includes an inflatable liner component to surround the club head region. Other golfers may wish to also protect the club shafts, in which case the entire shipping container may include an integral inflatable liner. Protection for other types of equipment, such as, ski and snowboard equipment, camping gear, hunting equipment, mps players, and the like, is also contemplated by the present invention.

[0011] In accordance with still yet another embodiment of the invention, the shipping container and/or liner may be adapted to accommodate various items being transported. The shipping container may contain several selectively inflatable compartments to accommodate the individual items being shipped, such as delicate bottles, souvenirs, and the like having separate inflatable compartments for each.

[0012] In accordance with yet further exemplary embodiments of the invention, an inflatable container or liner includes reinforced areas to prevent puncture of the container or liner. For example, portions of a golf bag liner may include puncture resistant material attached to the liner where the liner contacts a hard container or where the liner or to a container is likely to wear. Similarly, in the context

of a container directed towards shipping and storing ski or snowboarding equipment, the container may contain reinforcement at a point where the bindings are located, or where the tips of the skis are located.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0013] A more complete understanding of the present invention may be derived by referring to the detailed description and claims, considered in connection with the drawing figures, wherein like reference numbers refer to similar elements throughout the figures, and:

[0014] **FIG. 1** is an elevation view of a shipping container assembly in accordance with an exemplary embodiment of the invention;

[0015] **FIG. 2** is an elevation view of a shipping container assembly in accordance with another exemplary embodiment of the invention showing a Velcro sealing mechanism and an alternative handle configuration;

[0016] **FIG. 3** is a side elevation of the container illustrated in **FIG. 2** showing a shipping container assembly in accordance with an embodiment of the invention;

[0017] **FIG. 4** is a top-down view of the shipping container illustrate in **FIG. 2**;

[0018] **FIG. 5** is a cross-section view of the shipping container illustrated in **FIG. 2**;

[0019] **FIG. 6** is a bottom-up view of the shipping container illustrated in **FIG. 2**;

[0020] **FIG. 7** is a foldout view of the outside of another exemplary embodiment of a container assembly;

[0021] **FIG. 8** is a foldout view of the inside of the container illustrated in **FIG. 7**;

[0022] **FIG. 9** is a front section view of an exemplary embodiment of the container assembly;

[0023] **FIG. 10** is a partial, schematic cross section view taken along line V-V of **FIG. 9**, illustrating an exemplary arrangement of an outer protective layer and an inner inflatable layer;

[0024] **FIG. 11** is a cross sectional view taken along line VI-VI of **FIG. 1**, illustrating an outer protective layer, an inner inflatable layer, and an inner cargo region of a shipping container in accordance with an exemplary embodiment of the present invention;

[0025] **FIG. 12** is a vertical section view of a side portion of a protective container, showing a plurality of exemplary, parallel bladder sections in accordance with the exemplary container assembly of **FIG. 7**;

[0026] **FIG. 13** is a top view of a cross section in accordance with the exemplary container assembly illustrated in **FIG. 7**, and illustrative of the line VIII-VIII of **FIG. 1**, showing the interior of the container assembly;

[0027] **FIG. 14** is a top view of the container assembly of **FIG. 7**;

[0028] **FIG. 15** is a schematic view of an exemplary pump for inflating the exemplary container assembly of **FIG. 7**;

[0029] **FIG. 16** is a schematic, cross-section view of an exemplary embodiment of a container assembly illustrating adjacent bladder sections;

[0030] **FIG. 17** is a schematic view of an exemplary container configured to transport and store alternate leisure equipment, apart from golf clubs, such as skis, and the figure further shows reinforcing strips added to protect areas of the inflatable device that might be prone to puncture by sharp elements such as, for example, bindings or ski tips;

[0031] **FIG. 18** is a schematic view of an exemplary container configured to transport items of various sizes and particular customization, for example, an mp3 player; and

[0032] **FIG. 19** is a schematic view of an exemplary embodiment of the invention showing a bag having several independently inflatable compartments to accommodate multiple items.

[0033] Skilled artisans will appreciate that elements in the figures are illustrated for simplicity and clarity, and therefore may omit extraneous detail and have not necessarily been drawn to scale. For example, the dimensions of some of the elements in the figures may be exaggerated relative to other elements to facilitate the description of various aspects and features of the present invention.

#### DETAILED DESCRIPTION

[0034] The inflatable device and system of the present invention may be used to enclose and provide protection to a variety of items such as golf clubs, other sporting equipment, food, computers, and other fragile items. For convenience, the device and system are described in detail below in connection with a variety of specific applications. Those skilled in the art will appreciate that the invention is not limited to these specific applications and that the embodiments described below are merely exemplary.

[0035] **FIGS. 1 and 2** illustrate exemplary devices or assemblies **100** and **200** in accordance with the present invention. Assemblies **100** and **200** may be inserted into a conventional golf travel bag—either a hardcover container or a soft bag. Alternatively, the assemblies may be used as stand-alone containers. Assemblies **100** and **200** each include a main body section **102**, a hood section **104**, and a boot section **106**. As described in greater detail below, these three sections securely encase an interior cargo when bladder cells **116** are inflated with a fluid. For example, interior cargo, such a set of golf clubs (both the shafts and the heads of the clubs) within a golf travel bag, is protected when bladder cells **116** are inflated, and the assembly may be deflated for convenient storage and/or to facilitate removal of the cargo.

[0036] Body section **102**, hood section **104**, and boot section **106** include any desired number of separated, inflatable cells **116**. In accordance with one embodiment of the invention, body section **102** includes 11 cells, hood section **104** is a single cell, and boot section includes one cell. However, assemblies in accordance with the present invention may include any suitable number of separated, inflatable cells.

[0037] Assemblies **100** and **200** may be formed of any suitable material, such as polyurethane (e.g., Noveon Estane Resins) having a thickness of about 5-120 mils, preferably

about 8-30 mils, and more preferably about 12 mils. Puncture resistance of the assemblies may be enhanced by applying a nylon blend material, such as DuPont Cordura, to a portion of the respective assembly. The material for assemblies **100** and **200** may alternatively include a resilient plastic, rubber, or other suitable high-tension material.

[0038] Cells **116** may be formed in a variety of ways. However, in accordance with various aspects of the invention, cells **116** are formed by heat-sealing multiple layers of material (e.g., polyurethane) together.

[0039] To permit convenient loading and unloading of the contents to be shipped or stored, container assemblies **100** and **200** include a sealable opening, such as a zipper **108** or Velcro **109**. Other sealing mechanisms, such as buttons, snaps, or the like may also be used in connection with various embodiments of the invention. Assemblies **100** and **200** may also include one or more handles such as respective caddy handles **110** and **112** to permit convenient handling of the container by the user or by automated baggage handling equipment.

[0040] Assemblies **100** and **200** further include air release valve **114** to release the cushioning fluid, e.g. air, out of the assembly. Valve **114** may be an air release valve, but it should be appreciated that any type of valve that facilitates a fluid flow out of bladder cells **116**, described in greater detail below, is contemplated by the invention.

[0041] In accordance with various exemplary embodiments of the invention, the assemblies may also include a pump **118**. Pump **118** is configured to connect to assembly **100** and introduce, and optionally expel, the cushioning fluid into bladder cells **116**. As shown in FIG. 3, exemplary pump **118** is may include a "foot pump." In this case, the foot pump includes pumping mechanism **117** and hose **119**. However, it should be appreciated by those skilled in the art that any type of mechanical or powered pump (e.g., a dome pump) may be used to provide the cushioning fluid into and/or out of bladder cells **116**.

[0042] It should be further appreciated by those skilled in the art that the herein described invention refers to the various sections, cells, and bladders as "inflatable." In this context, various sections, cells, and bladders may be inflated with any fluid, such as gas, liquid or a semi-solid such as a gel or foam material. Moreover, the various valves of the invention are intended to regulate the respective type of cushioning fluid that occupies the various sections, cells, and bladders.

[0043] Referring now to FIGS. 4-6, various views in accordance with an exemplary embodiment of the invention further illustrate the configuration of assembly **200** elements. FIG. 4 shows a top-down view of assembly **200** illustrating the top hood section **104** having air release valve **114**, handle **112**, and the upper portion of sealable opening **109**. FIG. 5 shows a cross-sectional view of assembly **200** illustrating the configuration of the various inflatable bladder cells **116**, sealable opening **109** and handle **112**. FIG. 6 shows a bottom-up view of assembly **200** illustrating boot section **106** and handle **110**.

[0044] Air release valve **114**, handles **110** and/or **112**, and sealable opening **109**, may be configured in several design arrangements without detracting from the scope of the invention. For example, air release valve **114** may be located

on the side or lower portion of assembly **200**. Handles **110** and/or **112** may be located in various areas to accommodate toting of assembly **200**, and sealable opening **109**, while shown in the Figures in a longitudinal configuration, along the length of assembly **100**, sealable opening **109** may be formed in alternative configurations, such as in a transverse direction, or as, for example, multiple Velcro straps arranged in a longitudinal arrangement.

[0045] FIGS. 7-9 illustrate a system or carrier **700** in accordance with another exemplary embodiment of the invention. Carrier **700** includes respective panels **120**, **122**, **124**, and **126**. In the illustrated embodiment, each panel includes one or more bladder cells, which may be inflated and deflated as desired. When inflated, the bladder cells work together to secure the interior contents, and additionally provide protection from an exterior impact. In an alternative embodiment, assembly **700** includes a single inflatable bladder within the panel rather than a number of bladder cells. The bladder cells may be formed integrally with carrier **700**, be inserted between an exterior surface and an interior lining of carrier **700**, or form an interior and exterior surface of carrier **700**. Carrier **700** may also include one or more exterior compartments, such as an expandable side pocket **196**, as desired.

[0046] As illustrated, carrier **700** includes wheels **136**, for example castor wheels, to allow the user to move the container more easily through airports or, if desired, on a playing surface such as a golf course. In the illustrated embodiment, carrier **700** also includes runners **150**, for example hard plastic runners, to further protect the contents, to facilitate sliding the container along a flat surface, and for additional structural support. One or more bag straps **128** may also be employed to securely hold the cargo within the container. In addition, container **700** may include a compartment **141** to receive an identification card, such as a business card.

[0047] Referring now to FIGS. 10, 11, and 13, respective panels each comprise an outer protective layer **170** and an inner inflatable layer **172**. A cargo region **180** is thus formed by a perimeter of protective layer **170** suitably connected to inner inflatable layer **172**. Inner inflatable layer **172** may comprise any suitable number of bladder sections (or cells) **116**, of any desired shape or geometry. In the illustrated embodiment, the cell sections are configured as parallel, elongated tubes, with each tube corresponding to a bladder section. As described below and returning to FIGS. 7-9, a fluid such as pressurized air is fed into an air inlet **132** at an air pump connector **140**. The air then flows through one or more bladder manifolds **142** to thereby distribute the pressurized fluid to the various bladder cells **116**. A plurality of check valves **134** permit controlled flow of air between the bladders/cells and the air manifold during inflation and deflation.

[0048] Outer layer **170**, if one is used, and inner layer **172** which may include bladder material or bladder material in combination with one or more additional layers, may comprise any suitable material, such as the materials described above in connection with material used to form assemblies **100** and **200**. Inner layer **172** may include areas of reinforced or additional material, such that further protection is incorporated to protect damage from items that have protuberances, which might otherwise puncture the bladder. For

example, inner layer 172 may include reinforced material 180 and 182 to deter or prevent such consequence. Material 180, 182 may be attached using, for example, rf or other type of welding or other form of adhesive.

[0049] Referring to FIG. 15, in accordance with an exemplary embodiment, pump 118, such as a dome pump, may be used to inflate and/or deflate the cells. Pump 118 and hose 119 are configured for releasable connection to air inlet 132 via air pump connector 140. When the user desires to deflate the inflatable layer, one or more air release valves 114 may be manipulated to release all of or a desired amount of fluid. In accordance with an aspect of this exemplary embodiment, an air pump connector 140 includes an inlet check valve 141.

[0050] In accordance with another aspect of the invention, carrier 700 includes one or more exterior compartments. For example, FIGS. 7, 12 and 14 illustrate an assembly including an expandable side pocket 196. Each side pocket 196 may be used in a conventional format, or, in an alternative exemplary embodiment, may itself comprise another inflatable liner to store smaller delicate items.

[0051] In accordance with another aspect, certain assemblies and carriers of the invention may be configured and directed towards a particular endeavor. For example, while an exemplary embodiment has been herein described directed towards golf items, it should be appreciated by those skilled in the art that other configurations are contemplated. For example, with reference to FIG. 17, one exemplary assembly 1700 comprises a configuration directed towards accommodating various ski or snowboard items.

[0052] Assembly 1700 includes a main body section 1702, a hood section 1704, and a boot section 1706, which securely encase an interior cargo when bladder cells 1716 are inflated with a fluid. For example, interior cargo, such as a set skis or a snowboard is protected when bladder cells 1716 are inflated. As illustrated, assembly 1700 may additionally include a strap 1728, and additional protective material 1782 attached an interior and/or exterior portion of the assembly. Although not illustrated, assembly 1700 may also include wheels and runners as described above.

[0053] Similar to assemblies 100 and 200, assembly 1700 may be inserted into an existing hard or soft bag and/or hard casing. Further, although illustrated with three sections 1702, 1704, and 1706, assembly 1700 may alternatively be configured in one section, which is sealed at opposing ends.

[0054] The present invention can also be used with, for example, smaller items such as an mp3 player, a cell phone, a computer, DVD/CD player, television, and the like. FIG. 1800 illustrates an assembly 1800 for use with an mp3 player. Assembly 1800 includes inflatable cells 1816 and a handle 1828.

[0055] In accordance with another exemplary embodiment of the present invention, an assembly 1900 is configured to accommodate a number of delicate items. For example, travelers on or returning from a vacation may be transporting or have acquired a number of fragile items, such as, bottles of liquor, figurines, cosmetics, fragrances, and other delicate items that they wish to safely transport. As such, an exemplary embodiment of assembly 1900 includes several selectively inflatable pouches or compartments in which the items are placed. In this sense, each item is individually protected.

[0056] Exemplary traveler's bag 1900 includes a tote strap 1912, a closure mechanism 1908, and support elements 1910. Traveler's bag 1900 comprises several compartments 1920 for transporting and storing various items, such as those described above. In one aspect the bag comprises a single cell bladder that inflates to surround all of the internal compartments, but it should be appreciated by those skilled in the art that each individual compartment comprises its own inflatable cell (illustrated as cell 1916).

[0057] In accordance with yet another embodiment of the invention, a travel assembly includes multiple, separated cells, which are inflated to protect items. In this case, the travel assembly may be placed inside existing luggage and/or used as a stand-alone piece of luggage. The travel assemblies described herein may be formed of the same materials described above in connection with assemblies 100 and 200.

[0058] The present invention has been described above with reference to various exemplary embodiments. Those skilled in the art will recognize that changes and modifications may be made to the exemplary embodiments without departing from the scope of the present invention. For example, the inflatable liner, container, and bags and methods described herein may be used with various transporting and storage devices. These alternatives can be suitably selected depending upon the particular application or in consideration of any number of factors associated with the operation of the assembly, carrier, or bag. These and other changes or modifications are intended to be included within the scope of the present invention.

We claim:

1. A golf bag assembly comprising:
  - a plurality of inflatable cells for encasing shafts and heads of golf clubs;
  - a sealable opening, formed between at least two of the plurality of inflatable cells, to provide access to the golf clubs; and
  - a fluid input valve coupled to at least one of the plurality of inflatable cells to allow cushioning fluid into one or more of the inflatable cells.
2. The golf bag assembly of claim 1, wherein the plurality of inflatable cells forms an integral part of a container.
3. The golf bag assembly of claim 2 wherein the container is a soft-shell golf bag.
4. The golf bag assembly of claim 1, further comprising a protective surface proximate the plurality of inflatable cells.
5. The golf bag assembly of claim 4, wherein the protective surface is a golf bag.
6. The golf bag assembly of claim 4, wherein the protective surface is welded to a surface of at least a portion of the plurality of inflatable cells.
7. The golf bag assembly of claim 1, wherein the sealable opening comprises at least one of a, zipper, Velcro, buttons, and snaps.
8. The golf bag assembly of claim 1, further comprising a pump to introduce the cushioning fluid into the plurality of inflatable cells.
9. The golf bag assembly of claim 1, further comprising a check valve between two of the plurality of inflatable cells.

**10.** An assembly for protecting items, the assembly comprising

an inflatable cell formed of polyurethane material;

a sealable opening to provide access to an inner cargo area; and

a fluid input valve to allow cushioning fluid into the inflatable inner layer.

**11.** The assembly of claim 10, wherein the inner cargo region is configured to accommodate a bag of golf clubs.

**12.** The assembly of claim 10, wherein the inner cargo region is configured to accommodate a set of skis.

**13.** The assembly of claim 10, wherein the inner cargo region is configured to accommodate a snowboard.

**14.** The assembly of claim 10, wherein the inner cargo region is configured to accommodate an electronic device.

**15.** The assembly of claim 10, wherein the inner cargo region is configured to accommodate a wine bottle.

**16.** The assembly of claim 10, wherein the polyurethane material has a thickness of about 5 to about 120 mils.

**17.** The assembly of claim 10, further comprising a protective material adjacent the cell.

**18.** The assembly of claim 10, wherein the protective material is welded to a surface of the cell.

**19.** A method for protecting an item during storage and transport comprising:

placing the item in an inner cargo area defined by an interior portion of an inflatable cell;

sealing an opening that provides access to the inner cargo area; and

introducing a cushioning fluid into the inflatable inner layer.

\* \* \* \* \*