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(54) **Pouch and method of manufacturing the same**

(57) The invention relates to a pouch (10; 10') comprising :

- an inner pouch (20) comprising a bottom surface (22) and opposite side walls (24) extending upwardly from the bottom surface (22), said opposite side walls (24) being associated to each other along at least one peripheral edge (24a, 24b, 24c) thereof, thereby delimiting a product-filling area (A); and
- a pair of outer films (30), each overlying a respective one of said opposite side walls (24) of the inner pouch (10), said outer films (30) being associated to each other through a first seal (21, 23) at said at least one peripheral edge of the inner pouch (20);

The outer films (30) are further associated to each other through a second seal spaced apart from the first seal (21, 23) with respect to the product-filling area (A), thereby at least one inflatable chamber (34, 34') filled with an inert gas being delimited, between said first seal (21, 13) and second seal (31, 33; 31', 33').

The invention further relates to a method of forming a pouch (10; 10').

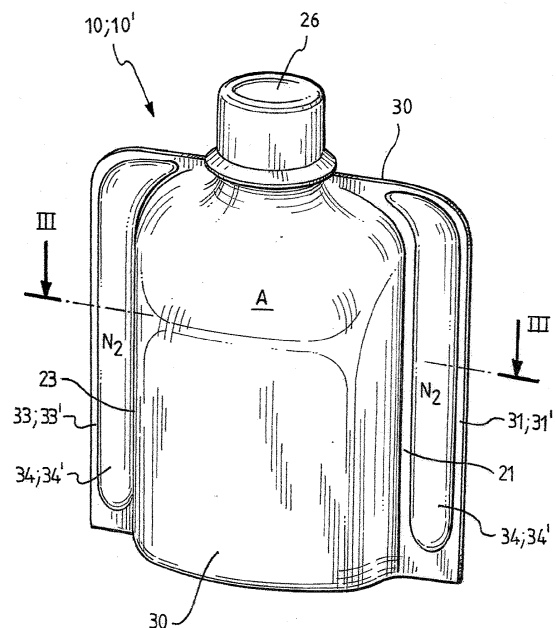


Fig. 1

Description

[0001] The present invention relates to a pouch, specifically for liquid or granular products. In particular, the invention relates to an inflatable pouch.

[0002] The present invention also relates to a method of manufacturing said pouch.

[0003] Pouches are well-known in the art. They are for example used to package liquid or granular products for food and medical use.

[0004] A known pouch typically consists of two superimposed walls of flexible plastic material, such as polyethylene, bonded to each other, typically heat-sealed, at peripheral edges thereof, so as to form an internal space of the pouch, suitable for being filled with the product to be packaged. The pouch can be also provided with a closure spout.

[0005] With specific reference to products having high degradability, such as food products, there is a growing demand for extending the shelf life of these products when packaged. If the pouch is not impervious to the transmission of contaminant agents, such as microorganisms, oxygen, other gases and water vapour, then the product packaged in the pouch can undergo a degradation by transmission through the walls. In particular, oxygen normally permeates the internal space along the sealed peripheral edges of the pouch.

[0006] Throughout the following description and the annexed claims, by "sealing" or "seal" a hermetical junction of the pouch walls, which can be made by means of heat-sealing or ultrasound sealing, or with other known methods is meant.

[0007] Throughout the following description and the annexed claims, reference will be specifically made to a gas (more particularly, oxygen) as a contaminant agent, while other contaminant agents which can pass through the pouch walls and degrade the product packaged therein might be considered in place or in combination with the aforementioned gas.

[0008] In order to extend the shelf life of the packaged product, so called aseptic and ultra clean pouches are available on the market. They are typically made of laminate materials, for example comprising one or more layers of polypropylene and a layer of aluminium or polyethylene with Deposited Silicon Oxide (PET-SiOx).

[0009] The aseptic and ultra clean pouches are produced in aseptic and ultra clean filling systems. In particular, the aseptic filling systems provide commercial sterility, whereby no unwanted organisms will grow in the filled pouch, whereas the ultra clean filling reduces the presence of organisms to levels approaching zero, but are not designed to ensure zero contamination.

[0010] EP 1 142 293 discloses a packaging container made of plastic material consisting of a flat hose, which is sealed at least on one side and forms a bag-shaped container. The flat hose is surrounded by two flat film sections, which overlap the edge regions. The hose has a filling opening and connection seams.

[0011] US 5,588,532 discloses an inflatable package comprising a pair of overlying inner panels defining an item-receiving zone therebetween to have the object received therein, a pair of outer panels each overlying a respective one of the inner panels to form an inflatable chamber therebetween and inflating means for at least partially inflating the inflatable chamber with a filler medium.

[0012] US 4,872,558 discloses a packaging system including an outer bag defining a sealed chamber therein, an inner bag defining a pocket adapted to retain an article therein and means for filling the chamber with a filling medium to substantially encapsulate and support the inner bag and article within the outer bag.

[0013] The Applicant has found that, although the laminate materials of the prior art are known as having high gas-barrier properties, pouches made of these materials have some drawbacks.

[0014] Firstly, being the superimposed walls typically heat-sealed, they can delaminate, i. e. the walls can partially separate from each other. As a result, ruptures or micro-perforations can generate at the sealed edges, thus causing the oxygen to enter the pouch, so deteriorating the product present therein. Further, the laminate materials are thick, this considerably increasing the manufacturing and shipment costs of the pouch, as well as the environmental impact of the pouch in that more plastic is needed for producing it and needed to be disposed at the end of its lifecycle.

[0015] Furthermore, when the pouch is produced in aseptic or ultra clean filling systems, it is not possible to use a printed film, because the ink is dissolved when the film enters a chemical decontamination area, e.g. it is dipped in a tank containing for example a hydrogen peroxide decontaminating liquid. In order to avoid the ink to be dissolved, expensive trap printing systems are used, thus further increasing the production costs of the pouch.

[0016] The present invention provides a pouch, particularly for liquid or granular products, which is suitable for increasing the gas-barrier effect at the sealed edges thereof, meanwhile making it possible to reduce the material thickness and, consequently, the manufacturing and shipment costs of the pouch. In addition the present pouch can be easily printed avoiding any problem of ink discoloration.

[0017] The present invention, in a first aspect thereof, relates to a pouch comprising:

- an inner pouch comprising a bottom surface and opposite side walls extending upwardly from the bottom surface, said opposite side walls being associated to each other along at least one peripheral edge thereof, thereby delimiting a product-filling area; and
- a pair of outer films, each overlying a respective one of said opposite side walls of the inner pouch, said outer films being associated to each other through a first seal at said at least one peripheral edge of the

inner pouch;

the pouch being **characterized in that** the outer films are further associated to each other through a second seal spaced apart from the first seal with respect to the product-filling area, thereby delimiting between said first seal and second seal at least one inflatable chamber filled with an inert gas.

[0018] The Applicant has surprisingly found that, owing to the provision of the inflatable chamber/s filled with an inert gas formed by the outer films, the pouch of the present invention has enhanced properties in terms of gas-barrier at the sealed edges thereof, with respect to the conventional pouches. This advantageously allows the use of thinner and cheaper materials for the inner pouch as well as for the outer films, thus reducing the manufacturing and shipment costs of the pouch.

[0019] Throughout the following description and the annexed claims, by "associated" and "associating" a direct association between the outer films or an association between the outer films with the interposition of the associated side walls of the inner pouch is meant.

[0020] Throughout the following description and the annexed claims, by "gas-barrier" is meant the capability to limit to a certain extent the passage of contaminant agent. With specific reference to oxygen, the desired gas-barrier properties are achieved by a layer, seal or structure when the OTR (Oxygen Transmission Rate) evaluated at 23°C and 0% R.H. according to ASTM D-3985 is lower than 500 cm³/m²·day·atm, preferably lower than 100 cm³/m²·day·atm, more preferably lower than 50 cm³/m²·day·atm.

[0021] In a preferred embodiment, at the second seal, the outer films are directly associated, one inflatable chamber being defined between the outer films.

[0022] In a further preferred embodiment, at the second seal, the outer films are sealed at the at least one peripheral edge of the inner pouch, one inflatable chamber being defined between each outer film and the at least one peripheral edge.

[0023] Preferably, each of the outer film is sealed around the perimeter of a respective side wall of the inner pouch. This advantageously ensures a better matching between the inner pouch and the outer walls.

[0024] Preferably, the inert gas filling the at least one inflatable chamber is nitrogen. This advantageously increases the gas-barrier properties of the pouch. However, different inert gases can be used.

[0025] In a preferred embodiment, the inner pouch is made of a flexible plastic material, such as polyethylene.

[0026] Preferably, the inner pouch is made of a material with gas-barrier properties, such as a mono or multilayer film or laminate comprising one or more layers of gas-barrier resins, such as polypropylene, ethylvinyl alcohol, polyvinylidenechloride, optionally including one or more layers of non plastic material, such as aluminium or polyethylene with Deposited Silicon Oxide (PET-SiOx). This additional material advantageously further in-

creases the gas-barrier properties of the pouch, particularly in the event of an aseptic pouch.

[0027] In a preferred embodiment, the outer films are made of a flexible plastic material, such as polyethylene.

[0028] Preferably, the outer films are made of a material with gas-barrier properties, such as a mono or multilayer film or laminate comprising one or more layers of gas-barrier resins, such as polypropylene or others, optionally including one or more layers of non plastic material, such as aluminium or polyethylene with Deposited Silicon Oxide (PET-SiOx). This additional material advantageously further increases the gas-barrier properties of the pouch, particularly in the event of an aseptic pouch.

[0029] Preferably, at least one outer film has a printed surface. The outer printed film needs not to undergo any decontamination process but is applied externally to the aseptic inner pouch. This advantageously allows to have a printed pouch and avoids expensive trap printing systems to be used when the pouch is produced in aseptic or ultra clean filling systems, thus reducing the pouch production costs.

[0030] In a second aspect thereof, the present invention relates to a method of manufacturing a pouch comprising:

- providing an inner pouch, comprising a bottom surface and opposite side walls extending upwardly from the bottom surface, the opposite side walls being associated to each other along at least one peripheral edge thereof, thereby delimiting a product-filling area;
- feeding a pair of outer films, each of said outer films overlying a respective side wall of the inner pouch;
- associating the outer films to each other through a first seal at said at least one peripheral edge of the inner pouch;
- associating the outer films to each other through a second seal spaced apart from said first seal with respect to the product-filling area, thereby delimiting between said first seal and second seal at least one inflatable chamber ;
- inflating the at least one inflatable chamber with an inert gas; and
- sealing said at least one inflated chamber (34).

[0031] In a preferred embodiment of the method, associating the outer films through a second seal comprises directly associating the outer film, one inflatable chamber being defined between the outer films.

[0032] In a further preferred embodiment of the method, associating the outer films through a second seal comprises sealing the outer films to said at least one peripheral edge of the inner pouch, one inflatable cham-

ber being defined between each outer film and said at least one peripheral edge.

[0033] In a preferred embodiment of the method, a plurality of inner pouches are provided, said plurality of inner pouches being aligned along a feeding direction, before feeding said pair of outer films.

[0034] Preferably, said plurality of inner pouches (20) are connected to each other at the peripheral edge.

[0035] Preferably, associating the outer films to the inner pouch comprises sealing each outer films around the perimeter of a respective side wall of the inner pouch. This advantageously ensures a better matching between the inner pouch and the outer walls.

[0036] Preferably, associating the outer films to each other through a second seal comprises associating the outer film through a weakening line (L). This advantageously allows a desired number of pouches to be grouped without providing expensive cardboard boxes. Moreover, owing to the connection weakening lines, the grouped pouches can be easily separated by a user.

[0037] In a third aspect, thereof, the present invention relates to a set of pouches, each pouch being of the type discussed above, wherein at the outer films said pouches are associated to each other through respective weakening lines.

[0038] Further characteristics and advantages of the present invention shall become clearer from the following detailed description of preferred embodiments thereof, made with reference to the attached drawings and given for indicating and not limiting purposes. In such drawings:

- figure 1 schematically shows a perspective view of a pouch according to the present invention;
- figure 2 is a partially exploded perspective view of a first embodiment of the pouch of figure 1;
- figure 3 is a cross-sectional view, taken along the line III-III of figure 1, showing a first embodiment of the pouch of the invention;
- figure 4 is a cross-sectional view similar to that of figure 3, showing a further embodiment of the pouch of the invention;
- figure 5 is a perspective view of a group of three pouches of the invention, which are connected to each other along weakening lines enabling an easier separation by the user;
- figure 6 schematically shows a perspective view of a machine suitable for manufacturing a plurality of pouches of figure 1; and
- figures 7 to 9 show a method of manufacturing the pouch according to the invention.

[0039] With reference to figures 1 and 2, a pouch in

accordance with the present invention is shown. Such a pouch is globally indicated with 10 and comprises an inner pouch 20 suitable for being filled with a product to be packaged, for example a liquid or granular food product.

[0040] As better shown in figure 2, the inner pouch 20 comprises a bottom surface 22 and opposite side walls 24, which extend upwardly from the bottom surface 22. The opposite side walls 24 are associated to each other at selected overlying peripheral edges thereof 24a, 24b, 24c, thereby delimiting with the bottom surface 22 an area A suitable for being filled with the product to be packaged. Preferably, the opposite side walls 24 of the inner pouch 20 are heat sealed along two opposite longitudinal peripheral edges 24a, 24b and along a top transversal peripheral edge 24c.

[0041] Preferably, the inner pouch 20 is provided, at the upper portion thereof, with a closure spout 26.

[0042] Preferably, the inner pouch 20 is made of a flexible plastic material, such as polyethylene, preferably having a thickness of about 20 microns or less. More preferably, the inner pouch 20 is made of a material having gas-barrier properties, for example a laminate comprising one or more layers of gas-barrier resins, such as polypropylene, optionally including one or more layers of non plastic material, such as aluminium or polyethylene with Deposited Silicon Oxide (PET-SiOx).

[0043] The pouch 10 further comprises a pair of outer films 30, each overlying a respective one of the opposite side walls 24 of the inner pouch 20.

[0044] The outer films 30 are preferably rectangular, with the size of the outer films 30 being selected according to the size of the inner pouch 20, and have an inner surface 30a, which in use faces a respective side wall 24 of the inner pouch 20, and an outer surface 30b, opposite to the inner surface 31. Preferably, at least one of the outer films 30 has a printed surface, more preferably the outer surface 30b thereof.

[0045] The outer films 30 are also made of flexible plastic material, such as polyethylene. Preferably, the outer films 30 are also made of a material having barrier to oxygen properties, for example a laminate comprising one or more layers of gas-barrier resins, such as polypropylene, optionally including one or more layers of non plastic material, such as aluminium or polyethylene with Deposited Silicon Oxide (PET-SiOx).

[0046] With reference to figures 1 and 3, a pouch 10 according a first embodiment of the present invention is shown. In this pouch 10, the outer films 30 are associated to each other through first seals 21, 23 provided at a respective longitudinal peripheral edge 24a, 24b of the inner pouch 20. Moreover, the outer films 30 are directly associated to each other through second seals 31, 33, each substantially parallel to and spaced apart from a respective first seal 21, 23 with respect to the product-filling area A. An inflatable chamber 34 is thus delimited between the first seal 21, 23 and the second seal 31, 33. In particular, one inflatable chamber 34 is defined between the outer films 30, which is filled with an inert gas,

preferably Nitrogen.

[0047] With reference to figures 1 and 4, a pouch 10' according a further embodiment of the present invention is shown. In this pouch 10' the outer films 30 are also associated to each other through first seals 21, 23 provided at a respective longitudinal peripheral edge 24a, 24b of the inner pouch 20. Moreover, the outer films 30 are sealed at the peripheral longitudinal edges 24a, 24b of the inner pouch 20 through second seals 31', 33', which are substantially parallel and spaced apart from the corresponding first seals 21, 23. The longitudinal peripheral edges 24a, 24b form thus a partition wall between the outer films 30. One inflatable chamber 34' is so delimited between the first seal 21, 23 and the second seal 31', 33'. In particular, one inflatable chamber 34' is defined between each outer film 30 and the longitudinal peripheral edges 24a, 24b. The inflatable chambers 34' are filled with an inert gas, preferably Nitrogen.

[0048] With reference to figure 5, an assembly of a plurality of pouches 10, 10', preferably three pouches 10, 10', is illustrated. The pouches 10, 10' are associated through the outer films 30 and weakening lines L are provided between adjacent pouches at the second seals associating the outer films to each other. Each weakening line L is preferably made of a serrated seal, which advantageously enable easier separation of the pouches by the user.

[0049] With reference to figure 6 to 9, it is now described a method of manufacturing a pouch according to the present invention.

[0050] Firstly, there is provided a plurality of inner pouches 20. Each inner pouch 20 of the plurality of inner pouches 20 is obtained by using any suitable manufacturing method known in the art, as for example the one disclosed in EP 2055 638.

[0051] In the event of an aseptic or ultra clean pouch 10, a step of decontaminating each of the inner pouches 20 with a substance which is chemically active as a decontaminating agent is carried out, thus obtaining a plurality of aseptic or ultra clean inner pouches 20. For instance, the decontaminating agent may be a hydrogen peroxide bath.

[0052] The inner pouches 20 optionally decontaminated are then aligned thereby resulting equally spaced from one another along a feeding direction D. The aligned inner pouches 20 are supported, at the bottom surface 22 thereof, by a conveyor belt or, alternatively suspended by gripping means, gripping a respective inner pouch 20, for example at its closure spout 26. In the event of the manufacturing of a single pouch 10, the alignment is not provided.

[0053] Subsequently, the outer films 30 are provided, each fed by a respective supply roll 2 along the feeding direction D, with the inner pouch 20 first coming along the feeding direction D being arranged between the outer films 30. Preferably, each outer film 30 is made to adhere to a respective side wall 24 of the inner pouch 20, for example by means of a respective deviation roller 4 suit-

ably provided at each side of the inner pouches 20.

[0054] Subsequently, the outer films 30 are associated, for example heat-sealed, along the perimeter of the respective side wall 24. To this end, a pair of sealing frames 5 are provided, each comprising a bottom sealing plate 5a, an upper sealing plate 5b and a pair of side sealing plates 5c and 5d, which connect the bottom and upper sealing plates 5a and 5b.

[0055] In the event the inner pouch 20 is provided with a closure spout 26, the upper sealing plate 5b of each sealing frame 5 is provided with a respective recess 5e, preferably a semicircular recess. The recesses 5e are suitable for embracing the closure spout 26 when the sealing frames 5 are pressed against the respective side wall 24 of the inner pouch 20, as shown in greater detail in figure 5.

[0056] Due to this association, the outer films 30 are associated to each other through first seals 21, 23 at longitudinal peripheral edges 24a, 24b of the inner pouch.

[0057] At the same time, the outer films 30 are further directly associated to each other through a second seal 33 spaced apart from a respective first seal 23 with respect to the product-filling area A. To this end a pair of sealing plates 6 are provided, preferably integral with a respective sealing frame 5. An inflatable chamber 34 is therefore delimited between the outer films 30 at a longitudinal peripheral edge 24b of the inner pouch 20. Preferably, the inner pouches 20 are provided connected one to the other at the longitudinal peripheral edges 24a, 24b. In this case, the outer films 30 are further associated to each other through a second seal 33', connecting the outer films 30 to a respective longitudinal edge 24a of the inner pouch. Inflatable chambers 34' are therefore delimited between each outer film 30 and the longitudinal peripheral edge 24a.

[0058] Preferably, the outer films 30 are associated to each other at the second seal 31, 33, 31', 33' through respective weakening lines L (see figure 5), thereby allowing an easier separation of the pouches by the user through hand pulling. This is preferably obtained by providing the seals 33 as a serrated seal.

[0059] If the inner pouches 20 are provided connected one to the other at the longitudinal peripheral edges 24a, 24b, when the outer films are associated to each other at the second seal 31', 33', the longitudinal peripheral edges 24a, 24b are locally perforated such as to allow an easier separation of the pouches by the user through hand pulling.

[0060] The obtained second seal 33, 33' for the currently processed inner pouch 20 corresponds to the second seal 31, 31' of the following inner pouch 20.

[0061] The inner pouches are then moved along the feeding direction D by a pitch whose length is equal to the length of the pouch 10 to be manufactured and the process discussed above is iteratively repeated for each subsequent inner pouch 20 of said plurality of inner pouches 20.

[0062] As shown in greater detail in figures 8 and 9,

the inflatable chambers 34, 34' thus formed are then filled with an inert gas, preferably Nitrogen, by using a suitable filling means, for example a filling tube 8, and subsequently sealed on the upper portion thereof through a respective upper seal 35.

[0063] Of course, a man skilled in the art can bring numerous modifications and variants to the pouch and to the related manufacturing method described above, in order to satisfy specific and contingent requirements, all of which are however covered by the scope of protection of the present invention as defined by the following claims.

[0064] For example, the material of the walls of the inner pouch 20 and of the outer films 30 can be a non gas-barrier material, the gas-barrier effect at the sealed edges being anyway provided by the chamber 34 inflated with the inert gas.

Claims

1. A pouch (10; 10') comprising:

- an inner pouch (20) comprising a bottom surface (22) and opposite side walls (24) extending upwardly from the bottom surface (22), said opposite side walls (24) being associated to each other along at least one peripheral edge (24a, 24b, 24c) thereof, thereby delimiting a product-filling area (A); and
- a pair of outer films (30), each overlying a respective one of said opposite side walls (24) of the inner pouch (10), said outer films (30) being associated to each other through a first seal (21, 23) at said at least one peripheral edge of the inner pouch (20);

characterized in that the outer films (30) are further associated to each other through a second seal (31, 33; 31', 33') spaced apart from the first seal (21, 23) with respect to the product-filling area (A), thereby delimiting between said first seal (21, 23) and second seal (31, 33; 31', 33') at least one inflatable chamber (34, 34'), said chamber being filled with an inert gas.

2. A pouch (10) according to claim 1, wherein at said second seal (31, 33) the outer films (30) are directly associated, one inflatable chamber (34) being defined between the outer films (30).
3. A pouch (10') according to claim 1, wherein at said second seal (31', 33'), the outer films (30) are sealed at said at least one peripheral edge (24a, 24b) of the inner pouch (20), one inflatable chamber (34') being defined between each outer film (30) and said at least one peripheral edge (24a, 24b).

4. A pouch (10; 10') according to any claims 1 to 3, wherein each of said outer films (30) is sealed around the perimeter of a respective side wall (24) of the inner pouch (20).

5. A pouch (10; 10') according to any one of the preceding claims, wherein said inert gas filling said at least one inflatable chamber (34; 34') is Nitrogen.

6. A pouch (10; 10') according to any one of the preceding claims, wherein the inner pouch (20) or the outer films (30) or both are made of a flexible plastic material.

7. A pouch (10; 10') according to any one of the preceding claims, wherein the inner pouch (20) or the outer films (30) or both are made of a material with gas-barrier properties.

8. A pouch (10; 10') according to claim 7, wherein the material with barrier to oxygen properties is a laminate comprising one or more layers of a gas-barrier resin, optionally including one or more layers of non plastic material.

9. A pouch (10; 10') according to any one of the preceding claims, wherein at least one outer film (30) has a printed surface.

10. A method of manufacturing a pouch (10; 10') according to any one of the preceding claims, comprising:

- providing an inner pouches (20), comprising a bottom surface (22) and opposite side walls (24) extending upwardly from the bottom surface (22), the opposite side walls (24) being associated to each other along at least one peripheral edge (24a, 24b, 24c) thereof, thereby delimiting a product-filling area (A);
- feeding a pair of outer films (30), each of said outer films (30) overlying a respective side wall (24) of the inner pouch (20);
- associating the outer films (30) to each other through a first seal (21, 23) at said at least one peripheral edge (24a, 24b) of the inner pouch (20);
- associating the outer films (30) to each other through a second seal (31, 33; 31', 33') spaced apart from said first seal (21, 23) with respect to the product-filling area (A), thereby delimiting between said first seal (21, 23) and second seal (31, 33; 31', 33') at least one inflatable chamber (34; 34');
- inflating the at least one inflatable chamber (34; 34') with an inert gas; and
- sealing said at least one inflated chamber (34; 34').

11. Method according to claim 10, wherein associating the outer films (30) to each other through a second seal (31, 33) comprises directly associating the outer film, one inflatable chamber (34) being defined between the outer films (30). 5
12. Method according to claim 11, wherein associating the outer films (30) to each other through a second seal (31', 33') comprises sealing the outer films (30) to said at least one peripheral edge (24a, 24b) of the inner pouch (20), one inflatable chamber (34') being defined between each outer film (30) and said at least one peripheral edge (24a, 24b). 10
13. A method according to any one of claims 10 to 12, wherein a plurality of inner pouches (20) are provided, said plurality of inner pouches (20) being aligned along a feeding direction (D), before feeding said pair of outer films (30). 15 20
14. A method according to claim 13, wherein said plurality of inner pouches (20) are connected to each other at the peripheral edges (24a, 24b)
15. A method according to any one of claims 13 or 14, wherein associating the outer films to each other through a second seal (31, 33; 31', 33') comprises associating the outer films (30) through a weakening line (L). 25 30
16. A set of pouches (10; 10'), wherein each pouch (10; 10') is a pouch (10) according to any of claims 1 to 11, wherein the outer films (30) of said pouches (10; 10') are associated to each other through respective weakening lines (L). 35

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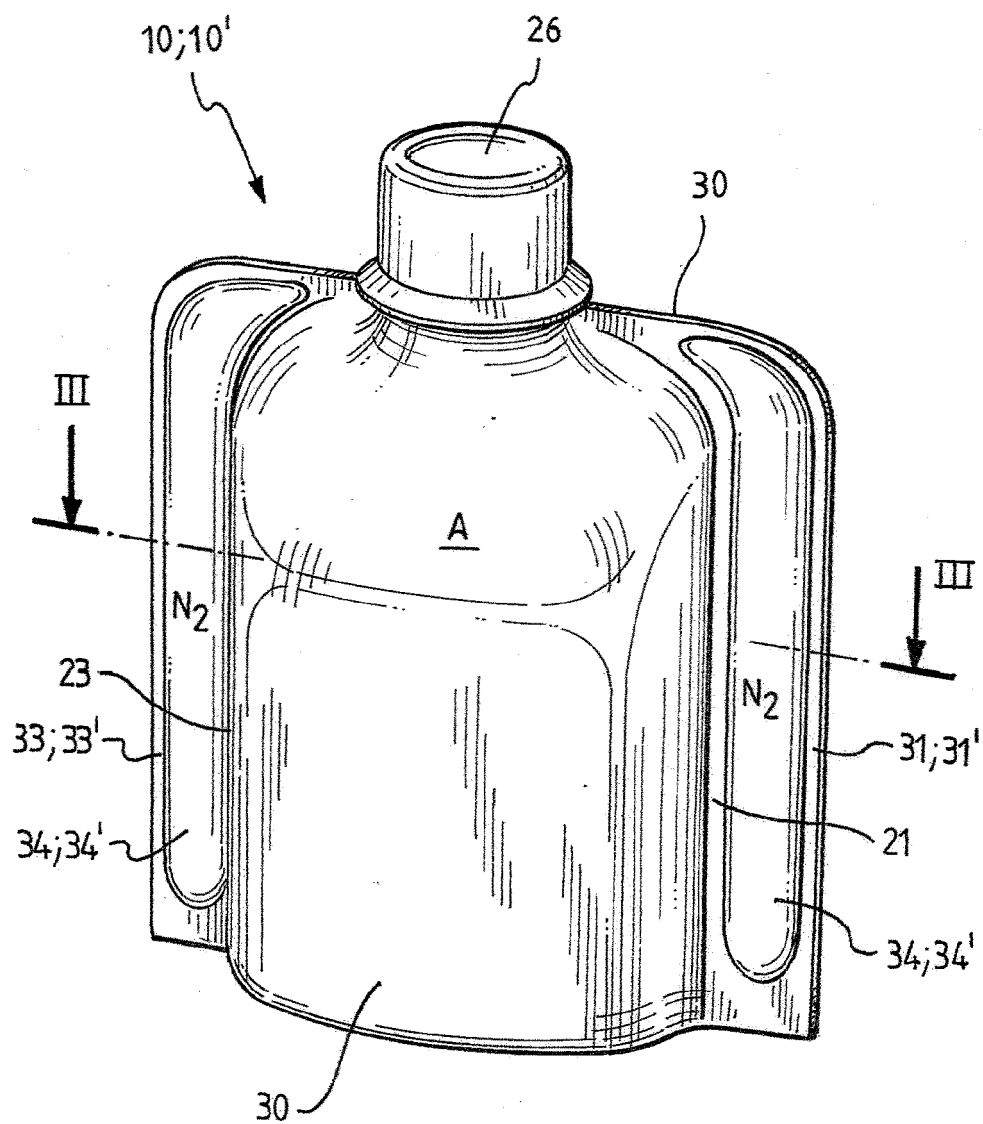
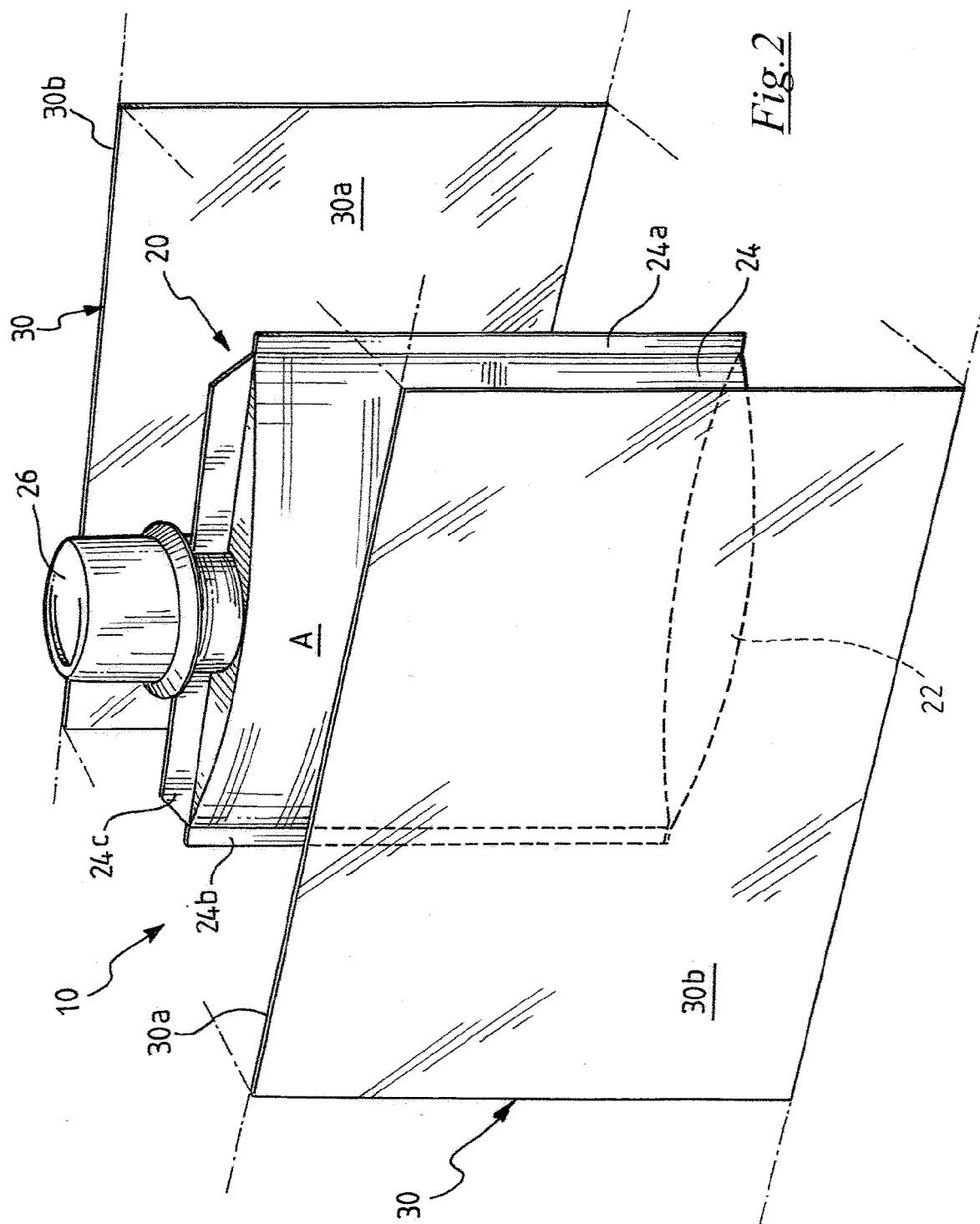


Fig. 1



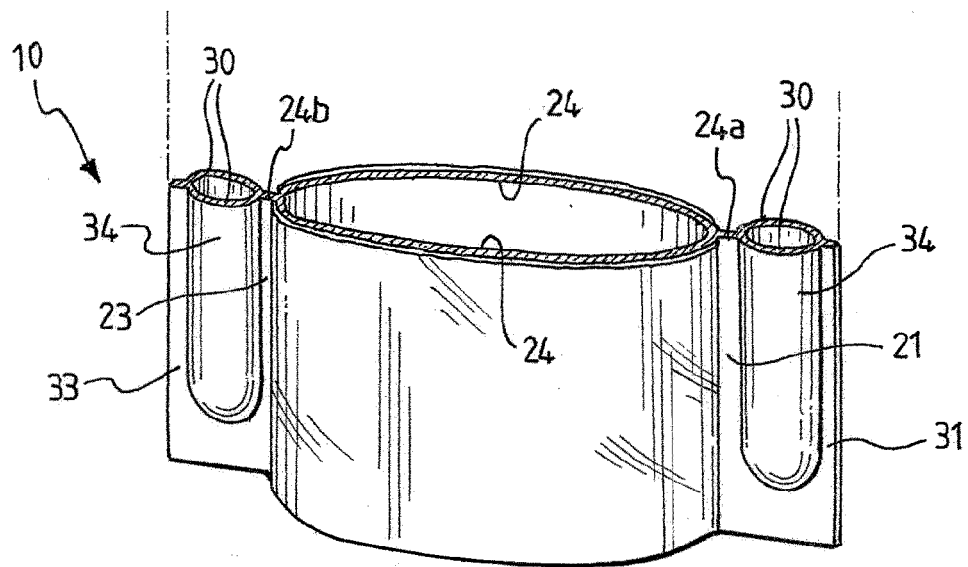


Fig. 3

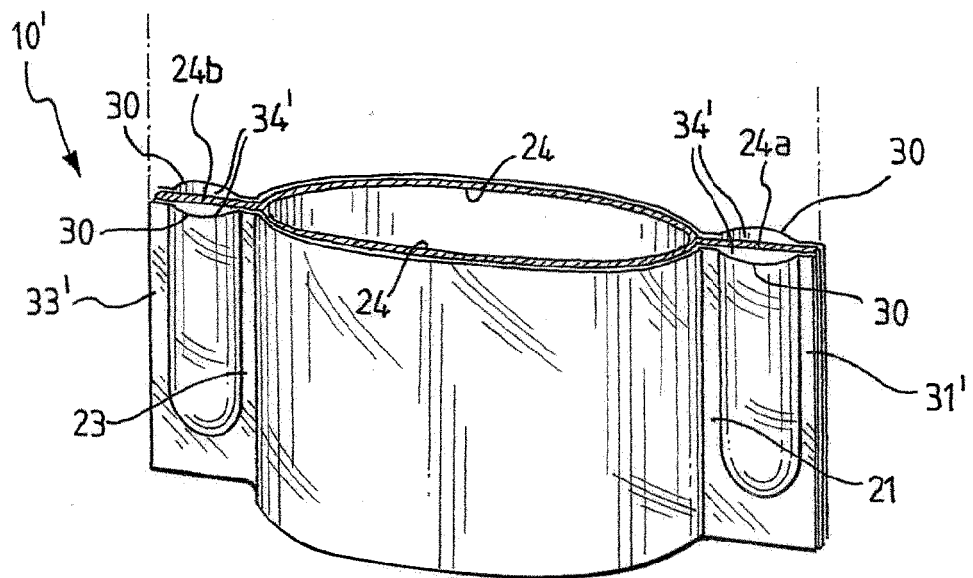


Fig. 4

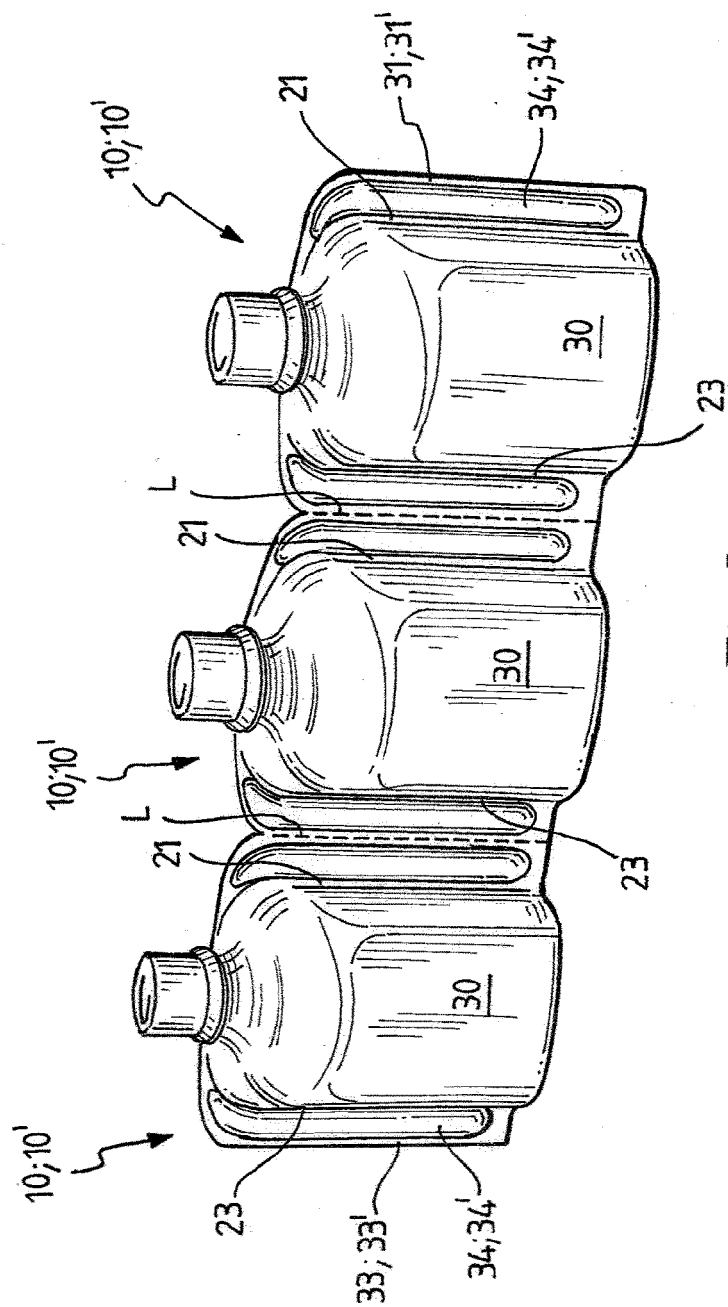


Fig. 5

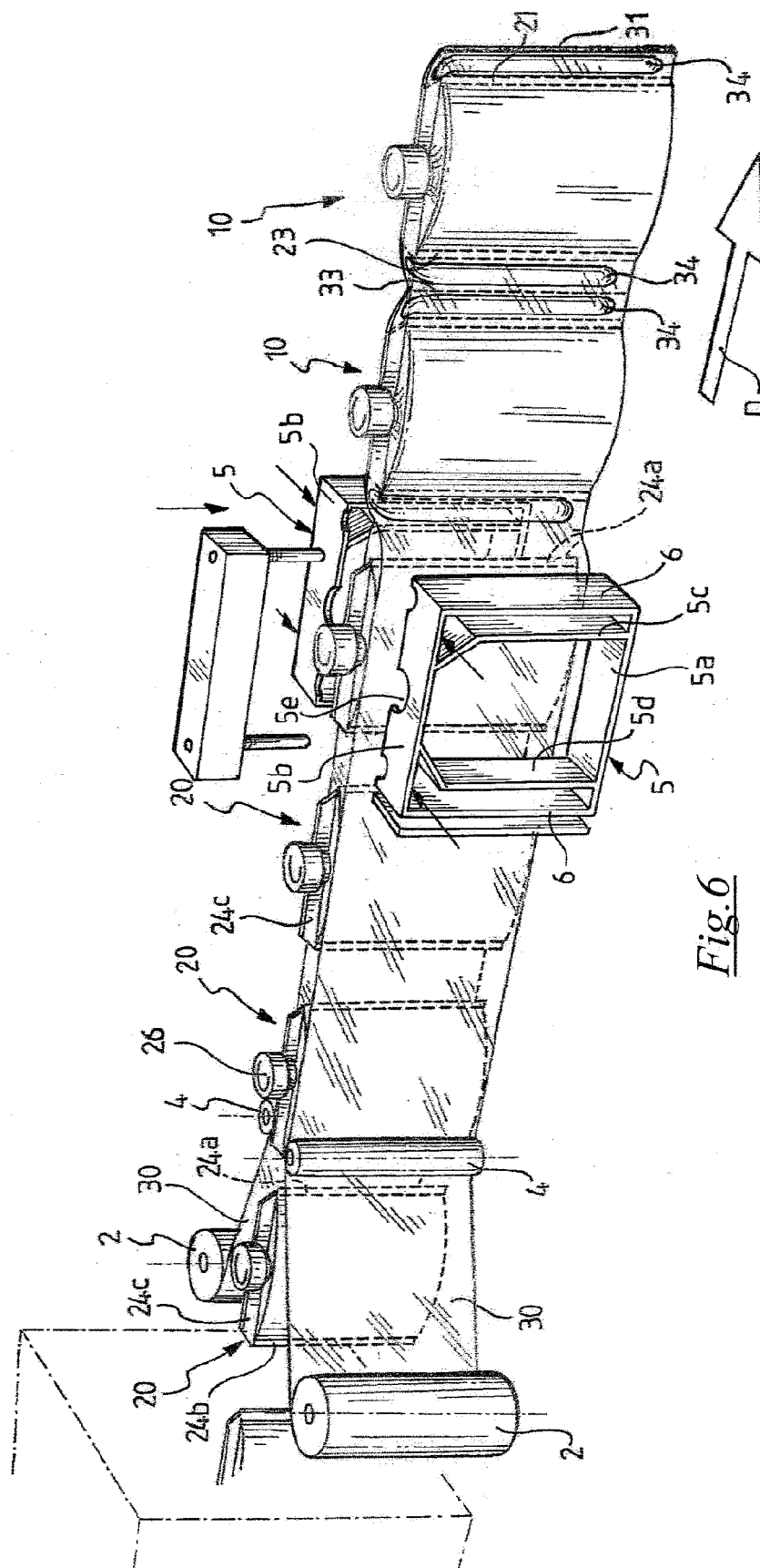
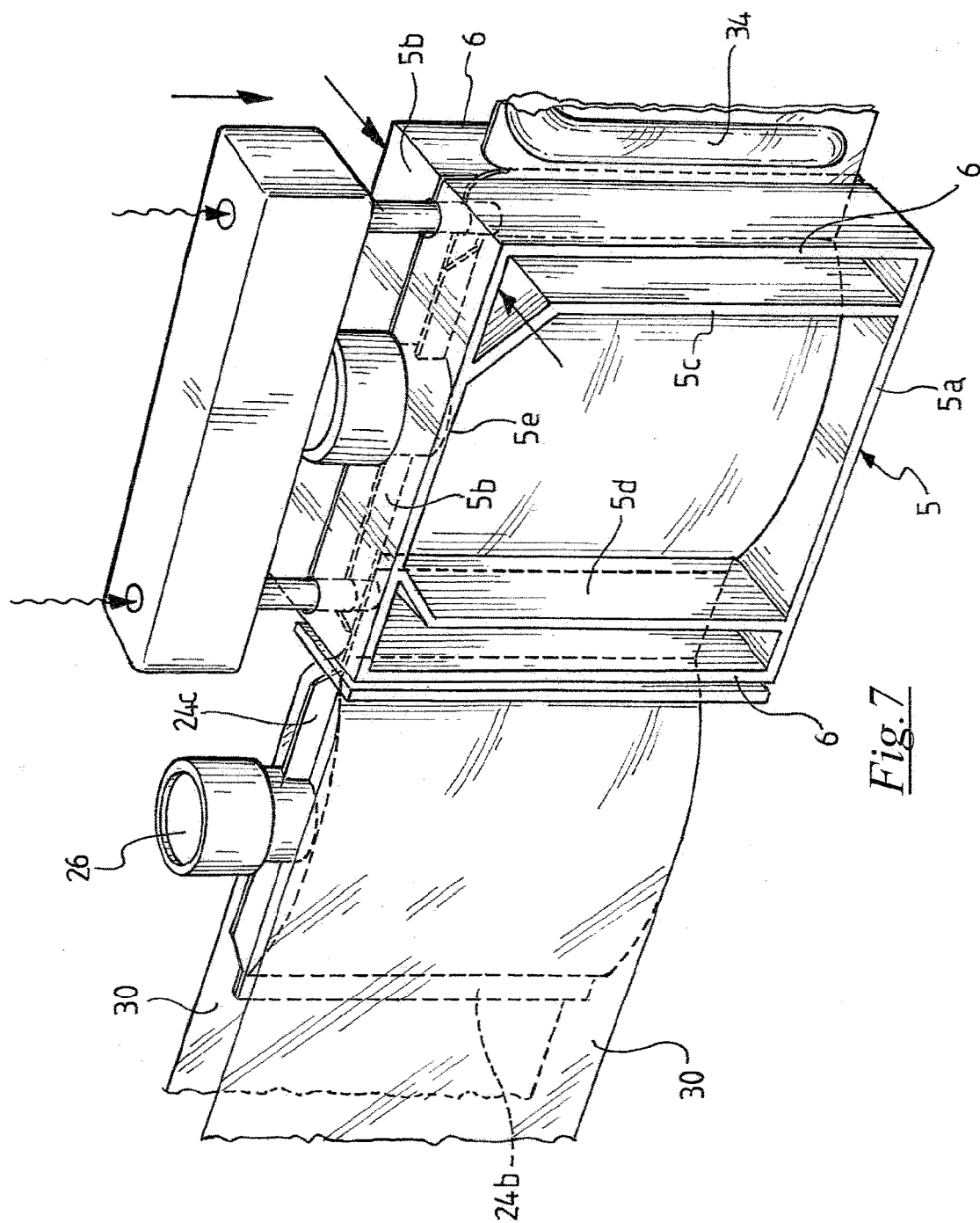
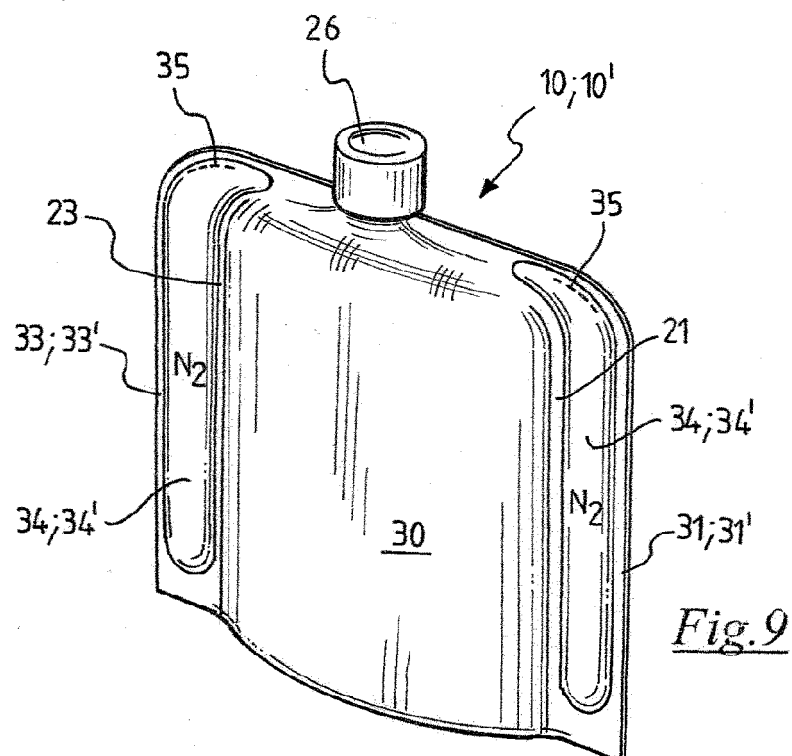
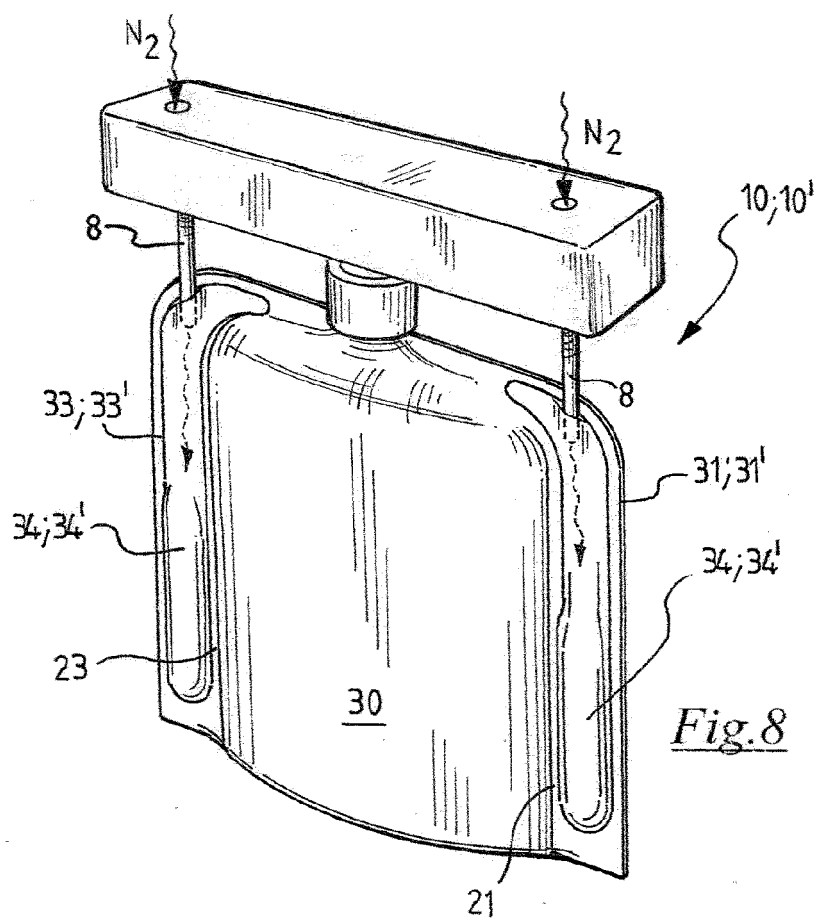


Fig. 6







EUROPEAN SEARCH REPORT

Application Number
EP 12 15 6628

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 4 454 945 A (JABARIN SALEH A [US] ET AL) 19 June 1984 (1984-06-19) * column 2, lines 40-69; figures 1,2 * -----	1-16	INV. B65D75/00 B65D75/52 B65D81/24
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