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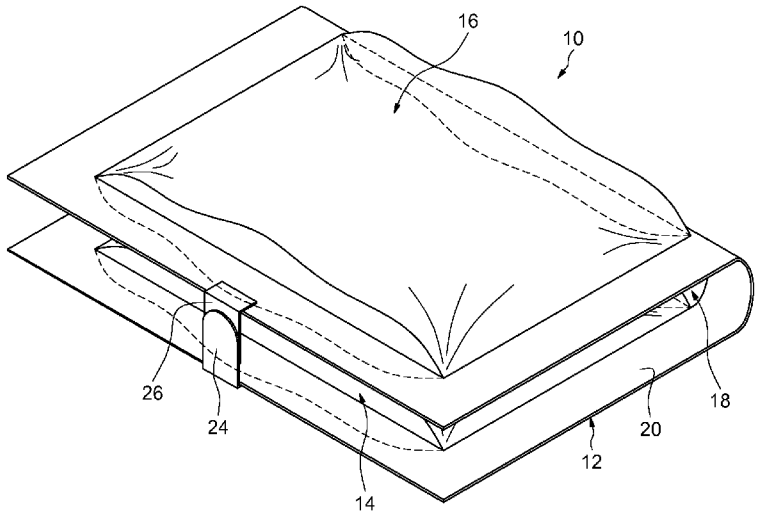
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[Continued on next page]

(54) Title: MULTIPLE-COMPARTMENT CONTAINER WITH FRANGIBLE SEAL

(57) Abstract: The multiple-compartment container comprises at least one first compartment 14 containing at least one first product,at least one second compartment 16 containing at least one second product, and at least one frangible seal 18 to separate said first and second compartments from one another so that the first and second products are prevented from mixing before said frangible seal is ruptured. The container is arranged in a folded state about at least a part of said frangible seal18in which one of the said first and second compartments 14, 16 overlies at least a part of the other compartment.

FIG.1



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Multiple-compartment container with frangible seal

The present invention relates to a multiple-compartment container for packaging products that must be kept separated during transport and storage and that are mixed within the container only when used.

One advantageous application of the invention is the use of the multiple-compartment container for packaging cosmetic products, such as cosmetic products for dyeing human keratin fibers. Other advantageous applications of the invention may be the use of the multiple-compartment container to store care products, adhesive products, polymer coatings, flavored liquids, etc.

In one type of multiple-compartment container, a hollow tube has a fold seal that divides it into two compartments separated from one another to prevent contact between the housed products. Such seal is formed by folding the compartments to face each other. For example, such a container is disclosed in patent US 3, 478, 871.

However, with such container, only a deformation of the hollow tube, and not a fused bond, is foreseen to separate the products of the two compartments. A design with such a fold seal would lead to accidental mixing of the housed products within the hollow tube.

In another type of multiple-compartment container, a closed envelope is divided in two distinct compartments separated from one another by a frangible seal to prevent contact between the housed products until there is a need to intermix. To this end, the frangible seal can be ruptured by exerting a manual pressure to the envelope.

As soon as the frangible seal is broken, the products formerly present in the first and second compartments can be blended and caused to form a single homogeneous mixture contained within the closed envelope. For more details, it is possible for example to refer to the patent applications US 2004/0118710, US 2004/0247813 and US 2011/0132782.

Such a frangible seal has sufficient strength to not be ruptured or compromised until a predetermined amount of pressure is applied to the container. A "compromised seal" should be understood as a seal which allows a communication between the housed products.

However, the multiple-compartment container must be designed such that the required breaking force pressure to apply is limited. As a matter of fact, the frangible seal must rupture easily in order to satisfy a consumer in search of effective products, and notably a consumer using such a container packaging cosmetic products. For example, the required force pressure to break the frangible seal may range from about 0.1 kg/cm^2 to about 3 kg/cm^2.

Since the strength of the frangible seal must remain limited, said seal may inadvertently be broken or compromised during normal handling, shipping or storing operations of the container. This would lead to accidental mixing of the housed products within the container.

One aim of the present invention is to overcome these drawbacks.

It is a particular object of the present invention to provide a container which securely houses at least two different products but which can easily be operated to achieve mixing of the products.

Another object of the present invention is to provide a container which is reliable in storage and prevents accidental or unintentional mixing of the housed products.

A further object of the present invention is to provide a container which is easy to manufacture, assemble and operate.

According to a first aspect, the invention relates to a multi-compartment container comprising at least one first compartment containing at least one first product, at least one second compartment containing at least one second product, and at least one frangible seal to separate said first and second compartments from one another so that said first and second products are prevented from mixing before said frangible seal is ruptured.

According to a general feature, this container is arranged in a folded state about at least a part of said frangible seal. One of the said

first and second compartments overlies at least a part of the other compartment in said folded state of the container.

A "frangible seal" should be understood as a membrane or partition which can rupture under pressure exerted on the container from the outside in an unfolded state of the container. In other words, the frangible seal forms a non-definitive bond that can be ruptured or failed without damaging other part(s) of the container in such unfolded state. To obtain the rupture of the seal in the unfolded state, a pressure may be exerted at least on one of the compartments so that the product contained in said compartment exerts a force on the seal and opens it. Alternatively, the pressure may be exerted directly on the frangible seal.

With the specific folding of the container, a fold is formed at least on a part of the frangible seal. Only the frangible seal sealingly separates the compartments from each other within the container, not the fold. The container is folded about at least one fold line. The fold line is formed at least on a part of the seal. Before use, the container is packaged in the folded state. The overall dimension of the container is thus limited.

With such a folding of the container, less stresses are transmitted to the frangible seal under a pressure applied to the container. The applicant has determined that, in such folded state of the seal, the container can sustain very high force pressure without any deterioration of the frangible seal. As a matter of fact, in the folded state, the container can withstand forces more than ten times higher than in a flat state, i.e. unfolded state. Besides, in such a folded position, the container has also greater resistance to drop.

Accordingly, the container is robust enough to withstand imposed forces that are inherently applied during handling, shipment and storage. This facilitates reliable storage without significant risk of inadvertent or accidental mixing of the products.

Therefore, it is not necessary to design a frangible seal having an increased strength to avoid its inadvertent rupture. The user may still rupture easily the seal in the unfolded state of the container.

Advantageously, the container is packaged in a folded state about the whole length of said frangible seal. Accordingly, the risk of deterioration of the frangible seal is further reduced.

In one particular embodiment, the first and second compartments are folded one over the other. The first and second compartments may also be superposed exactly.

In addition, the multiple-compartment container may further comprise at least one retaining element for holding said container packaged in the folded position. Therefore, the folded state can be maintained in a sure way. In one particular embodiment, said retaining element is disposed on a side opposite to said frangible seal with respect to one of the said first and second compartments. In other words, one of the said first and second compartments is located between said retaining element and said frangible seal. The container may comprise two retaining elements disposed on opposite sides of the container. For example, the retaining element(s) comprise an adhesive tape or an elastic band or a tape band or a clip or a self-locking cut-out from a sealed peripheral edge of the container.

In one particular embodiment, the container comprises a closed envelope made from a flexible material and having a sealed peripheral edge, said envelope being divided into at least the first and second compartments by said frangible seal extending between the sealed peripheral edge and connected to said edge. For example, the closed envelope may be made from a flexible material with a laminate structure.

In one particular embodiment, the frangible seal may extend substantially along a longitudinal axis of said container. Alternatively, the seal may extend substantially along a transverse direction of said container, said transverse direction being preferentially perpendicular to the longitudinal axis of said container. In another variant, the seal may extend substantially along a diagonal direction of said container.

According to a second aspect, the invention also relates to a packaging assembly comprising a multiple-compartment container as previously defined and an outer removable wrapping, said container

being packaged in the folded state inside said wrapping. For example, the wrapping may be made from a cardboard sheet.

The present invention and its advantages will be better understood by studying the detailed description of specific embodiments given by way of a non-limiting examples and illustrated by the appended drawings on which:

- Figure 1 is a schematic perspective view of a multiple-compartment container arranged in a folded state according to a first example of the invention,
- Figure 2 is a side view of the container of Figure 1,
- Figure 3 is a schematic perspective view of the container of Figures 1 and 2 in an unfolded state,
- Figure 4 is a top view of the container of Figure 3 in the unfolded state,
- Figure 5 and 6 are schematic perspective views of a multiple-compartment container arranged in a folded state according to a second example of the invention, and
- Figure 7 is a side view of a packaging assembly according to an example of the invention.

Figures 1 to 4 show an example of a multiple-compartment container, denoted by the general reference number 10, for packaging products (not shown) that must be kept separated until there is a need to use said products.

The container 10 may be used for packaging cosmetic products, for example products intended to be mixed to obtain a dyeing composition. The expression "cosmetic product" is understood to mean a product as defined in Article 2 of Regulation No. 1223/2009 of the European Parliament and of the Council of 30 November 2009.

The container 10 may also be used for packaging other types of cosmetic products such as skin care products, or other types of products like adhesive products, polymer coatings, flavored liquids, etc. A variety of products may be separated into the container, such as liquid products for example aqueous compositions, or solid products that can be powdered or not, or gas products.

As shown on Figures 1 and 2, the container 10 is arranged in a folded state. As will be described later, such packaging in a folded state is provided to prevent accidental or unintentional mixing of the products during handling, shipment and storage. Figures 3 and 4 represent the container 10 in an unfolded state that is assumed to be horizontal. In such a state, the container 10 has a longitudinal axis X-X'.

The container 10 comprises an envelope 12 which is divided into two distinct first and second pouches or compartments 14, 16 by means of a seal 18 that is frangible or rupturable under pressure. The compartments 14, 16 are designed to contain the products housed separately from one another up to the preparation of the mixture. Each compartment 14, 16 protrudes transversally on either side of the envelope 12.

The envelope 12 comprises a sealed peripheral edge 20. Each compartment 14, 16 is delimited by said sealed peripheral edge 20 and the frangible seal 18. More precisely, the compartment 14 is delimited by a part of the sealed peripheral edge 20 and the frangible seal 18 while the other compartment 16 is delimited by the other part of said edge 20 and the seal 18.

The envelope 12 may be single-layered or have a multilayer structure. Preferably, the envelope 12 is made of at least one sheet of polymeric film folded back on itself and sealed at the peripheral edge 20. The polymeric film may comprise at least two, different or identical, layers of polymeric film. Thus, the sheet of polymeric film has a laminate structure and the layers of polymeric film are superposed on one another. For example, the sheet of polymeric film may be made from polyvinyl chloride (PVC), polyesters, polyolefins, polyamides, polystyrenes or ionomers.

The frangible seal 18 is connected to the sealed peripheral edge 20. In the disclosed example, the frangible seal 18 is connected to facing opposed regions of the sealed peripheral edge 20. As shown more clearly on Figures 3 and 4, the frangible seal 18 comprises two opposite ends 18a, 18b each connected to the sealed peripheral edge

20 to define the two separate compartments 14, 16. The frangible seal 18 also comprises two opposite edges 18c, 18d which respectively delimit the compartments 14, 16. Each compartment 14, 16 is delimited by the sealed peripheral edge 20 on three sides and by one of the edges 18c, 18d on its last side.

In the illustrated example, the frangible seal 18 is oriented transversally with respect to the longitudinal axis X-X' of the container 10 in the unfolded position. The edges 18c, 18d of the seal extend transversely with respect to the axis X-X'. Alternatively, it is possible to foresee other orientations for the frangible seal 18. For example, the frangible seal 18 may extend substantially along the longitudinal axis X-X' of the container or along a diagonal direction of said container. Here, the frangible seal 18 has a straight form. Alternatively, the frangible seal 18 may have another geometry, for example with a presence of a sharp point or apex in the design, or a smooth curve design.

The frangible seal 18 may be formed by bonding the envelope 12. The term "bonding" should be understood to mean an attachment by melting of the envelope 12 locally, for example by heat-sealing or ultrasonic-sealing. In other words, the polymeric film(s) of the envelope 12 are sealed locally together in order to create the frangible seal 18. Alternatively, a rupturable strip seal having micro-fibers may be used to form the frangible seal. A rupturable strip formed by localized coating of different polymers could also be possible.

It should be noted that the sealed peripheral edge 20 of the envelope, which is also made by bonding and avoid the contamination of the housed products, has a much higher resistance than the resistance of the frangible seal 18 in the unfolded state of the container 10. As a matter of fact, the sealed peripheral edge 20 should not be opened at the same time that the frangible seal 18 but must be kept sealed to isolate from the outside.

The "sealed peripheral edge 20" refers to a definitive bond made on the envelope 12 that cannot be opened without damaging said envelope. On the contrary, the "frangible seal 18" refers to a non-

definitive bond that can be ruptured or failed under pressure exerted on the container from the outside without damaging the envelope 12.

As previously indicated and as shown on Figures 1 and 2, the container 10 is packaged in a folded state, folded about the frangible seal 18. The seal 18 is folded. The seal 18 forms a folded end of said container. The compartment 16 is folded over the compartment 14 about the seal 18. In the illustrated example, the compartments 14, 16 are superposed exactly. The container 10 is folded about a fold line 22 (Figures 2 and 4) formed on the whole length of the frangible seal 18. Alternatively, according to the shape of the seal 18, the fold line 22 may be formed only on a part of said seal. The first and the second compartments 14, 16 are positioned on either side of the fold line 22. In the illustrated example, the fold line 22 extends transversally to the axis X-X' in the unfolded state of the container 10. The frangible seal 18 extends on either side of said fold line. In other words, first and second parts of the seal 18 are separated by the fold line 22. Preferably, the first and second parts of the seal 18 positioned on either side of the fold line 22 are superposed exactly.

With the folded state of the frangible seal 18, when the container 10 is handled, shipped, stored, even dropped, the risk of inadvertent or accidental breaking of said seal is strongly decreased. As a matter of fact, the applicant has determined that, with a frangible flange 18 that requires a breaking force pressure of about 3 kg/cm^2 in the unfolded state of the container 10, such breaking force pressure is about 40 kg/cm^2 in the folded state.

In the illustrated example, the container 10 further comprises two adhesive tabs 24, 26 cooperating together for holding said container is the folded state. In the illustrated example, the adhesive tabs 24, 26 are secured on opposite sides of the sealed peripheral edge 20. The adhesive tabs 24, 26 are arranged in such a way that the compartment 14 is located between the adhesive tab 24 and the frangible seal 18 and the other compartment 16 is located between the other adhesive tab 26 and the frangible seal 18. Alternatively, it is possible to foresee other dispositions of the adhesive tabs 24, 26 on

the sealed peripheral edge 20 to hold the compartments 14, 16 together when the container 10 is in the folded state.

Any other appropriate elements may also be provided in order to retain the container 10 is the folded state such as elastic bands, tape bands, or clips for example. In another variant illustrated on Figures 5 and 6, in which identical parts are given identical references, the container 10 comprises a cut-out tab 28 and a slit 30 cooperating together for holding said container is the folded state. In the illustrated example, the tab 28 and the slit 30 are formed on opposite sides of the sealed peripheral edge 20. The disposition of these retaining elements is identical that the one of the adhesive tabs as disclosed in the previous example.

The slit 30 extends through the thickness of the sealed peripheral edge 20. The slit 30 may be formed by cutting. The slit 30 is large enough that the tab 28 can be inserted from the position as shown on Figure 5 into said slit as shown on Figure 6 for holding the container in the folded state. The tab 28 is formed in the thickness of the sealed peripheral edge 20 by cutting. The tab 28 comprises two self-locking lugs 28a, 28b. After the insertion of the tab 28 through the slit 30, said tab is folded on the sealed peripheral edge 20 and lugs 28a, 28b lock the container in the folded state.

It should be noted that, in another variant, the container 10 may be deprived of such retaining elements. In this case, the folded state of the container 10 is only maintained by the own weight of the product housed inside the second compartment 16.

To mix the products housed respectively into the first and second compartments 14 and 16, the users unfolds the container 10 and then squeezes one or both the compartments 14, 16 to break the frangible seal 18 such that said compartments become one single compartment. In the unfolded state of the container, the frangible seal 18 may be rupture easily. The multiple-compartment container 10 may also comprise an opening element (not shown) to deliver the obtained mixture, for example by way of tearing or cutting, or dispensing

nozzle or system. The opening means may be for example a pre-cut line.

Figure 7 shows a packaging assembly, denoted by the general reference number 32, comprising a wrapping 34 and the container 10 packaged in the folded state inside said wrapping. The wrapping 34 surrounds the container 10. The container 10 is sandwiched into the wrapping 34. With such a packaging assembly, the container 10 is hold in the folded position by the wrapping 34. The container 10 may be deprived of the retaining elements illustrated on Figures 1 to 6. The wrapping 34 forms a secondary packaging.

The first and second compartments 14, 16 of the container may be or not attached to the walls of the wrapping 34. Preferably, the compartments 14, 16 are entirely housed inside the wrapping 34. Accordingly, the risk of deterioration of the compartments 14, 16 is limited. However, in a variant, the container 10 may protrude outwards relative to the wrapping 34. Before use, the wrapping 34 has to been removed. For example, the outer wrapping 34 may be made from cardboard or flexible material laminate.

In the illustrated examples, the packaging consists in folding the container 10 on itself about a single fold line 22, symmetrically, the two compartments 14, 16 positioned on either side of this line then being superposed exactly. As a variant, the folding may consist in folding the container about a fold line that does not lie in a median plane of symmetry of the container once the latter is unfolded. The compartments thus positioned on either side of the fold line and one of the compartments may for example jut out beyond the contour of the other compartment. With such a disposition, the fold line still extends on the frangible seal.

The invention has been illustrated on the basis of a container having two compartments separated by one frangible seal and folded on itself about only a single fold line formed on said seal. Alternatively, the container may comprise at least one other compartment separated from the first and second compartments by at least one other seal. In this case, the container may be packaged in a

folded state with at least one other fold line formed on said at least one other frangible seal. The folding may be repeated several times on the container. The container may be folded up on itself. When the container comprises, in the packaged state, more than one fold lines, the fold lines may be for example parallel or perpendicular to one another. Otherwise, the invention is not limited to a container having a rectangular shape in the unfolded state. The container may have, in such state, a contour of any shape, in particular polygonal or not, circular or oval.

The expression "comprising a" is synonymous with "comprising at least one", unless specified to the contrary.

CLAIMS

1. Multiple-compartment container (10) comprising at least one first compartment (14) containing at least one first product, at least one second compartment (16) containing at least one second product, and at least one frangible seal (18) to separate said first and second compartments from one another so that said first and second products are prevented from mixing before said frangible seal is ruptured, characterized in that said container is arranged in a folded state about at least a part of said frangible seal (18) in which one of the said first and second compartments (14, 16) overlies at least a part of the other compartment.

2. Multiple-compartment container according to claim 1, wherein said container is packaged in the folded state about the whole length of said frangible seal (18).

3. Multiple-compartment container according to claim 1 or 2, wherein the first and second compartments (14, 16) are folded one over the other.

4. Multiple-compartment container according to any one of the preceding claims, wherein the first and second compartments (14, 16) are superposed exactly.

5. Multiple-compartment container according to any one of the preceding claims, further comprising at least one retaining element (24, 26; 28, 30) for holding said container in the folded state.

6. Multiple-compartment container according to claim 5, wherein said retaining element (24, 26; 28, 30) is disposed on a side opposite to said frangible seal with respect to one of the said first and second compartments (14, 16).

7. Multiple-compartment container according to claim 5 or 6, comprising two retaining elements (24, 26; 28, 30) disposed on opposite sides of the container (10)

8. Multiple-compartment container according to any one of the preceding claims 5 to 7, wherein said retaining element comprises

an adhesive tape or an elastic band or a tape band or a clip or a self-locking cut-out tab.

9. Multiple-compartment container according to any one of the preceding claims, comprising a closed envelope (12) made from a flexible material and having a sealed peripheral edge (20), said envelope being divided into at least the first and second compartments (14, 16) by said frangible seal (18) extending between the sealed peripheral edge and connected to said edge.

10. Multiple-compartment container according to any one of the preceding claims, wherein the frangible seal (18) extends substantially along a transverse direction of said container, said transverse direction being preferentially perpendicular to a longitudinal axis of said container.

11. Multiple-compartment container according to any one of the preceding claims 1 to 9, wherein the frangible seal (18) extends substantially along a longitudinal axis of said container.

12. Multiple-compartment container according to any one of the preceding claims 1 to 9, wherein the frangible seal (18) extends substantially along a diagonal direction of said container.

13. Packaging assembly comprising a multiple-compartment container (10) according to any one of the preceding claims and an outer removable wrapping (34), said container being packaged in the folded state inside said wrapping.

FIG.1

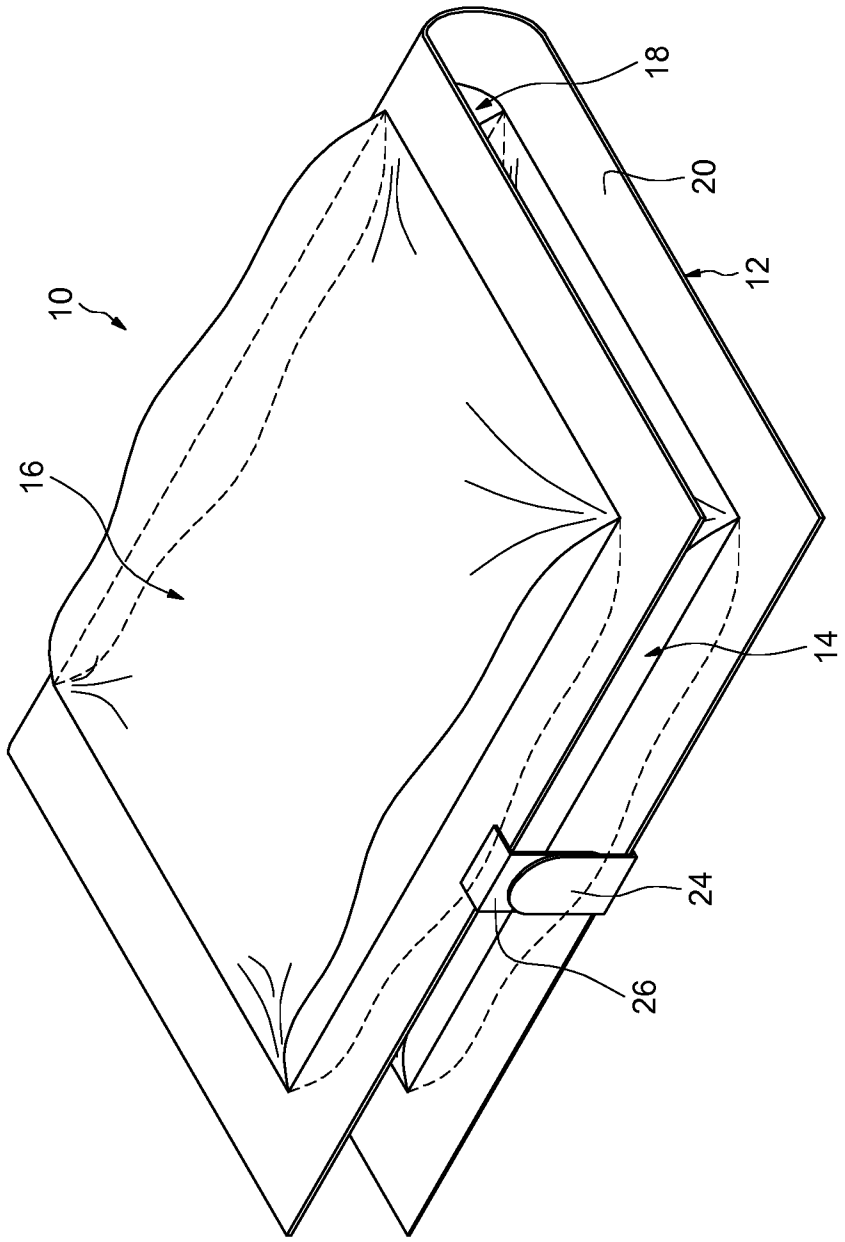


FIG.2

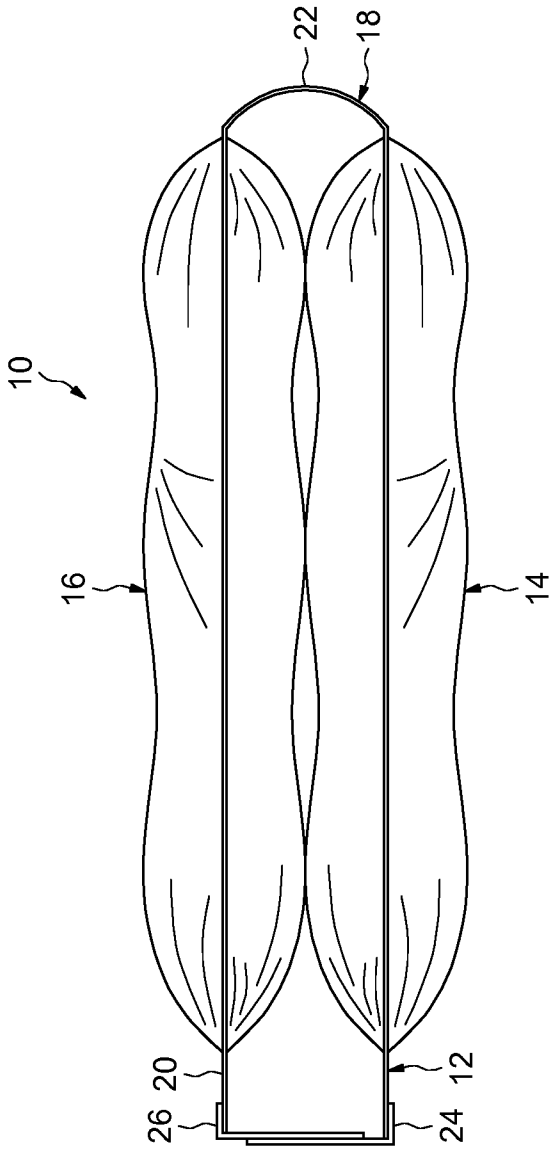


FIG.3

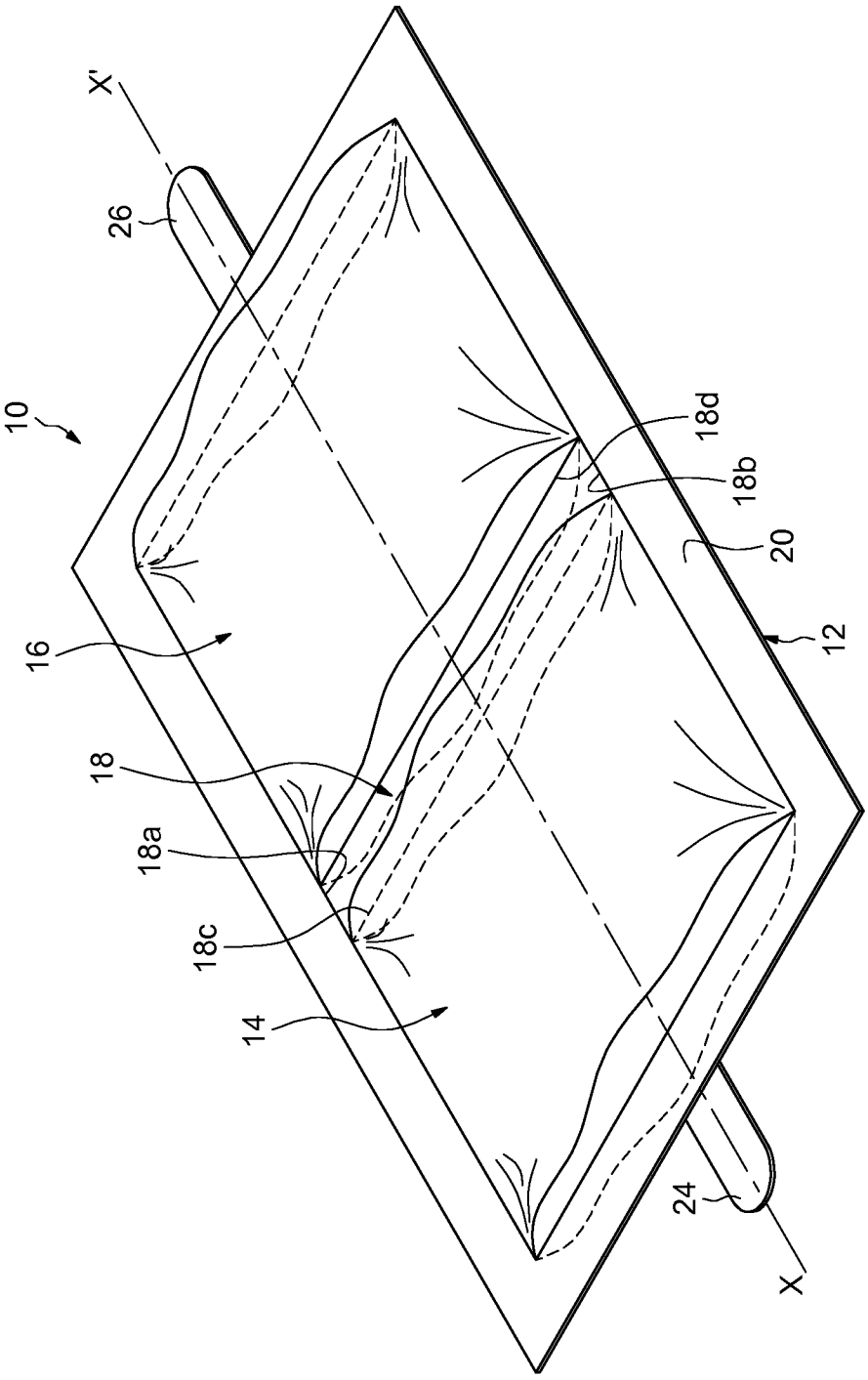


FIG.4

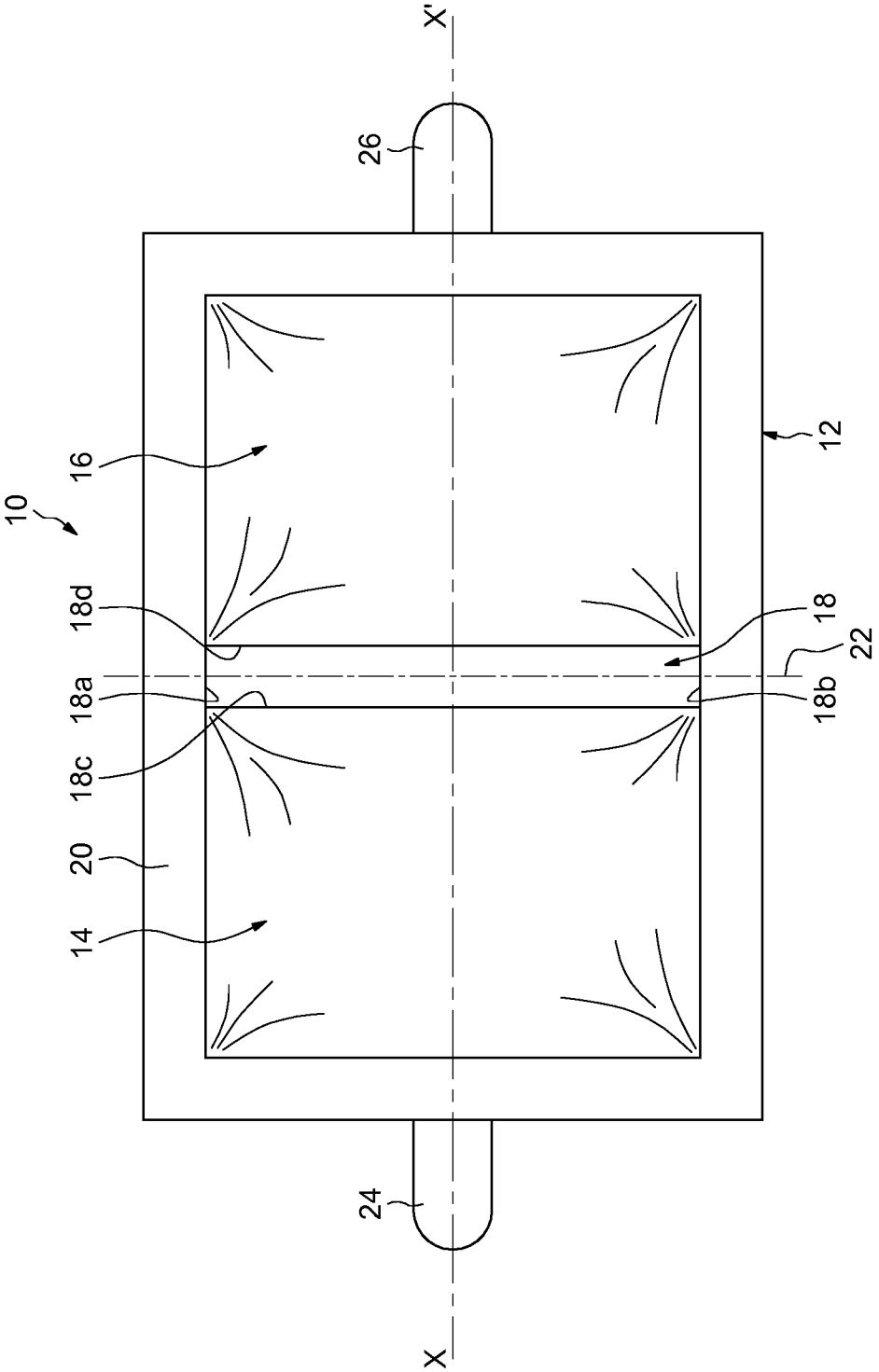


FIG.5

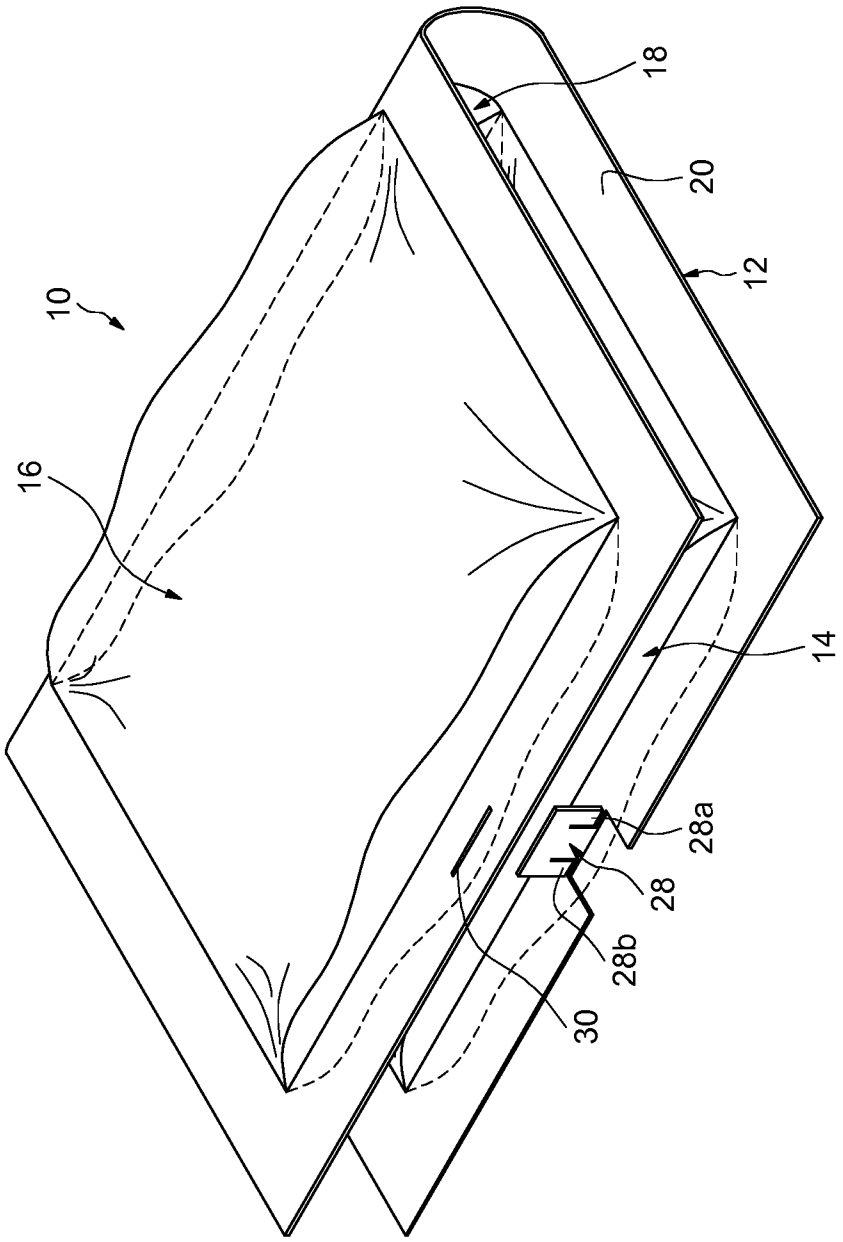


FIG.6

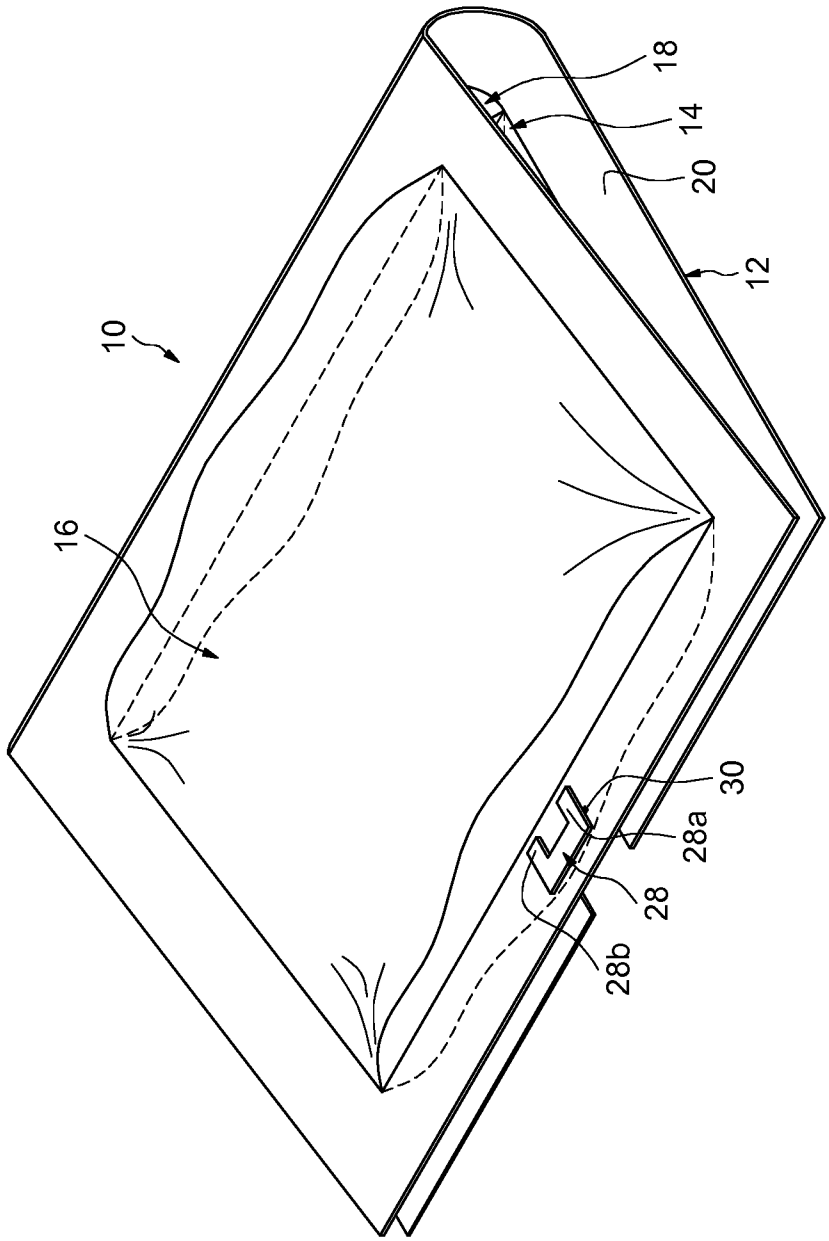
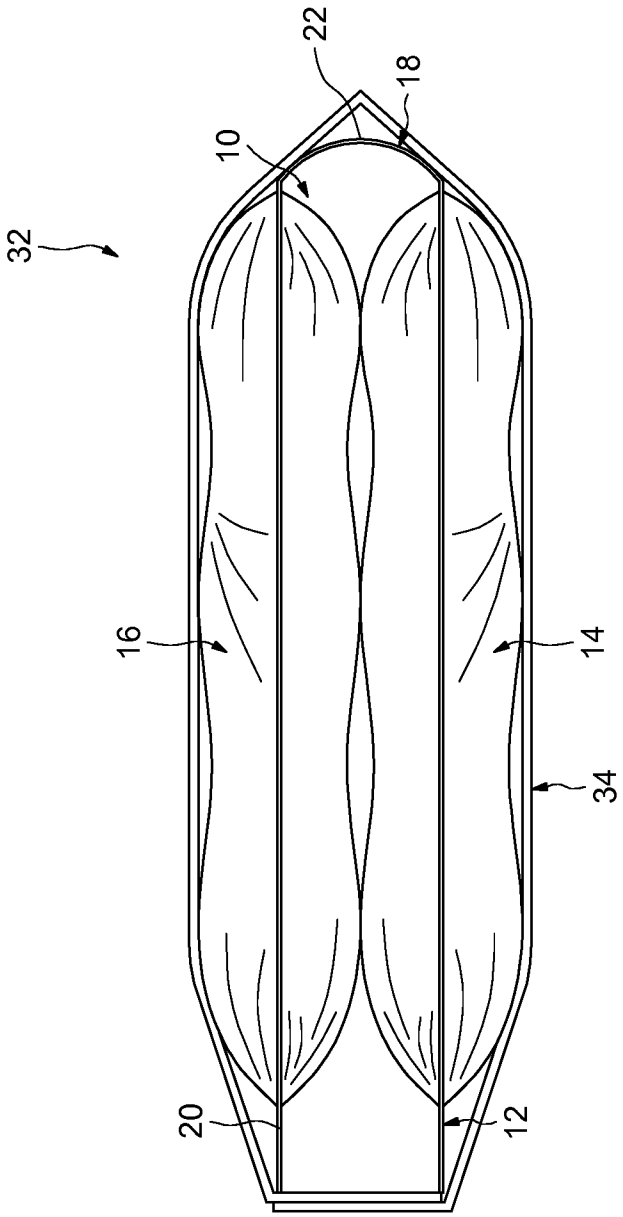


FIG.7



INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/081375

A. CLASSIFICATION OF SUBJECT MATTER
INV. B65D81/32
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	JP H09 226846 A (TOPPAN PRINTING CO LTD) 2 September 1997 (1997-09-02) abstract	1-5,8-11 6,7,12, 13

X	US 2 898 744 A (ROBBINS ALBERT A) 11 August 1959 (1959-08-11) figures 5-7	1-5,9-11

Y	US 3 478 871 A (SAGER THOMAS) 18 November 1969 (1969-11-18) cited in the application figures 1-8	6,7

Y	US 2009/239291 A1 (TIMMINS MARK R [US]) 24 September 2009 (2009-09-24) figures 1,4,5	12

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

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1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/081375

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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1

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