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(54) **COLLAPSIBLE TRANSPORT CONTAINER**

ZUSAMMENKLAPPBARER TRANSPORTBEHÄLTER

RECIPIENT DE TRANSPORT PLIABLE

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Description

[0001] The present invention relates to a transport container for use in safely transporting products.

[0002] Transported products generally need to be protected from physical shocks and damage, and therefore there is a general need for transport containers which provide impact resistance to the products they contain.

[0003] Some products are temperature sensitive and hence may require either being kept cool or being protected from chilling during transit. Examples of products that need to be kept cool whilst being transported from place to place, for example by postal or courier services (particularly from a manufacturer or distributor to a consumer), include frozen food products, pharmaceutical and biochemical products (including diagnostic agents), and organs for transplantation. Examples of products that, by contrast, need instead to be protected from chilling during transport (particularly, for example, from freezing as part of air cargo), include heated foodstuffs and further pharmaceutical products, as well as blood products. Both types of goods conventionally have been transported in thermally insulated, rigid containers such as boxes fabricated of polystyrene foam. However, polystyrene boxes can be fragile and are expensive to manufacture, as well as being space-inefficient.

[0004] As an alternative, the applicant's co-pending International Patent Application No. PCT/GB99/02225 (published as WO 00/03931) describes an improved transport container that comprises an insulating block and a plurality of layers of flexible insulating foam material forming sides of the container. The plurality of layers are mounted on the block, which closes one end of the container, and an outer envelope is also provided to apply pressure around the exterior of the sides and the block. Although, such a container can be made of materials that can be recycled, and is therefore more environmentally friendly as compared to polystyrene boxes, disadvantageously this prior container is still bulky and thus difficult to store when not being used to transport products,

[0005] French Patent Application No. 7808251 (published as FR-A-2419884) discloses a rigid container comprising sides having at least two layers of sheets of plastic material laminated with metal, which provide thermo-insulation of any contents. However, because the sheets are metalised, the container cannot be collapsed and remains in a bulky, non-collapse state even when no contents are held.

[0006] NL 83368 C discloses a transport container, comprising a liner which is collapsible, in a direction transecting a "vertical axis" of the container, such that the container is configurable between states that are non-collapsed and at least partially collapsed. The preamble of claim 1 is based on this disclosure.

[0007] It is an aim of the present invention to provide a transport container that is both compact to store when empty, that may be composed of materials that can be recyded, and whose components are also easy to manufacture and to construct.

[0008] It is a further aim that the container should preferably also provide a space efficient outer shape when full of transportable products, so that the number of containers that can be transported per given transit space may be maximised.

[0009] Thus, in a first aspect, the present invention provides a transport container, comprising a liner which is collapsible, in a direction transecting a "vertical axis" of the contalner, such that the container is configurable between states that are non-collapsed (for holding transportable contents therein) and at least partially collapsed (for compact storage when empty); characterized In that the collapsible liner is substantially rigid, and further characterized in that the container further comprises a plurality of layers of flexible material surrounding the liner.

[0010] By "vertical axis" is meant an axis extending through opposite ends of the liner, preferably at least one such end of the liner being open or openable to allow a transported product to be inserted Into, and removed from, the transport container. Preferably the (or each) open or openable end of the liner is closable by means of a respective substantially rigid plug (described below). The use of the term "vertical" is not intended necessarlly to denote any particular orientation with respect to gravity, although the transport container will usually be oriented with the "vertical axis" of the liner in a substantially vertical orientation with respect to gravity in order to allow the insertion and/or removal of a product into and out of the transport container conveniently.

[0011] The flexible material preferably is impact resistant. Additional or alternatively the flexible material may be resiliently compressible. In some embodiments of the invention the flexible material may be elastic.

[0012] Advantageously, the flexible material may be thermally insulating,

[0013] Preferably the transport container includes one or more substantially rigid plug(s) for insertion inside the liner when the container is in its non-collapsed state.

[0014] The invention preferably provides a transport container comprising a substantially rigid liner, a plurality of layers of flexible material surrounding said liner, and one or more substantially rigid plug(s) inserted inside the liner to retain the liner in a non-collapsed configuration (for holding transportable contents therein), wherein the, or each, plug is removable from the liner and when so removed the liner Is collapsible, in a direction transecting a vertical axis of the container, such that the container is configurable between its non-collapsed state and an at least partially collapsed state (for compact storage when empty).

[0015] The liner provides a means for altering the shape of the container between collapsed and non-collapsed conjurations, whereas the surrounding flexible material provides the container with appropriate additional structural integrity (In combination with the liner) and preferably also thermally and/or physically protective insulation properties. Goods can be stored safely Inside

the non-collapsed liner, which Is kept in such a configuration by means of the one or more plug(s), once the latter have been inserted.

[0016] The transport container of the present invention is constructed such that it can be collapsed into a space saving, flattened configuration when empty, and hence can be easily stored and moved prior to, or after, holding any transportable contents. Moreover, the collapsible container of the present invention is preferably constructed of materials that can be re-cycled and thus are ecologically friendly.

[0017] To keep a product as cold as possible during transit, the pre-chilled product may be placed inside the non-collapsed container together with a desired quantity of "dry Ice" in granulated, sliced or chunk form, However, If the product is only required to be kept moderately cool (but not frozen) or Indeed warm, Instead of surrounding the product with "dry ice", a separate sealed bag containing a refrigerant, or warmed liquid respectively, can be placed inside the container together with the product.

[0018] The flexible material comprises a plurality of layers of the flexible material, and this generally has the advantage of increasing its thermal and/or physical Insulation properties. Advantageously the flexible material may comprise one or more sheets or loops wound around the liner one or more times, thereby providing a plurality of layers of flexible material. The flexible material preferably comprises a polymeric foam material e.g, polyethylene foam.

[0019] Before and after the container has been used for transporting the goods, the plug(s) can be removed, as mentioned above, so allowing the container to be flattened by an operator into Its space saving, collapsed configuration. In this way, multiple flattened containers can be stored or transported without taking up substantial room.

[0020] A second aspect of the invention provides a method of constructing a transport container according to the first aspect of the invention, the method comprising either:

(a) winding a plurality of layers of the flexible material around the outside of the liner; or
(b) winding a plurality of layers of the flexible material around a mandrel or the like and subsequently inserting the liner inside the innermost layer of the wound flexible material.

[0021] In some embodiments of the method according to the invention, the liner and the flexible material may have greater an the required vertical length for a single transport container, and the method may include the step of cutting the assembled liner and flexible material into a plurality of assembled liners and associated flexible material, thereby to form a plurality of transport containers therefrom.

[0022] Preferably the method also includes the step of inserting at least one of said plug(s) inside the liner to maintain the non-collapsed state of the container.

[0023] The transport container according to the invention preferably further comprises an envelope surrounding the exterior of the flexible material.

[0024] The method according to the second aspect of the invention preferably further comprises the step of surrounding the exterior of the flexible material with an envelope.

[0025] The envelope is preferably a pressure envelope which provides compression to the flexible material and/or the liner, at least when the liner is In its non-collapsed configuration.

[0026] Advantageously, the envelope may be shrunk around the flexible material, preferably by heat-shrinkage, e.g. by means of a hot air gun- Preferably the envelope is bonded to at least part of the exterior of the flexible material, for example by means of shrinkage, especially heat-shrinkage, of the envelope.

[0027] Preferably the method according to the second aspect of the invention Includes the following additional steps:

(c) bonding (for example by heat-shrinking) at least part of an envelope around the outside of the plurality of layers of the flexible material, preferably with the liner in its collapsed state;
(d) ensuring that the liner Is in its han-collapead state;
(e) inserting at least one of said plug(s) inside the liner to maintain the non-collapsed state of the container, and preferably:
(f) bonding (for example by heat-shrinking) at least another part of the envelope to at least one of said plug(p).

[0028] Thus, in one embodiment, the fully constructed container has an optional envelope, when present, that is preferably bonded (In separate stages) to both the outermost of the plurality of layers of the flexible material and to the one or more plug(s). In this way, such a container provides a simple and effective way of very securely sealing the contents inside, since the envelope's pressure increases the tensioning of the container walls. Further, sealing the container involves no use of tapes and so forth that can become unstuck and that are often tricky to apply or re-apply.

[0029] Furthermore, by sealing a complete outer envelope around such a container, the latter is provided with a tamper evident security feature which can easily be monitored.

[0030] In some preferred embodiments of all aspects of the invention, the flexible material, the liner, and the, or each, plug, (and preferably also the envelope) may be contained within a box, for example a box in the form of a carton. The box is preferably collapsible, and preferably the collapsed liner and flexible means (preferably also with one or more plug(s)) may be supplied together with the collapsed box. When the liner is put into Its non-collapsed configuration, and the (or each) plug is inserted

into the liner, the assembled liner, flexible materiel and inserted plug(s) (preferably all enclosed within an envelope) preferably are placed within the assembled box. The box therefore provides additional structural integrity and protection to the remainder of the transport container, and therefore provides additional protection to the product(s) contained therein. The box (e.g. a carton) is preferably made from cardboard, especially reinforced cardboard (e.g. corrugated cardboard).

[0031] Additional (and non-exhaustive), preferred features of the present invention are referred to in the attached subsidiary claims.

[0032] The present invention will now be described in greater detail by reference to the following non-limiting example as illustrated in the accompanying drawings, in which:

Figures 1A and 1 B show two perspective views of a liner of a container according to one embodiment of the present invention;

Figure 2A depicts a perspective view of the liner of Figures 1A and 1B after construction and in a collapsed configuration;

Figure 2B illustrates a plan view of the liner of Figure 2A;

Figures 2C and 2E show perspective views of the collapsed liner of Figure 2A together with a surrounding plurality of layers of flexible insulating material and with a further envelope, respectively;

Figures 2D and 2F illustrate plan views of the containers shown in Figures 2C and 2E respectively;

Figure 3A shows the collapsed container of Figure 2E;

Figures 3B and 3C show the container of Figure 3A in a non-collapsed configuration with top and bottom end plugs in unattached and in attached positions respectively;

Figure 4A illustrates the container of Figure 3C with the envelope fully sealed around the container;

Figure 4B depicts a plan view of Figure 4A along line C-C';

Figure 4C illustrates an enlarged, cross-sectional view of the container of Figure 4A in the direction of B-B';

Figure 5A shows an alternative arrangement of the liner and a wound plurality of layers;

Figure 5B depicts the container shown in Figure 5A being capped at both ends by plugs having slits for engagement with the liner; and

Figure 6 depicts an alternative embodiment of liner.

[0033] A collapsible transport container is shown in Figures 4A to C that has been fully constructed in its non-collapsed state and has been sealed, and thus is ready for transporting goods (not shown) previously placed within the cavity 1 of the container.

[0034] The container comprises a liner 2 that optionally has a rigidity substantially in a direction parallel to a vertical axis C-C' of the container. The container is collapsible, in a direction transecting this vertical axis, between a non-collapsed state, as shown in Figures 4A to C, and an at least partially collapsed state, as shown in Figures 2A to E and Figure 3A.

[0035] Flexible material 3 (which is preferably thermally insulating and/or impact resistant) surrounds the liner 2 so as to form sides of the container with two insulating plug(s) 4 inserted inside the liner 2 in its non-collapsed state. Alternatively, the liner 2 itself may be provided with flaps (not shown) at either end, which can be inserted instead of the plugs 4, and which can act as a lid and a base for the container. Such flaps may simply be unitary pieces of material or may be provided in a segmented form so as to form "crash-lock" ends to the container.

[0036] When flaps are present they may be kept in their inserted position by optional locking means, or may be retained simply by bonding the envelope 5 directly to them.

[0037] Further, a combination of plugs 4 and flaps may be employed, if desired.

[0038] Although containers can be constructed that are collapsible in directions that transect the vertical axis C-C' at various angles, the container shown in the Figures is collapsible in a direction that is perpendicular to the vertical axis.

[0039] The liner 2 is usually extruded in a flat form and then die stamped to shape (see Figure 1A). Cardboard liners 2 are then folded and their ends are glued together, whereas plastic ones are creased and the ends are then heat bonded (see Figure 1 B). If such a plastic liner 2 is made of a foam, it can be extruded with integral shallow mitred grooves 7 that allow the liner 2 to be easily folded rather than creased.

[0040] Preferred materials for a plastic liner 2 are blown, or solid, low-density polyethylene, polypropylene, nylons and so forth. The plugs 4 may be of similar materials, if desired, although are typically extruded in such a manner as to be more rigid than the walls of the liner 2. Further, the flexible material 3 may also be extruded from the same or similar types of blown plastics as mentioned above.

[0041] The material forming the walls of the liner 2 may optionally be corrugated and examples of such material include corrugated cardboard, corrugated plastic (such as Correx™ and Twinplast™) and so forth.

[0042] Typically, the corrugations of such material are fluted in a direction substantially parallel to the horizontal plane containing the line B-B' (see Figure 4A) of the container. This type of fluting provides the container with substantial rigidity, since in the non-collapsed position the corrugations tend to buckle somewhat. This pushes the corners of the liner 2 outwards, so increasing the tension in the sides of the container. In addition, the presence of the inserted rigid plug(s) 4 provides the container with extra lateral rigidity.

[0043] The container's overall rigidity is an important property that enables the transported goods to be insulated from physical shocks during transit. Vertical rigidity is predominantly provided by the rigidity of the walls of the liner 2.

[0044] Further, the air trapped within the flutes of the corrugations can also provide a degree of thermal insulation of the goods held within the container.

[0045] If desired, the corrugations may be fluted in a direction substantially parallel to the vertical plane containing the line C-C' (see Figure 4A again).

[0046] The transport container shown in Figures 4 A to C further comprises a heatshrunk envelope 5 that applies pressure around the exterior of the sides of the container, especially when the container is in its non-collapsed state. Thus, the envelope also contributes to providing the container's overall rigidity.

[0047] The flexible insulating material 3 comprises a plurality of layers, which optionally consist of at least one sheet of the material wound a plurality of times around itself. The air trapped within the layers can provide the container with increased properties of insulation. When the material 3 is in the form of a winding, the innermost and outermost edges are typically secured by heat bonding. However as the container changes its shape during opening or flattening, the layers of the winding can still move relative to one another. Thus, if the liner 2 is sufficiently opened and then re-flattened, the container may remain in its non-collapsed state despite the absence of any plug(s) 4. The plugs do, of course, need to be inserted if any contents are to be securely held inside the container.

[0048] As shown in Figure 2 E and Figures 3 A to C, the envelope 5 can comprise loose edges 6 that protrude away from the plurality of layers of flexible insulating material 3. Such loose edges 6 can be bonded (see Figure 4 C) to the plugs. Alternatively, the loose edges 6 can be bonded (not shown) to the edges of the plurality of layers of flexible insulating material 3.

[0049] Typically, as mentioned above, at least a portion of an outermost layer of the flexible insulating material 3 is bonded to an adjacent, inner layer of said flexible insulating material 3.

[0050] Preferably, the liner 2, the plurality of flexible layers, the plugs 4 and the envelope are made of a convenient thermoplastic such as a low-density polyethylene. Typically, the envelope 5 is heat-shrinkable for ease of sealing the container. It is particularly preferred for all components to be made of the same thermoplastic.

[0051] Although the plugs 4 shown in the Figures are used as container closure means, alternative plugs 4 can be used as content separator means for sub-dividing the cavity 1 into compartments. Dividing the container in this manner can also help give the container extra physical strength to protect any contents during transit.

[0052] The plugs 4 may be simple disks of material or, as illustrated in the Figures, may be cut into the form of blocks with an outer protruding ledge 8 for closing over the edge of the flexible insulating material 3. However, when relatively simple disks are used, they may be constructed to have slits 9 cut into one of their major surfaces (see Figure 3), so as to be adapted to receive the ends of the liner 2. In this way (see Figures 5A and B), such disks can be used to cap the latent openings at the ends of the liner 2, so as to form a base and lid of the container. This type of arrangement is particularly easy to assemble if the ends 10 of the liner 2 protrude outwards away from the flexible means 3, that is when the latter is shorter in the length than the liner 2.

[0053] Preferably, the walls of the liner form a tessellating shape when the liner is in its non-collapsed state. In this way, the outer shape of the fully constructed container filled with goods will allow multiple containers to be packed efficiently together without wasting space during transit.

[0054] The container can be assembled (either by its manufacturer or by a subsequent customer) from a kit comprising the following components: at least one of the liners 2, each being surrounded by an amount of flexible insulating material 3; at least one set of a couple of plugs 4; and at least one envelope 5.

[0055] The kit, and thus the transport container, can be easily constructed by way of the following method steps which define a procedure that is sequentially illustrated by the accompanying drawings in an order starting from Figure 2A and finishing at Figure 3C.

[0056] Firstly, a liner 2 is placed in its collapsed state (see Figures 2A and B) around a flat mandrel (not shown). Secondly, a plurality of layers of flexible insulation material 3 is wound around the outside of the liner 2 (see Figures 2C and D). If a relatively long mandrel is used, multiple container units may be produced at the same time.

[0057] Subsequently, the partially constructed container is removed from the flat mandrel and may be supplied in this flattened state. Thus, a manufacturer may supply such a product directly to a customer wishing to transport goods, in a kit form (as mentioned above) that further comprises the required separate plugs 4 and separate envelopes 5.

[0058] When a long mandrel is used the long, partial construction that is removed from the mandrel can be cut into separate container units, so that multiple container units can be simultaneously produced.

[0059] To assemble the kit, the customer can bond at least part of each envelope 5 around the outside of the

plurality of layers of each container with the liners 2 still in their collapsed state (as illustrated in Figures 2E and F and Figure 3A).

[0060] Then, after each liner 2 has been opened into its non-collapsed state, plugs 4 can be inserted at each end of the liners 2. This helps to maintain the non-collapsed state of the liner of each container, as shown in Figures 3B and C, and the goods can be placed inside the container. Finally, the loose protruding edges 6 of the envelope of each container can be bonded to both plugs 4, so as to seal the contents within the container.

[0061] Preferably, the bonding steps are achieved by heat shrinking, for example when the envelope 5 is also a thermoplastic material. Such an envelope 5 is typically formed as a mono-extrusion of low density polyethylene, polypropylene, nylon and so forth. When the container is subsequently opened into its non-collapsed configuration tension increases in the plurality of layers of flexible material 3 and the envelope 5. The increased tension provides the container with extra rigidity.

[0062] Although the Figures only show a four-sided liner 2, any number of liner walls can be employed. In this way, the container need not only be substantially rectangular, but can be generally any shape, including substantially polygonal shapes, as desired, when three or more walls are present.

[0063] Thus, a customer can purchase a kit that can be easily assembled into a transport container comprising components composed of a single, re-cyclable material. The assembled container can be efficiently and simply sealed, for example, by using only a single piece of bonding machinery such as a heat-shrinking device.

[0064] Advantageously, the resultant transport container is easy to store when it is empty, because it is at least partially collapsible and can therefore be flattened to a compact state. It may also have a space efficient outer shape in its non-collapsed state, so that the number of such containers that may be transported per given transit space can be maximised.

[0065] Figure 6 shows an alternative embodiment of liner 12 in which the collapsibility of the liner is provided by means of longitudinal folds 14 in a pair of opposing sides 16 of the liner, as indicated by the arrows.

Claims

1. A transport container, comprising a liner (2, 12) which is collapsible, in a direction transecting a "vertical axis" of the container, i.e. an axis extending through opposite ends of the liner, such that the container is configurable between states that are non-collapsed for holding transportable contents therein and at least partially collapsed for compact storage when empty, **characterized in that** the collapsible liner (2, 12) is substantially rigid, and further **characterized in that** the container further comprises a plurality of layers of flexible material (3) surrounding the liner (2, 12).

2. A container according to Claim 1 further comprising one or more substantially rigid plug(s) (4) for Insertion inside the liner (2, 12) when the container Is in its non-collapsed state,

3. A container according to claim 2, in which the, or each, plug (4) has been Inserted Inside the liner (2, 12) and the liner (2, 12) is in its non-collapsed state.

4. A container according to any preceding claim, in which the flexible material (3) is impact resistant and/or resiliently compressible.

5. A container according to any preceding claim, in which the flexible material (3) is elastic and/or thermally Insulating.

6. A container according to any preceding claim, in which the plurality of layers of flexible material (3) comprise one or more sheets or loops of the flexible material (3) wound around the liner (2, 12) one or more times.

7. A container according to any preceding, in which the flexible material (3) comprises a polymeric foam material, e.g. polyethylene foam.

8. A method of constructing a transport container according to any preceding claim, the method comprising either:

(a) winding a plurality of layers of the flexible material (3) around the outside of the liner (2, 12); or
(b) winding a plurality of layers of the flexible material (3) around a mandrel and subsequently inserting the liner (2, 12) inside the Innermost layer of the wound flexible material (3).

9. A method according to Claim 8 when dependent upon Claim 2 or any claim dependent thereon, further comprising the step of inserting at least one of said plug(s) (4) inside the liner (2, 12) to maintain the non-collapsed state of the container.

10. A method according to Claim 8 or Claim 9. in which the liner (2, 12) and the flexible material (3) have greater than the required vertical length for a single transport container, and the method includes the step of cutting the assembled liner (2, 12) and flexible material (3) into a plurality of assembled liners (2, 12) and associated flexible material (3), thereby to form a plurality of transport containers therefrom.

11. A method according to any one of claims 8 to 10, further comprising the step of surrounding the exte-

rior of the flexible material (3) with an envelope (5).

12. A container according to any one of claims 1 to 7, further comprising an envelope (5) surrounding the exterior of the flexible material (3).

13. A method or container according to claim 11 or claim 12, in which the envelope (5) is a pressure envelope (5) which provides compression to the flexible material (3) and/or the liner (2, 12), at least when the liner (2, 12) is In Its non-collapsed configuration.

14. A method or container according to Claim 13, in which the envelope (5) is shrunk around the flexible material (3), preferably by heat-shrinkage.

15. A method or container according to Claim 14, In which the envelope (5) is bonded to at least part of the exterior of the flexible material (3), preferably by means of said shrinkage of the envelope (5).

16. A method according to any one of claims 8 to 11, or 13 to 15, the method further comprising the following additional steps:

(c) bonding, for example by heat-shrinking, at least part of an envelope (5) around the outside of the plurellty of layers of the flexible material (3), preferably with the liner (2,12) In Its collapsed state;
(d) ensuring that the liner (2, 12) is in its non-collapsed state; and
(e) inserting at least one of said plug(s) (4) Inside the liner (2, 12) to maintain the non-collapsed state of the container.

17. A method according to Claim 16, further comprising the step of:

(f) bonding, for example by heat-shrinking, at least another part of the envelope (5) to at least one of said plug(s) (4).

18. A container or method according to any preceding claim, In which the container further comprises a box in which the rest of the container is contained or is containable.

19. A container or method according to Claim 18, in which the box Is collapsible.

20. A container according to Claim 2, or a container or method according to any preceding claim dependent on claim 2, in which the plug(s) (4) is/are formed from a polymeric foam material.

21. A container or method according to any one of claims 11 to 15, or any claim dependent thereon, in which the envelope (5) is formed from a thin flexible polymeric material.

Patentansprüche

1. Transportbehälter, der eine Auskleidung (2, 12) aufweist, die in einer Richtung zusammenfaltbar ist, die eine "vertikale Achse" des Behälters, d.h. eine Achse, die durch gegenüberliegende Enden der Auskleidung verläuft, durchschneidet, so dass der Behälter zwischen einem nicht zusammengefalteten Zustand zur Aufnahme von zu transportierendem Inhalt darin und einem wenigstens teilweise zusammengefalteten Zustand für eine kompakte Lagerung im Leerzustand konfiguriert werden kann, **dadurch gekennzeichnet, dass** die zusammenfaltbare Auskleidung (2, 12) im Wesentlichen starr ist, und ferner **dadurch gekennzeichnet, dass** der Behälter ferner eine Mehrzahl von Lagen aus flexiblem Material (3) aufweist, das die Auskleidung (2, 12) umgibt.

2. Behälter nach Anspruch 1, der ferner einen oder mehrere im Wesentlichen starre Stöpsel (4) zum Einsetzen in die Auskleidung (2, 12) umfasst, wenn sich der Behälter in seinem nicht zusammengefalteten Zustand befindet.

3. Behälter nach Anspruch 2, bei dem der oder jeder Stöpsel (4) in die Auskleidung (2, 12) eingesteckt wurde und die Auskleidung (2, 12) sich in ihrem nicht zusammengefalteten Zustand befindet.

4. Behälter nach einem der vorherigen Ansprüche, bei dem das flexible Material (3) stoßfest und/oder elastisch komprimierbar ist.

5. Behälter nach einem der vorherigen Ansprüche, bei dem das flexible Material (3) elastisch und/oder wärmeisolierend ist.

6. Behälter nach einem der vorherigen Ansprüche, bei dem die Mehrzahl von Lagen aus flexiblem Material (3) eine oder mehrere Folien oder Schleifen aus dem flexiblen Material (3) umfasst, das um die Auskleidung (2, 12) ein oder mehrere Male gewickelt wurde.

7. Behälter nach einem der vorherigen Ansprüche, bei dem das flexible Material (3) ein polymeres Schaumstoffmaterial wie z.B. Polyethylenschaumstoff umfasst.

8. Verfahren zum Konstruieren eines Transportbehälters nach einem der vorherigen Ansprüche, wobei das Verfahren einen der folgenden Schritte umfasst:

(a) Wickeln einer Mehrzahl von Lagen des flexiblen Materials (3) um die Außenseite der Aus-

kleidung (2, 12); oder
(b) Wickeln einer Mehrzahl von Lagen des flexiblen Materials (3) um einen Dorn und anschließend Einführen der Auskleidung (2, 12) in die innerste Lage des gewikkelten flexiblen Materials (3).

9. Verfahren nach Anspruch 8 in Abhängigkeit von Anspruch 2 oder einem der davon abhängigen Ansprüche, das ferner den Schritt des Einführens von wenigstens einem der genannten Stöpsel (4) in die Auskleidung (2, 12) umfasst, um den Behälter in seinem nicht zusammengefalteten Zustand zu halten.

10. Verfahren nach Anspruch 8 oder Anspruch 9, bei dem die Auskleidung (2, 12) und das flexible Material (3) eine größere als die benötigte vertikale Länge für einen einzelnen Transportbehälter haben und das Verfahren den Schritt des Schneidens der zusammengefügten Auskleidung (2, 12) und des flexiblen Materials (3) zu einer Mehrzahl von zusammengefügten Auskleidungen (2, 12) und zugehörigem flexiblem Material (3) beinhaltet, um so eine Mehrzahl von Transportbehältern zu bilden.

11. Verfahren nach einem der Ansprüche 8 bis 10, das ferner den Schritt des Umgebens der Außenseite des flexiblen Materials (3) mit einer Umhüllung (5) umfasst.

12. Behälter nach einem der Ansprüche 1 bis 7, der ferner eine Umhüllung (5) um die Außenseite des flexiblen Materials (3) umfasst.

13. Verfahren oder Behälter nach Anspruch 11 oder Anspruch 12, wobei die Umhüllung (5) eine Druckhülle (5) ist, die das flexible Material (3) und/oder die Auskleidung (2, 12) wenigstens dann komprimiert, wenn die Auskleidung (2, 12) in ihrer nicht zusammengefalteten Konfiguration ist.

14. Verfahren oder Behälter nach Anspruch 13, wobei die Umhüllung (5) um das flexible Material (3) geschrumpft wird, vorzugsweise durch Wärmeschrumpfen.

15. Verfahren oder Behälter nach Anspruch 14, wobei die Umhüllung (5) auf wenigstens einen Teil der Außenseite des flexiblen Materials (3), vorzugsweise durch das genannte Aufschrumpfen der Umhüllung (5) gebondet wird.

16. Verfahren nach einem der Ansprüche 8 bis 11 oder 13 bis 15, wobei das Verfahren die folgenden zusätzlichen Schritte umfasst:

(c) Bonden, z.B. durch Wärmeschrumpfen, von wenigstens einem Teil einer Umhüllung (5) um die Außenseite der Mehrzahl von Lagen aus dem flexiblen Material (3), vorzugsweise mit der Auskleidung (2, 12) in ihrem zusammengefalteten Zustand;
(d) Gewährleisten, dass die Auskleidung (2, 12) in ihrem nicht zusammengefalteten Zustand ist; und
(e) Einführen von wenigstens einem der genannten Stöpsel (4) in die Auskleidung (2, 12), um den Behälter in seinem nicht zusammengefalteten Zustand zu halten.

17. Verfahren nach Anspruch 16, das ferner den folgenden Schritt umfasst:

(f) Bonden, z.B. durch Wärmeschrumpfen, von wenigstens einem weiteren Teil der Umhüllung (5) auf wenigstens einen der genannten Stöpsel (4).

18. Behälter oder Verfahren nach einem der vorherigen Ansprüche, wobei der Behälter ferner einen Kasten umfasst, in dem der Rest des Behälters enthalten ist oder aufgenommen werden kann.

19. Behälter oder Verfahren nach Anspruch 18, wobei der Kasten zusammenfaltbar ist.

20. Behälter nach Anspruch 2 oder Behälter oder Verfahren nach einem der vorherigen Ansprüche in Abhängigkeit von Anspruch 2, wobei der/die Stöpsel (4) aus einem polymeren Schaumstoffmaterial geformt ist/sind.

21. Behälter oder Verfahren nach einem der Ansprüche 11 bis 15 oder einem davon abhängigen Anspruch, wobei die Umhüllung (5) aus einem dünnen, flexiblen polymeren Material gebildet ist.

Revendications

1. Récipient de transport, comprenant une doublure (2, 12) repliable, dans une direction qui coupe un « axe vertical » du récipient, c'est à dire un axe qui se prolonge à travers des extrémités opposées de cette doublure, de sorte que le récipient peut être configuré entre un état non replié pour recevoir des contenus transportables et un état au moins partiellement replié pour assurer un rangement compact des récipients vides, **caractérisé en ce que** la doublure repliable (2, 12) est sensiblement rigide, et **caractérisé de plus en ce que** le récipient comprend en outre une pluralité de couches de matériau flexible (3) qui entoure la doublure (2, 12).

2. Récipient selon la revendication 1, qui comprend de plus un ou plusieurs obturateurs sensiblement rigi-

des (4), pour une introduction dans la doublure (2, 12) lorsque le récipient est en son état non replié.

3. Récipient selon la revendication 2, dans lequel l'obturateur ou chaque obturateur (4) a été introduit dans la doublure (2, 12), et cette doublure (2, 12) est en son état non replié.

4. Récipient selon l'une quelconque des revendications précédentes, dans lequel le matériau flexible (3) résiste aux chocs et/ou reprend sa forme initiale après compression.

5. Récipient selon l'une quelconque des revendications précédentes, dans lequel le matériau flexible (3) est élastique et/ou calorifuge.

6. Récipient selon l'une quelconque des revendications précédentes, dans lequel la pluralité de couches de matériau flexible (3) comprend une ou plusieurs nappes ou spires du matériau flexible (3) enroulées une ou plusieurs fois autour de la doublure (2, 12).

7. Récipient selon l'une quelconque des revendications précédentes, dans lequel le matériau flexible (3) comprend un matériau en mousse polymérique, mousse de polyéthylène par exemple.

8. Procédé de construction d'un récipient de transport selon l'une quelconque des revendications précédentes, le procédé comprenant :

(a) soit l'enroulement d'une pluralité de couches du matériau flexible (3) autour de l'extérieur de la doublure (2, 12),
(b) soit l'enroulement d'une pluralité de couches du matériau flexible (3) autour d'un mandrin, et l'introduction ultérieure de la doublure (2, 12) dans la couche la plus centrale du matériau flexible enroulé.

9. Procédé selon la revendication 8 lorsque dépendante de la revendication 2 ou de toutes revendications ainsi dépendantes, qui comprend de plus l'étape d'introduction d'au moins un desdits obturateurs (4) dans la doublure (2, 12) de sorte à empêcher le récipient de se replier.

10. Procédé selon la revendication 8 ou la revendication 9, selon lequel la doublure (2, 12) et le matériau flexible (3) ont une longueur verticale plus que suffisante pour un récipient de transport unique, et le procédé comprend l'étape consistant à couper la doublure (2, 12) et le matériau flexible (3) assemblés en une pluralité de doublures (2, 12) assemblées avec le matériau flexible (3) associé pour former, à partir de ceux-ci, une pluralité de récipients de transport.

11. Procédé selon l'une quelconque des revendications 8 à 10, qui comprend de plus l'étape consistant à entourer l'extérieur du matériau flexible (3) avec une enveloppe (5).

12. Récipient selon l'une quelconque des revendications 1 à 7, qui comprend de plus une enveloppe (5) qui entoure l'extérieur du matériau flexible (3).

13. Procédé ou récipient selon la revendication 11 ou la revendication 12, suivant ou dans lequel l'enveloppe (5) est une enveloppe à pression (5) qui assure la compression du matériau flexible (3) et/ou de la doublure (2, 12), au moins quand la doublure (2, 12) est en sa configuration non repliée.

14. Procédé ou récipient selon la revendication 13, suivant ou dans lequel l'enveloppe (5) est rétractée autour du matériau flexible (3), préférentiellement par thermorétrécissement.

15. Procédé ou récipient selon la revendication 14, suivant ou dans lequel l'enveloppe (5) est collée à une partie au moins de l'extérieur du matériau flexible (3), préférentiellement par ledit rétrécissement de l'enveloppe (5).

16. Procédé selon l'une quelconque des revendications 8 à 11, ou 13 à 15, qui comprend de plus les étapes supplémentaires suivantes consistant à :

(c) coller, par thermorétrécissement par exemple, une partie au moins d'une enveloppe (5) autour de l'extérieur de la pluralité de couches du matériau flexible (3), préférentiellement lorsque la doublure (2, 12) est en son état replié ;
(d) s'assurer que la doublure (2, 12) est en son état non replié, et
(e) introduire au moins un desdits obturateurs (4) dans la doublure (2, 12) pour empêcher le récipient de se replier.

17. Procédé selon la revendication 16, qui comprend de plus l'étape consistant à :

(f) coller, par thermorétrécissement par exemple, au moins une autre partie de l'enveloppe (5) sur au moins un desdits obturateurs (4).

18. Récipient ou procédé selon l'une quelconque des revendications précédentes, dans ou suivant lequel le récipient comprend de plus une boîte dans laquelle le reste du récipient est contenu ou peut être contenu.

19. Récipient ou procédé selon la revendication 18 dans ou suivant lequel la boîte est repliable.

20. Récipient selon la revendication 2, ou récipient ou procédé selon l'une quelconque des revendications précédentes dépendantes de la revendication 2, dans ou suivant lequel l'obturateur (4) ou chaque obturateur (4) est formé en une mousse polymérique.

21. Récipient ou procédé selon l'une quelconque des revendications 11 à 15, ou toute autre revendication dépendante de celles-ci, dans ou suivant lequel l'enveloppe (5) est formée à partir d'une matière polymérique flexible en couche mince.

Fig. 1B

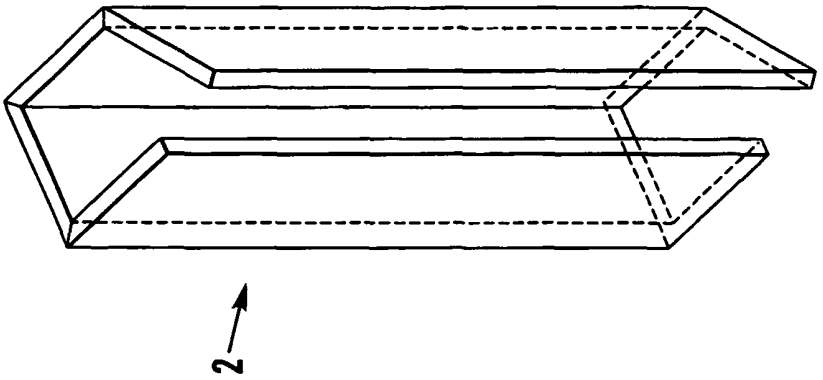
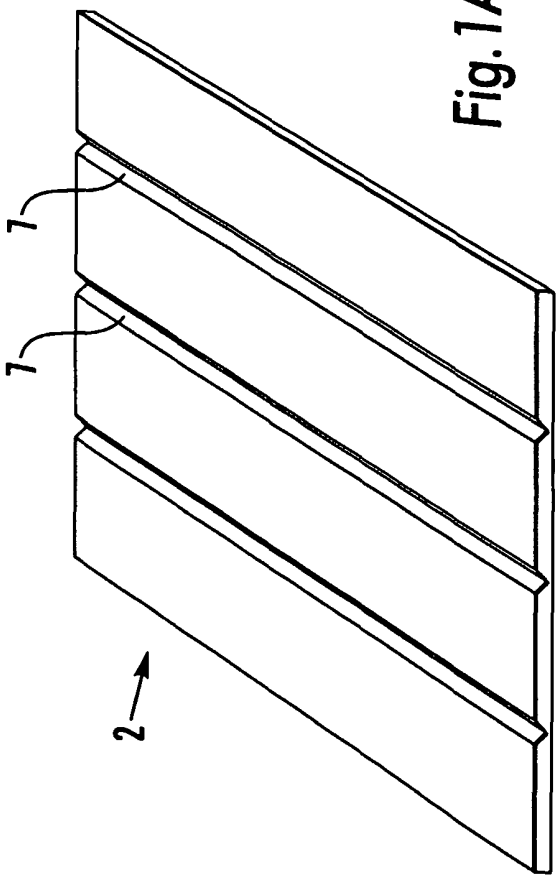


Fig. 1A



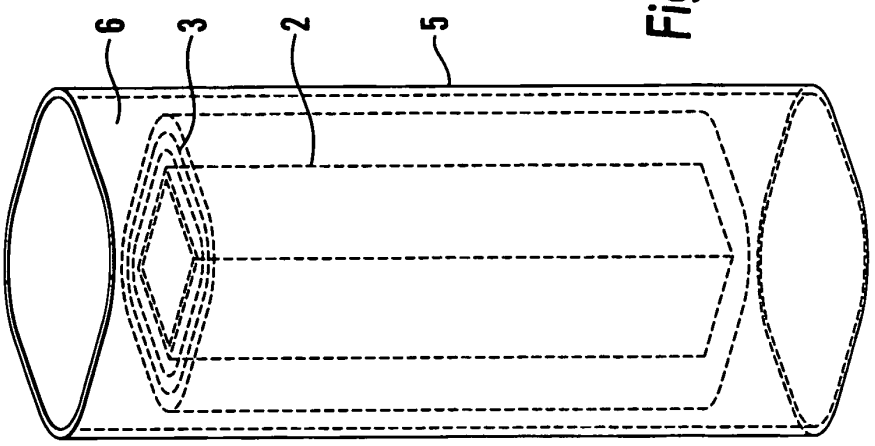


Fig.2E

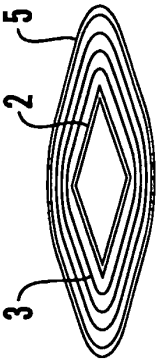


Fig.2F

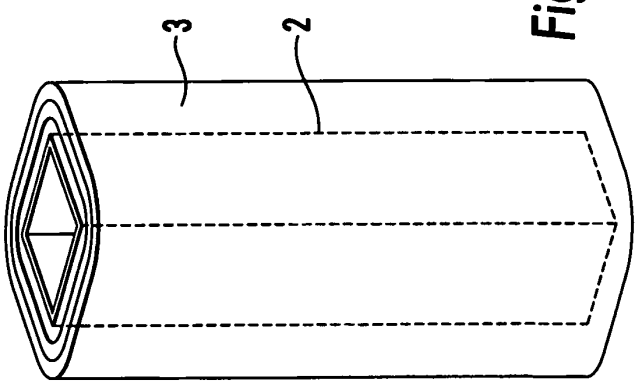


Fig.2C

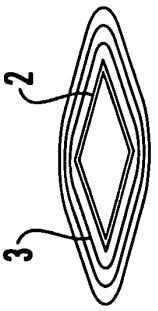


Fig.2D

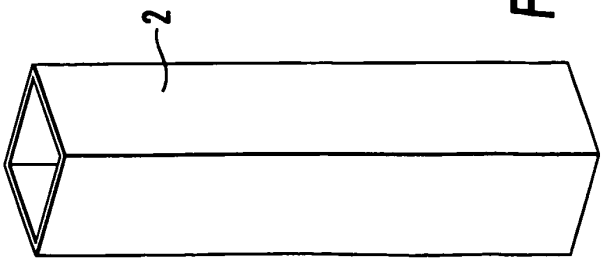


Fig.2A

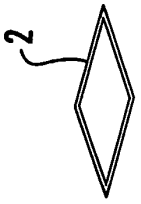


Fig.2B

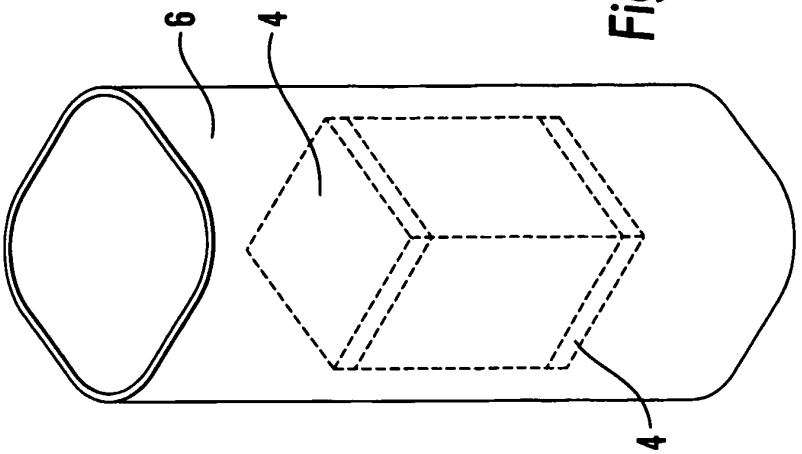


Fig.3C

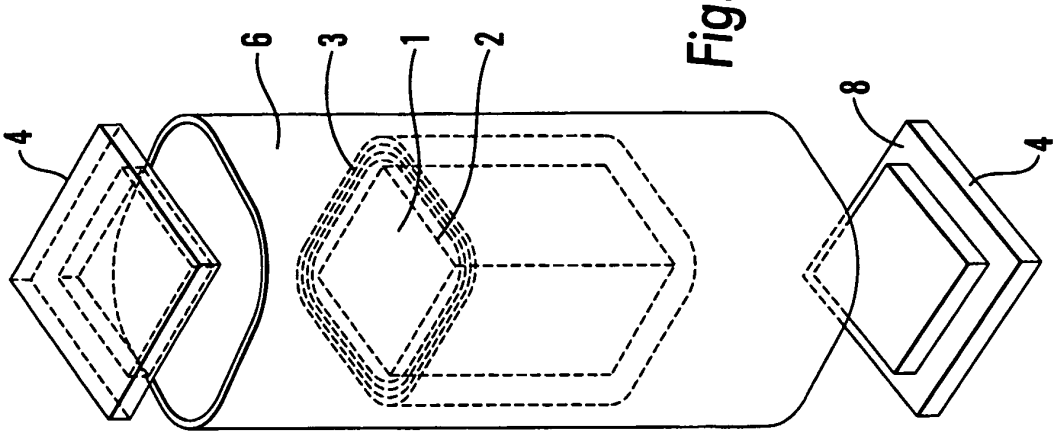


Fig.3B

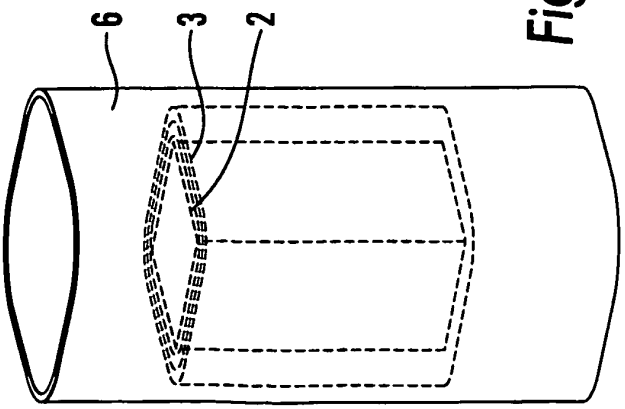


Fig.3A

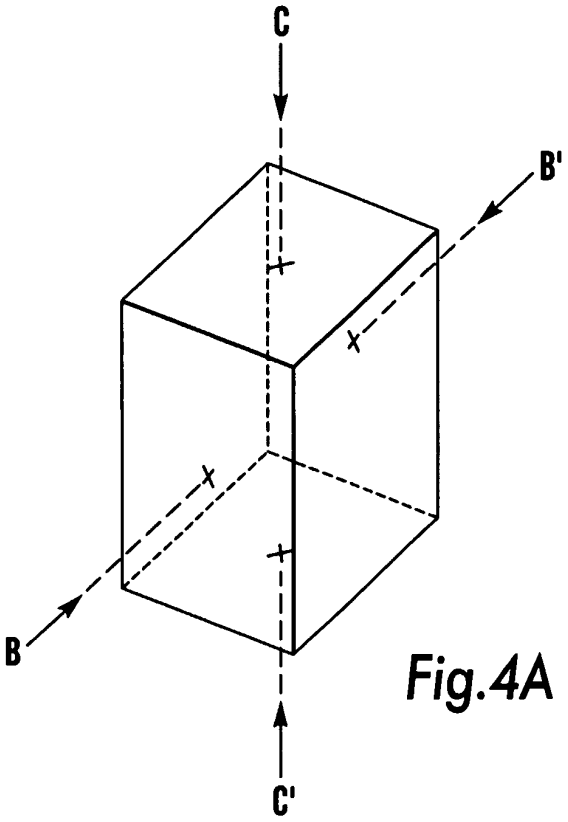


Fig.4A

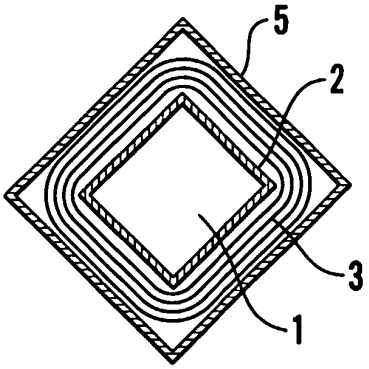


Fig.4B

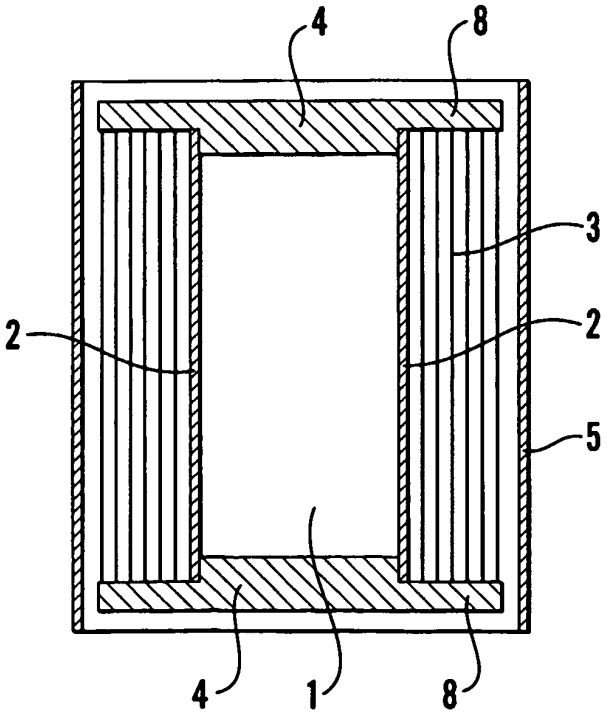


Fig.4C

Fig.5B

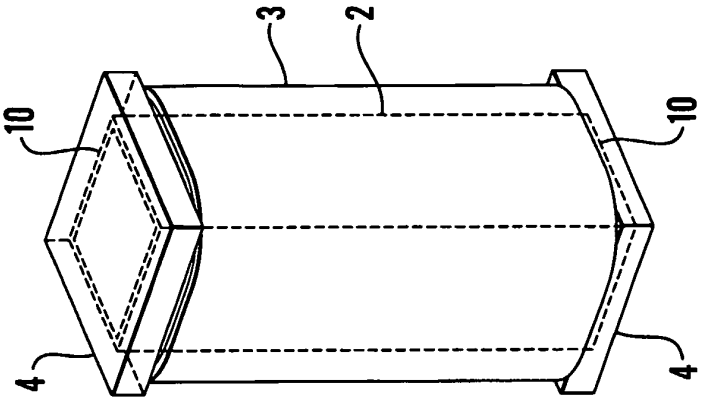
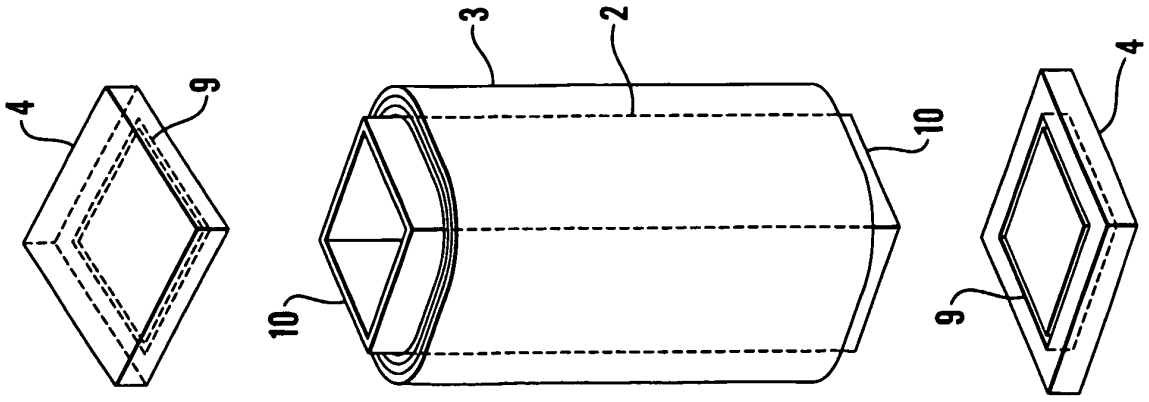


Fig.5A



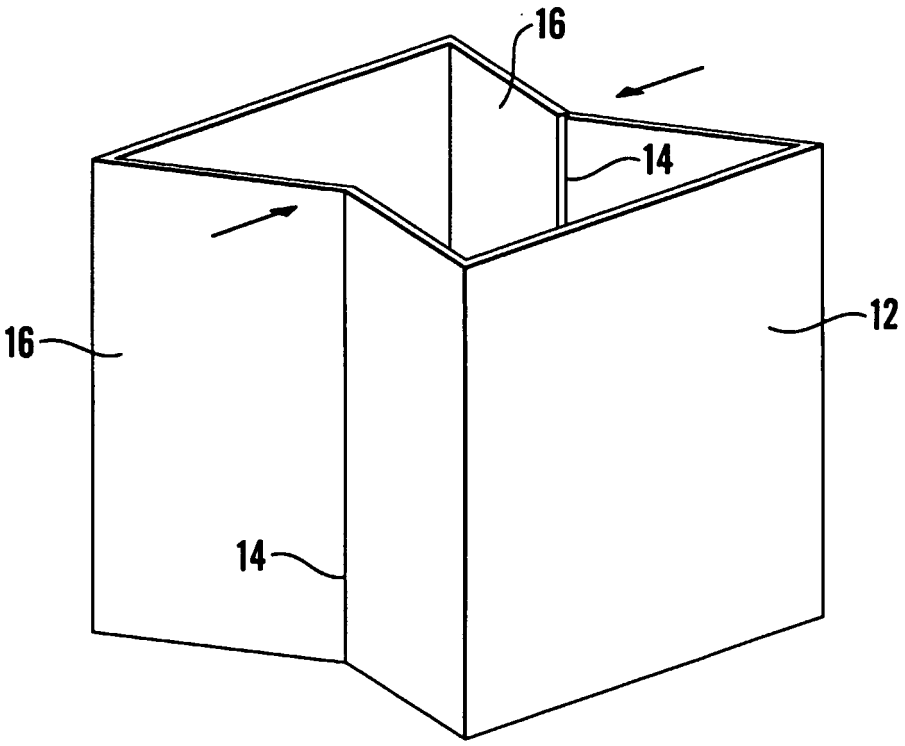


Fig.6