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### (54) **PACKAGING SYSTEM FOR FOOD ARTICLES**

VERPACKUNGSSYSTEM FÜR LEBENSMITTELARTIKEL

SYSTÈME D'EMBALLAGE DESTINÉ À DES PRODUITS ALIMENTAIRES

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## Description

[0001] The present invention relates to a packaging system, in particular a packaging system for transporting foods, such as pizzas.

## Background of invention

[0002] In recent times, the pizza pie (hereinafter "pizza") has become a popular food dish. Pizzas typically have square or round, flat crust upon which tomato sauce and cheese, as well as other ingredients, are placed before baking in an oven. One reason for the popularity of pizzas is the wide variety of toppings which may be included on the pizza to satisfy the diverse tastes of the consumers. Many pizzas are consumed in the restaurant where the pizzas are made and purchased. However, a very large portion of pizza sales occur through delivery where the made to order pizzas are physically transported and delivered to the customer at the requested location such as their home or work. Various types of packaging systems have been used but most common packaging systems utilize a cardboard box sized to hold one pizza. Typically, the cardboard box has a square top and bottom but other shapes such as hexagon and octagon have also been used.

[0003] Boxes of this type provide only a moderate degree of heat retention for the pizza during delivery. If the boxes are unvented, an extended delivery period can result in a pizza which is both cool and soggy.

[0004] The use of paper-board boxes of adequate strength to contain pizzas is relatively expensive and furthermore, they take up much space during transportation, in the pizzerias and with the litter.

[0005] WO 03/043901 discloses inflatable packaging systems in the form of an envelope like package providing protection for relatively flat items to be shipped. However, there is no disclosure of a central area being able to adapt to the changes in geometry that may arise when the packaging system is inflated.

## Summary of invention

[0006] The present invention offers a new principle for packaging of food, in particular for packaging for pizza delivery and takeaway.

[0007] Accordingly, the present invention relates to a packaging system comprising at least three layers of material, wherein at least two adjacent layers of material are welded together thereby forming an inner system defining at least one compartment, said compartment extending around at least a part of a central area of said two adjacent layers of material, and said compartment being closed by a valve means, and wherein the at least third layer extends above or below at least the central area of the two adjacent layers, and wherein the central area is capable of adapting to changes in geometry through deformation sites or through at least two holes.

[0008] The food to be delivered in the packaging may be arranged on the central area surrounded partly or fully by the at least one compartment. By inflating the compartment the inner system is stabilised thereby being capable of stabilising the food to be delivered.

[0009] The invention further relates to a method for producing a packaging system as defined above, comprising assembling the inner system, welding the inner system, arranging at least a third layer of material below and/or above the inner system and welding remaining seams.

## Drawings

### [0010]

Fig. 1 shows the inner system of the packaging system shown from above.

Fig. 2 shows a packaging system according to the invention in a cut side view.

Fig. 3 shows the packaging system according to the invention shown from above.

Fig. 4 shows the inflated packaging system.

Fig. 5 shows means for inflating.

Fig. 6 shows holes in the flap

Fig. 7 shows stabiling of packaging systems

Fig. 8 shows means for puncturing the inflated packaging system.

## Detailed description of the invention

[0011] The packaging system of the invention has several advantages as compared to prior art pizza packaging. First of all it is possible to produce a packaging capable of supporting the pizza during transport, and secondly also capable of being significantly reduced in size, thereby taking up very little space during storage as well as with the litter.

[0012] The packaging system comprises at least three layers of material, wherein at least two adjacent layers of material are welded together thereby forming an inner system defining at least one compartment. Said at least one compartment is constructed to be inflatable, such as filled with air, by welding the two layers of adjacent material together obtaining an air-tight compartment, whereby the compartment is an air channel. The compartment is closed by a valve means, through which the compartment may be inflated. It is preferred that the inner system comprises only one compartment; however, the packaging system may have more than one compartment, such as two or more compartments arranged concentrically around the central area, or two or more compartments

arranged serially around the central area.

**[0013]** The compartment extends around at least a part of a central area of said two adjacent layers of material. In a preferred embodiment, the compartment extends around more than half of the periphery of the central area, more preferably the compartment extends around more than two thirds of the periphery of the central area, most preferably the compartment extends around the whole periphery of the central area. In a preferred embodiment the compartment is an air channel around the central area.

**[0014]** The ratio of width of the compartment to the width of the central area may be any suitable ratio for the purpose discussed herein. It is preferred that the width of the at least one compartment, before inflation, is less than half the width of the central area. Thereby, the size of the packaging, in particular the size of the central area is adapted most suitably to the size of the food article to be delivered. However, the width of the at least one compartment should not be too small, since the inner system would then lose stability.

**[0015]** The packaging system is preferably constructed from layers of web material being welded together, whereby the packaging system is flat before inflation.

**[0016]** In order to produce an inner system having at least one inflatable compartment around a central area, then in one embodiment the central area comprises at least two holes arranged to allow the width of the central area to increase when the at least one compartment is inflated. The two holes through the material should be arranged opposite each other, preferably adjacent the periphery of the central area. The central area may comprise more than two holes, it is however preferred that an even number of holes is selected, such as at least four holes, such as at least six holes, such as at least eight holes. Independent of the number of holes, it is preferred that holes are arranged in pairs opposite each other, preferably close to the periphery of the central area. The term "hole" is meant to include any holes, independent of size and form, through the layers of the inner system. Preferably, the holes are in the form of slits when the inner system is uninflated.

**[0017]** The shape of the central area may be any suitable shape leading to a stable packaging system. Accordingly, the shape of the central area may be selected from the shapes of circular, oval, triangular, rectangular, hexagonal, octagonal and a square. It is however preferred that the central area is substantially circular.

**[0018]** In a preferred embodiment the rigidity of the inner system is obtained due to the fact that when the at least one compartment is inflated then the central area is extended due to the holes therein, and being stretched within the at least one compartment. To enable this extension and rigid shape, the material of adjacent layers constituting the inner system is preferably an elastic material. In one embodiment the layers constituting the inner system are made from the same material; it may, however, be advantageous to provide different materials for

the two layers, for example by providing a heat stable material for the upper layer of the inner system.

**[0019]** In another embodiment the correct geometry is provided by having deformation sites in the central area capable of adapting to the changes in geometry when the inflatable compartment is inflated. The deformation sites may be manufactured by means of mechanically stretching the layers or by means of local thermal heating.

**[0020]** Furthermore, in one embodiment the central area may be provided at least partly with one or more inflatable channels. Inflatable channels in the central area may provide better insulation properties, and furthermore any fluids may be collected between the channels thereby avoiding spilling and soaking of the food. The inflatable channels may be of any shape or size

**[0021]** Accordingly, the invention also relates to a packaging system, wherein the material of at least one layer of the inner system is heat-stable allowing for transport of hot food articles.

**[0022]** The material of adjacent layers constituting the inner system may be selected from any suitable material capable of providing the functionality as described above. Preferably the material is selected from polymers, copolymers and laminates of polyethylene, polypropylene, polyethylene terephthalate, polyester, polyether, paper laminate, and nylon. Preferably the material is airtight, at least for a period corresponding to the transport time.

**[0023]** In one embodiment at least the outer surface of the material, or the material as a whole is provided with an agent to prevent formation of dew on and in the package during use.

**[0024]** Furthermore, the material may be provided with an anti-static agent, either added to the layer material as such or added to the surface of the material. Also, the material may be surface treated by means of corona-treatment or other methods in order to be able to apply text, logos and other prints to the packaging material.

**[0025]** The packaging system also includes at least a third layer extending above or below at least the central area of the two adjacent layers. It is preferred that the third layer extends above or below the central area and the at least one compartment of the two adjacent layers. The third layer may cover either the top or the bottom of the food article to be transported.

**[0026]** It is more preferred that the packaging system further comprise a fourth layer of material, wherein the third layer and the fourth layer are welded together at least at a part of their periphery, said welding being positioned so that the third and the fourth layer is capable of housing the inner system yet allowing access to the inner system.

**[0027]** By enclosing the inner system within a housing constructed from the third and the fourth layer, the food article arranged on the inner system is totally covered both on top and on bottom. Furthermore, the housing consisting of the third and the fourth layer may add to the stabilisation of the inner system leading to a rigid packaging system when the at least one compartment is in-

flated.

**[0028]** In order to improve the stability it is preferred that the inner system is kept in a tight fit between the third and the fourth layer. This may be obtained by constructing the layers as described in relation to Fig. 2 with respect to a circular packaging system. The tight fit and stability is further increased if the material selected for the third and/or the fourth layer is less elastic than the layers of the inner system.

**[0029]** The material of the third and/or the fourth layer may be any suitable material capable of providing the functionality described herein. In a preferred embodiment the material of the third and/or the fourth layer is selected from polymers, co-polymers and laminates of polyethylene, polyester, polyether, paper laminate, and nylon.

**[0030]** The third and/or the fourth layer may be constructed with a free end, i.e. that a part of the third and/or the fourth layer is not welded to another part of the packaging system. The free end facilitates access to the inner system. The free end may comprise a pocket, for example a pocket constructed by reversing a part of the free end of the third and/or a part of the free end of the fourth layer and welding it to the free end of said layer. The pocket provides the layer with a function as a reservoir receiving any food material falling from the food article arranged on the inner system. Furthermore, the pocket may also be folded around the inner system thereby closing the packaging system. Accordingly, the pocket may be positioned to extend around the edge of the inner system, when said layer is positioned above or below the inner system.. The form of the pocket may be any suitable for closing the packaging system.

**[0031]** The packaging system according to the invention having a pocket capable of closing the packaging system is particularly suitable for maintaining the initial temperature of food articles arranged on the inner system during transport

**[0032]** In another embodiment the packaging system is provided with a separate layer for closing the packaging system, for example a separate layer having a pocket as described above in opposite sites for extending around the inner system. The layer may be fitted with a reclosable system such as Velcro or adhesive.

**[0033]** When providing the packaging system with a closing layer it may be advantageous to provide perforations or other types of holes in the closing layer thereby providing capabilities for allowing any steam to escape the packaging system while preferably maintaining the food inside at its desired temperature. The holes may be provided by any suitable means such as selective heating, mechanically using for example brushes or punching. The form of the holes may be any suitable form.

**[0034]** In one embodiment, the packaging system according to the invention further comprises a fifth layer of material, said fifth layer being positioned between the third layer and the inner system. The fifth layer may for example be an absorptive layer, whereby the packaging

system is particular suited for transporting hot food articles, since the absorptive fifth layer may absorb any condensed moisture in the packaging.

**[0035]** The packaging system according to the invention is preferably stored un-inflated, to be inflated after arranging the food article on the central area of the inner system. Inflation is preferably carried out by inserting air into the at least one compartment. Air may be inserted through at least one valve means into the at least one compartment, said valve means being any suitable valve means. In a preferred embodiment the valve means is constituted by one or two flaps of material connected to the inner system, space between said flaps communicating with the interior of the at least one compartment. After inflation the flaps are closed, for example by being welded together. In a preferred embodiment the inflation is conducted with an instrument capable of welding the flaps after inflation.

**[0036]** In one embodiment the inflation and welding may be performed in one operation by means of an apparatus capable of inflation and welding. Thereby, it is also possible to standardize correct inflation, such as by means of volume or pressure.

**[0037]** In another embodiment the flaps consist of a reclosable valve so that the packaging system can be inflated and deflated more than once.

**[0038]** The packaging system according to the invention may be used for transport and delivery of a variety of food articles, such as pizzas, hamburgers, cakes, pancakes, tarts, , soups, ice cream and other full hot, cold and tempered meals.

**[0039]** The food article is preferably arranged on the central area of the inner system, after which the at least one compartment is inflated, and optionally a pocket of either the third and/or the fourth layer is folded around the inner system closing the packaging system. After transport and delivery the packaging system is opened, and the food article may be consumed. The packaging system may be deflated before or after removing the food article. The deflation may be carried out by any suitable means, for example by puncturing the at least one compartment with a knife or a fork.

**[0040]** Due to the design of the packaging system and the materials selected therefor, the space taken up by the packaging system before and after use is much smaller than with previously known boxes. Furthermore, the packaging system may be constructed from material leading to less pollution of the environment when destroyed after use. The material used may be less energy consuming to manufacture leading to less energy use.

**[0041]** The packaging system is preferably made of materials provided as web material, whereby the inner system as well as the housing may be produced in a process line capable of welding the material in the pre-determined form and cutting away excess material. It is preferred that all layers of the packaging system are assembled in the process line, for example by assembling the inner system and welding the inner system and sub-

sequently arranging the other layers below and above the inner system and welding the remaining parts.

**[0042]** Furthermore, the packaging system according to the invention may be provided with means for stabling two or more packaging system in a stable manner. In one embodiment a stabling device, such as a wedge formed device may be inserted between two packaging system at two or more positions. In another embodiment the packaging system is provided with projections and corresponding cavities so that projections in one packaging system fits into cavities in the adjacent packaging system. The cavities may in one embodiment be the space between two neighbouring projections. The means for stabling may allow for a space between each packaging system thereby providing possibilities for excess steam to escape. When providing means for stabling each packaging system may be considered the closing means for the packaging system underneath, and consequently only the top packaging system may need its own closing means.

**[0043]** The packaging system according to the invention may be provided with different means for puncturing the packaging system after use, such as a slot for easy tearing until puncture occurs is provided, as well as a perforated foil for easy tearing until puncture occurs. In addition hereto the packaging system may be provided with a marked spot for perforation with a sharp object such as a fork. All the different means may co-exist in one packaging system, or the packaging system may comprise only one type of means for puncturing.

#### Detailed description of the drawings

**[0044]** Reference signs in the figures:

1	packaging system
2	inner system
3	layer of adjacent layers
4	compartment
5	central area
6	hole in central area
7	third layer
8	fourth layer
9	pocket
10	valve
11	fifth layer
12	connection of the two adjacent layers
13	connection between housing and inner system
14	flap
15	free end
16	channel
17	folding line
18	means for inflation
19	means for closing valve
20a, 20b, 20c	different types of holes in flap
21	projection
22	cavity

23	slot for easy tearing
24	perforated foil for easy tearing
25	marked spot
26	feeding channel
27	expandable area

**[0045]** Fig. 1 shows the inner system 2 of a packaging system 1 according to the invention before inflation. The inner system 2 comprises a compartment 4 being an air channel extending around the periphery of the central area 5. The central area 5 has six holes 6 allowing the central area 5 to extend when the compartment 4 is inflated. The size of the central area 5 is preferably adapted to the size of the food article to be transported in the packaging system 1.

**[0046]** Fig. 2 shows a cut view through the packaging system 1 of the invention. The inner system 2 is inflated showing the compartment 4 filled with air. Within the inflated compartment 4 the central area 5 is extended. As may be seen from the figure 2, the central area 5 is constructed from the two adjacent layers 3', 3" forming the inner system 2. The two adjacent layers 3', 3" are welded together at connection 12', 12" thereby forming the compartment 4. The inner system 2 is arranged in a housing of third layer 7 and fourth layer 8 welded together. As may be seen from the figure 2 the dimension of the housing of the third layer 7 and the fourth layer 8 is adapted to the dimension of the inner system 2, so that the inner system 2 is kept in a tight fit within the housing. In a preferred embodiment the layers of the housing are connected to the inner system at least in one connection 13, for example by a common welded seam. It is however preferred that only one or a few points of connections be provided to enable the tight fit described above.

**[0047]** In figure 2 a fifth layer 11 is provided between the third layer 7 and the inner system 2.

**[0048]** Fig. 3 shows the packaging system 1 according to the invention before inflation. The inner system 2 is shown in broken lines within the housing constituted by the third layer 7 and the fourth layer 8. A valve 10 is provided between two flaps 14 of the inner system. After inflation the valve may be closed by welding a seam on the flaps. In this embodiment the third layer 7 and the fourth layer 8 extend over the inner system with a free end 15. The housing is connected to the inner system 2 at points of connection 13', 13".

**[0049]** Fig. 4 shows the packaging system 1 according to the invention after inflation through valve 10 into. The central area 5 is provided with inflated channels 16. Furthermore, the packaging system 1 is provided with a flap 14 for closing the packaging system by folding in folding line 17. A pocket 9 is provided in the free end 15. A feeding channel 26 allows air to pass on to the channels 16. The central area 5 is equipped with an expandable area 27.

**[0050]** Fig. 5 shows an example of inflating the compartment 4 through valve 10 by means of inflation 18 and subsequently closing the valve 10 by welding means 19.

**[0051]** Fig. 6 shows different types of holes 20a, 20b,

and 20c in the flap 14.

**[0052]** Fig. 7 shows stabling of two packaging systems according to the invention, wherein projections 21 fits into cavities 22 in the below packaging system.

**[0053]** Fig. 8 shows different means for puncturing the packaging system after use, wherein a slot 23 for easy tearing until puncture occurs is provided, as well as a perforated foil 24 for easy tearing until puncture occurs. In addition hereto is a marked spot 25 for perforation with a sharp object such as a fork. All the different means may co-exist in one packaging system, or the packaging system may comprise only one type of means for puncturing.

## Claims

1. A packaging system (1) comprising at least three layers of material, wherein at least two adjacent layers of material (3) are welded together thereby forming an inner system (2) defining at least one compartment (4), said compartment (4) extending around at least a part of a central area (5) of said two adjacent layers of material (3), and said compartment (4) being closed by a valve means (10), and wherein the at least third layer (7) extends above or below at least the central area (5) of the two adjacent layers (3), **characterized in that** the central area (5) is capable of adapting to changes in geometry through deformation sites or through at least two holes (6).
2. The packaging system (1) according to claim 1, wherein the at least one compartment (4) is an air channel (16).
3. The packaging system (1) according to any of the preceding claims, wherein the at least one compartment (4) is an air channel (16) extending around the central area (5).
4. The packaging system (1) according to any of the preceding claims, wherein the width of the at least one compartment (4), before inflation, is less than half the width of the central area (5).
5. The packaging system (1) according to any of the preceding claims, wherein the central area (5) comprises at least two holes (6) arranged to allow the width of the central area (5) to increase when the at least one compartment (4) is inflated.
6. The packaging system (1) according to any of the preceding claims, wherein the shape of the central area (5) is selected from the shapes of circular, oval, triangular, rectangular, hexagonal, octagonal and a square, preferably circular.
7. The packaging system (1) according to any of the

preceding claims, wherein the third layer (7) extends above or below the central area (5) and the at least one compartment (4) of the two adjacent layers (3).

8. The packaging system (1) according to any of the preceding claims, further comprising a fourth layer (8) of material, wherein the third layer (7) and the fourth layer (8) are welded together at least at a part of their periphery, said welding being positioned so that the third (7) and the fourth layer (8) is capable of housing the inner system (2).
9. The packaging system (1) according to claim 8, wherein the inner system (2) is kept in a tight fit between the third (7) and the fourth layer (8).
10. The packaging system (1) according to any of the preceding claims, wherein the material of adjacent layers (3) constituting the inner system (2) is an elastic material.
11. The packaging system (1) according to any of the preceding claims, wherein the material of adjacent layers (3) constituting the inner system (2) is selected from polymers, co-polymers and laminates of polyethylene, polypropylene, polyethylene terephthalate, polyester, polyether, paper laminate, and nylon.
12. The packaging system (1) according to any of the preceding claims, wherein the material of at least one layer of the inner system (2) is heat stable.
13. The packaging system (1) according to any of the preceding claims, wherein the third (7) and/or the fourth layer (8) is less elastic than the layers of the inner system (2).
14. The packaging system (1) according to any of the preceding claims, wherein the material of the third (7) and/or the fourth layer (8) is selected from polymers, co-polymers and laminates of polyethylene, polyester, polyether, paper laminate, and nylon.
15. The packaging system (1) according to any of the preceding claims, further comprising a fifth layer (11) of material, said fifth layer (11) being positioned between the third layer (7) and the inner system (2).

## Patentansprüche

1. Verpackungssystem (1), das mindestens drei Material-Schichten umfaßt, worin mindestens zwei benachbarte Material-Schichten (3) miteinander verschweißt sind und dadurch ein inneres System (2) ausbilden, das mindestens einen Raum (4) definiert, worin sich der Raum (4) um mindestens einen Teil des zentralen Bereichs (5) der zwei benachbarten

Material-Schichten (3) erstreckt und worin der Raum (4) durch ein Ventilmittel (10) verschlossen ist, und worin sich die mindestens dritte Schicht (7) mindestens über oder unter den zentralen Bereich (5) der zwei benachbarten Schichten (3) erstreckt, **dadurch gekennzeichnet, dass** sich der zentrale Bereich (5) an Änderungen der Geometrie aufgrund von Deformationsstellen oder aufgrund mindestens zwei Löcher (6) anpassen kann.

2. Verpackungssystem (1) nach Anspruch 1, worin der mindestens eine Raum (4) ein Luftkanal (16) ist.
3. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin der mindestens eine Raum (4) ein Luftkanal (16) ist, der sich um den zentralen Bereich (5) erstreckt.
4. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin die Weite des mindestens einen Raums (4) vor dem Aufblähen weniger als die Hälfte der Weite des zentralen Bereichs (5) ist.
5. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin der zentrale Bereich (5) mindestens zwei Löcher (6) umfasst, die so angeordnet sind, dass die Weite des zentralen Bereichs (5) ansteigen kann, wenn der mindestens eine Raum (4) aufgebläht ist.
6. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin die Form des zentralen Bereichs (5) ausgewählt ist unter den Formen, ringförmig, oval, dreieckig, rechteckig, hexagonal, oktagon und quadratisch, vorzugsweise ringförmig.
7. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin sich die dritte Schicht (7) über und unter dem zentralen Bereich (5) erstreckt und dem mindestens einen Raum (4) der zwei benachbarten Schichten (3).
8. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, welches weiter eine vierte Material-Schicht (8) umfasst, worin die dritte Schicht (7) und die vierte Schicht (8) mindestens an einem Teil ihres Umfangs miteinander verschweißt sind, worin die Verschweißung so positioniert ist, dass die dritte (7) und vierte (8) Schicht das innere System (2) aufnehmen kann.
9. Verpackungssystem (1) nach Anspruch 8, worin das innere System (2) in einer festen Passung zwischen der dritten (7) und vierten Schicht (8) gehalten wird.
10. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin das Material der benachbarten Schichten (3), das das das innere System (2)

darstellt, ein elastisches Material ist.

11. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin das Material der benachbarten Schichten (3), das das innere System (2) darstellt, ausgewählt ist unter Polymeren, Copolymeren und Laminaten von Polyethylen, Polypropylen, Polyethylenterephthalat, Polyester, Polyether, Papierlaminat und Nylon.
12. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin das Material der mindestens einen Schicht des inneren Systems (2) hitzestabil ist.
13. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin die dritte (7) und vierte Schicht (8) weniger elastisch ist als die Schichten des inneren Systems (2).
14. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, worin das Material der dritten (7) und vierten Schicht (8) ausgewählt ist unter Polymeren Copolymeren und Laminaten von Polyethylen, Polyester, Polyether, Papierlaminat und Nylon.
15. Verpackungssystem (1) nach einem der vorstehenden Ansprüche, welches weiter eine fünfte Material-Schicht (11) umfasst, worin die fünfte Schicht (11) zwischen der dritten (7) und dem inneren System (2) angeordnet ist.

## Revendications

1. Système d'emballage (1) comprenant au moins trois couches de matériau, dans lequel au moins deux couches de matériau adjacentes (3) sont soudées ensembles, formant ainsi un système interne (2) définissant au moins un compartiment (4), ledit compartiment (4) s'étendant autour d'au moins une partie d'une zone centrale (5) desdites deux couches de matériau adjacentes (3), et ledit compartiment (4) étant fermé par un moyen de valve (10), et dans lequel l'au moins une troisième couche (7) s'étend au-dessus ou au-dessous d'au moins la zone centrale (5) des deux couches adjacentes (3), **caractérisé en ce que** la zone centrale (5) est capable de s'adapter aux changements de géométrie par le biais de sites de déformation ou par le biais d'au moins deux trous (6).
2. Système d'emballage (1) selon la revendication 1, dans lequel l'au moins un compartiment (4) est un canal d'air (16).
3. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel l'au moins un compartiment (4) est un canal d'air (16)

s'étendant autour de la zone centrale (5) .

4. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel la largeur de l'au moins un compartiment (4), avant gonflage, est inférieure à la moitié de la largeur de la zone centrale (5). 5
5. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel la zone centrale (5) comprend au moins deux trous (6) agencés pour permettre à la largeur de la zone centrale (5) d'augmenter lorsque l'au moins un compartiment (4) est gonflé. 10
6. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel la forme de la zone centrale (5) est choisie parmi les formes circulaire, ovale, triangulaire, hexagonale, octogonale et carrée, de préférence circulaire. 20
7. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel la troisième couche (7) s'étend au-dessus ou au-dessous de la zone centrale (5) et de l'au moins un compartiment (4) des deux couches adjacentes (3). 25
8. Système d'emballage (1) selon l'une quelconque des revendications précédentes, comprenant en outre une quatrième couche (8) de matériau, dans lequel la troisième couche (7) et la quatrième couche (8) sont soudées ensemble au moins au niveau d'une partie de leur périphérie, ladite soudure étant positionnée de telle sorte que la troisième (7) et la quatrième couche (8) soient capables de loger le système interne (2). 30 35
9. Système d'emballage (1) selon la revendication 8, dans lequel le système interne (2) est maintenu en ajustement serré entre la troisième (7) et la quatrième couche (8). 40
10. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel le matériau des couches adjacentes (3) constituant le système interne (2) est un matériau élastique. 45
11. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel le matériau des couches adjacentes (3) constituant le système interne (2) est choisi parmi les polymères, les copolymères et les stratifiés de polyéthylène, polypropylène, poly(téréphtalate d'éthylène), polyester, polyéther, le papier stratifié et le nylon. 50 55
12. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel le matériau d'au moins une couche du système interne (2)

est thermostable.

13. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel la troisième (7) et/ou la quatrième couche (8) sont moins élastiques que les couches du système interne (2).
14. Système d'emballage (1) selon l'une quelconque des revendications précédentes, dans lequel le matériau de la troisième (7) et/ou de la quatrième couche (8) est choisi parmi les polymères, les copolymères et les stratifiés de polyéthylène, polyester, polyéther, le papier stratifié et le nylon.
15. Système d'emballage (1) selon l'une quelconque des revendications précédentes, comprenant en outre une cinquième couche (11) de matériau, ladite cinquième couche (11) étant positionnée entre la troisième couche (7) et le système interne (2).



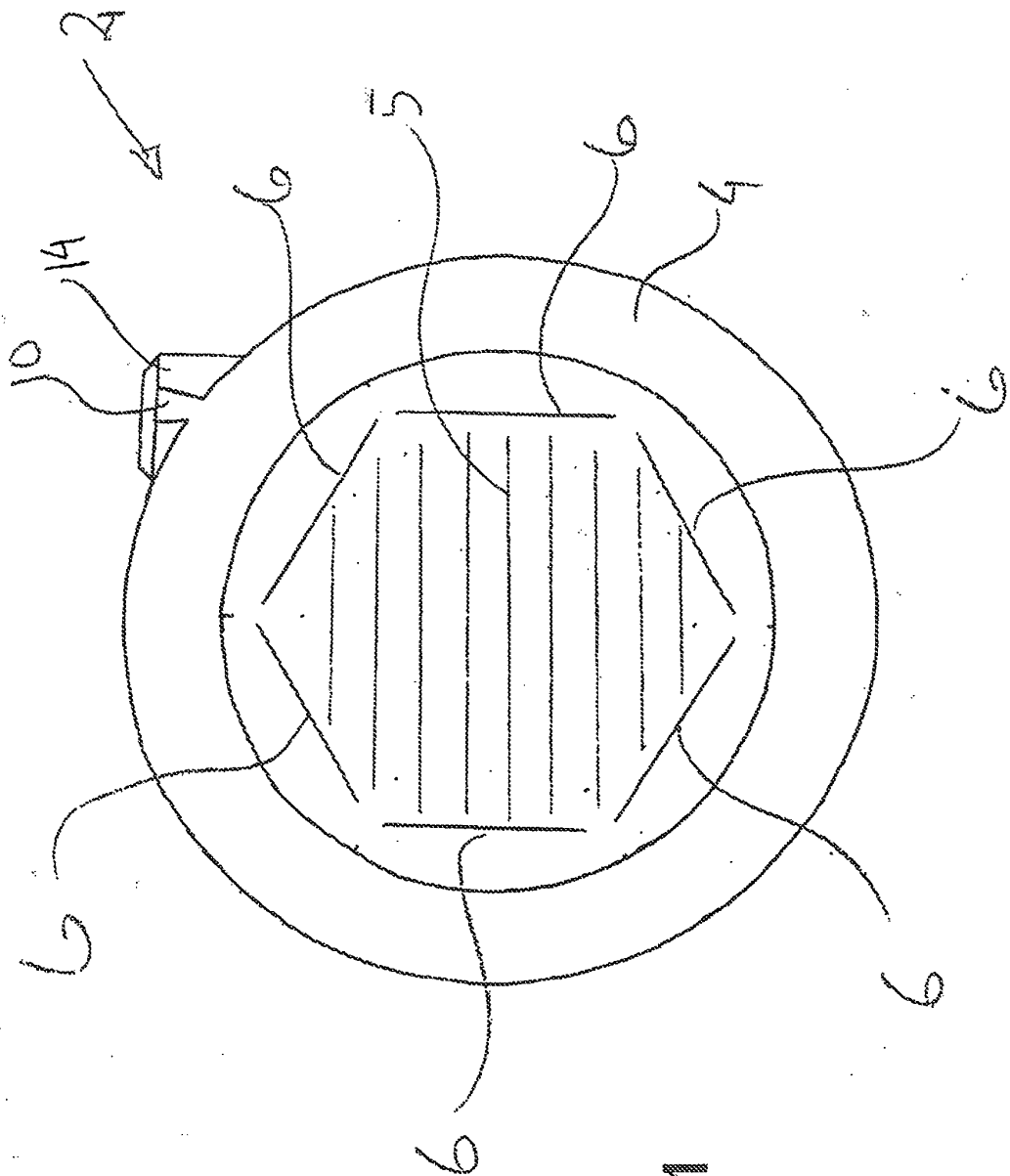


Fig. 1

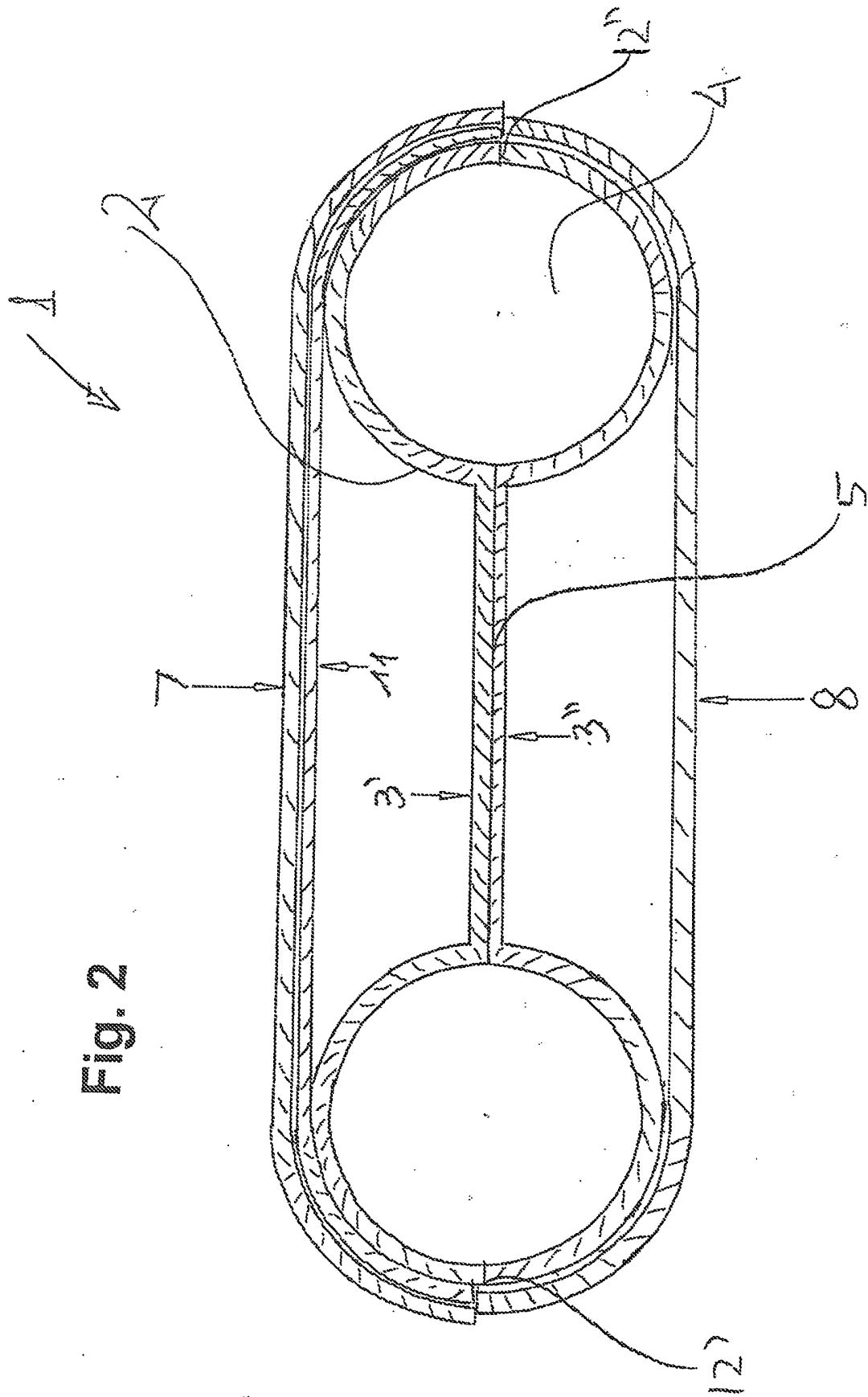


Fig. 2

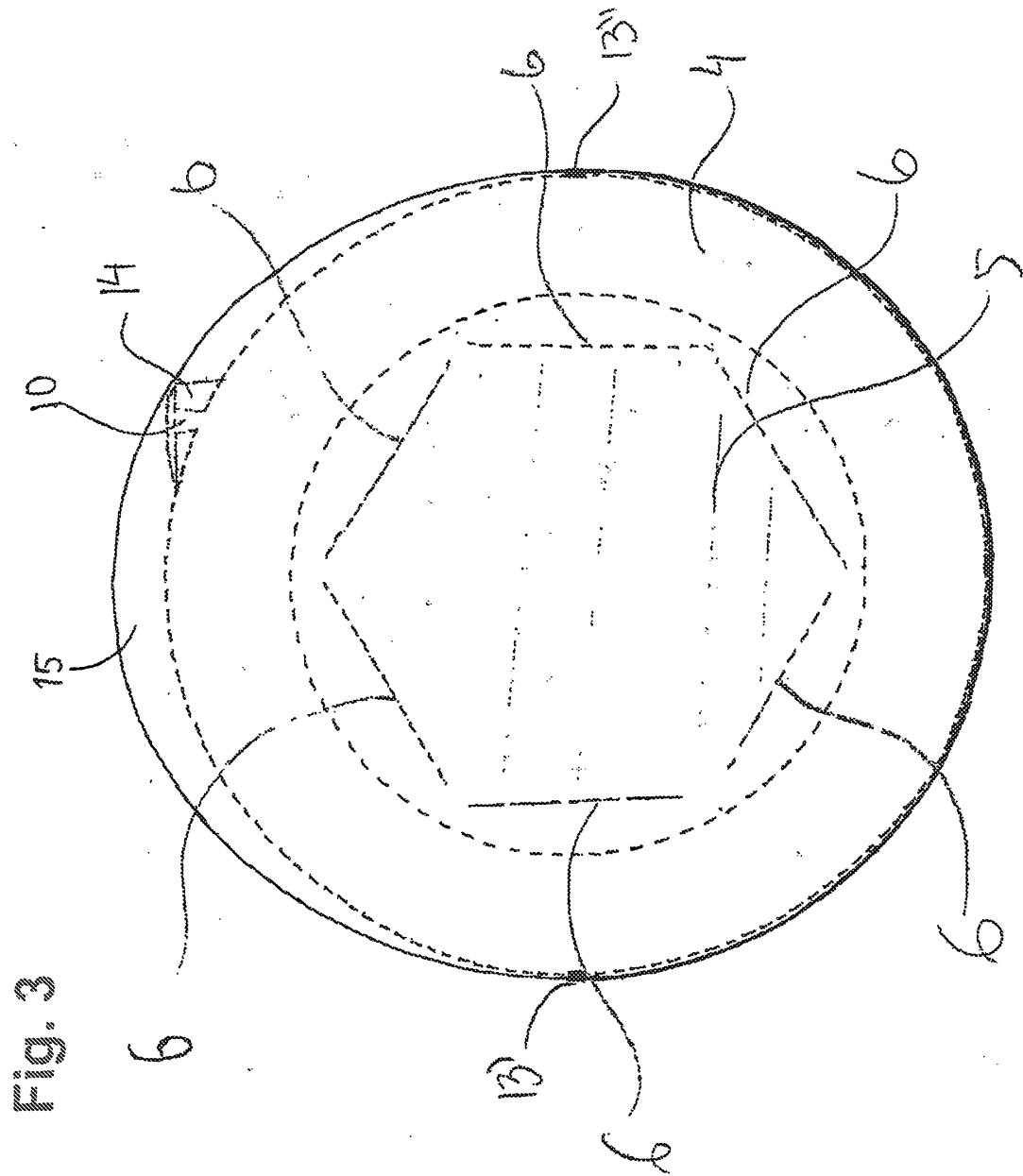
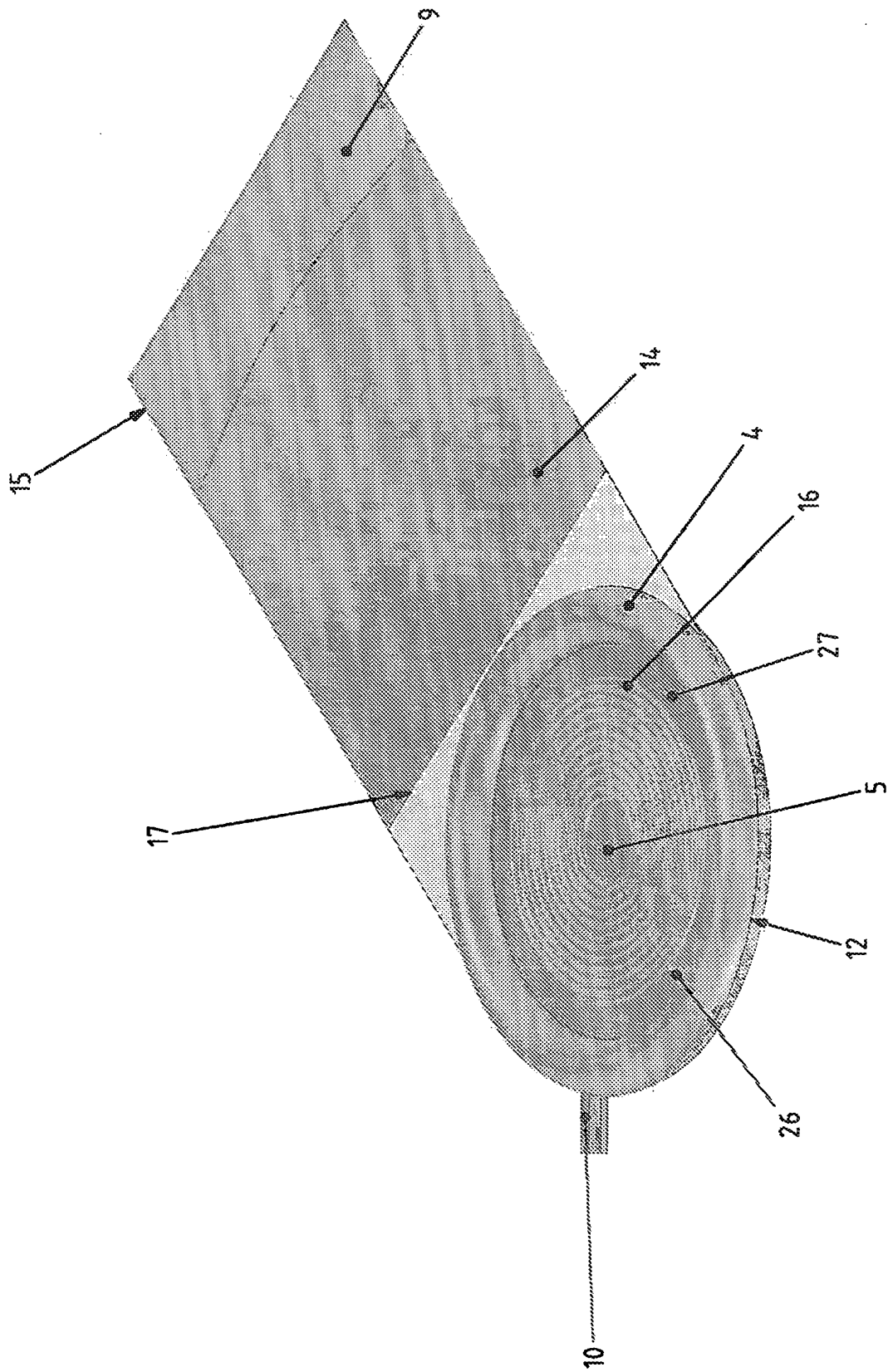
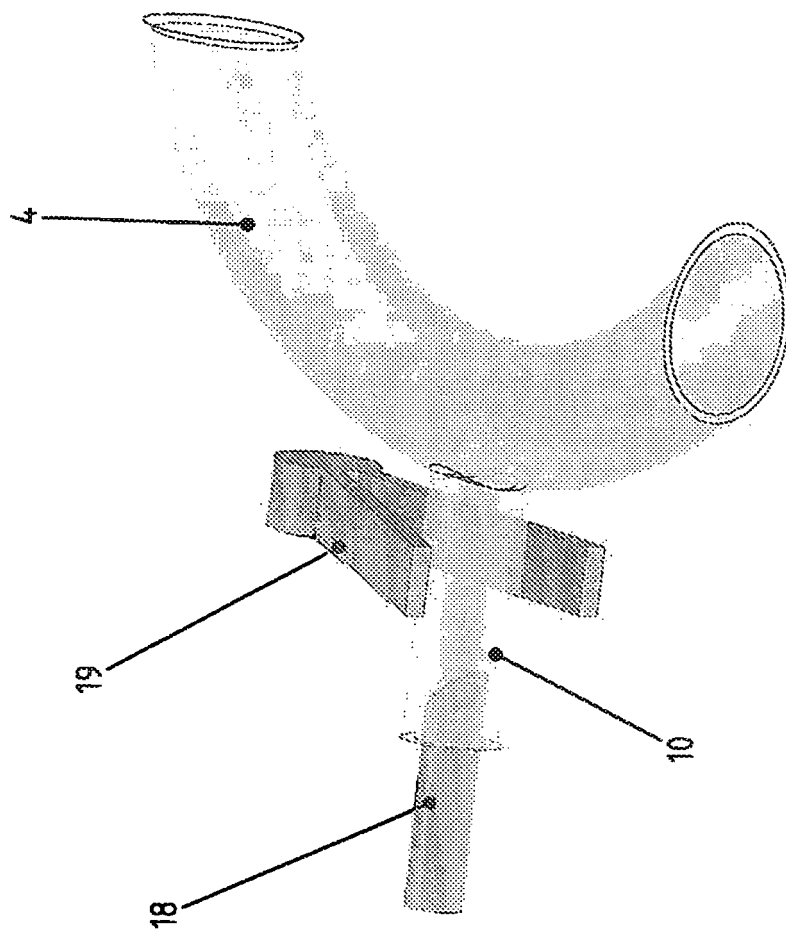
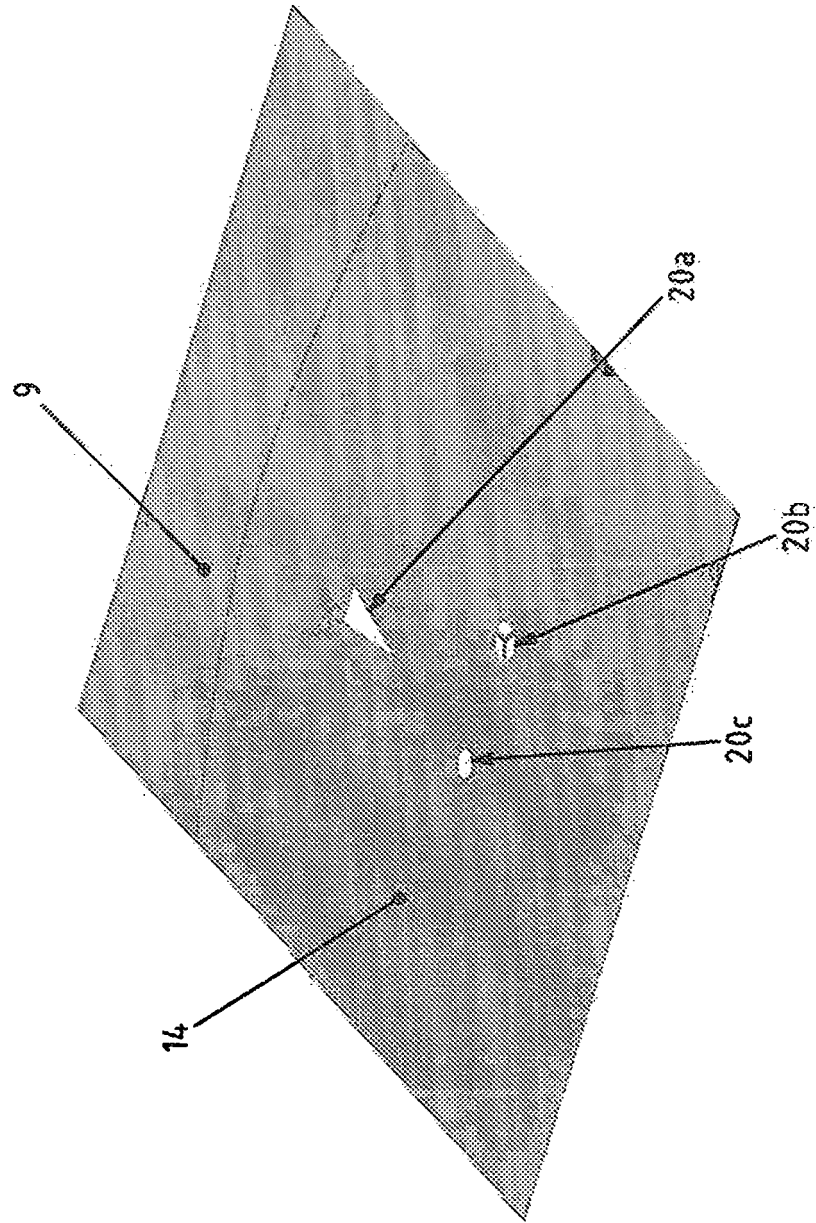
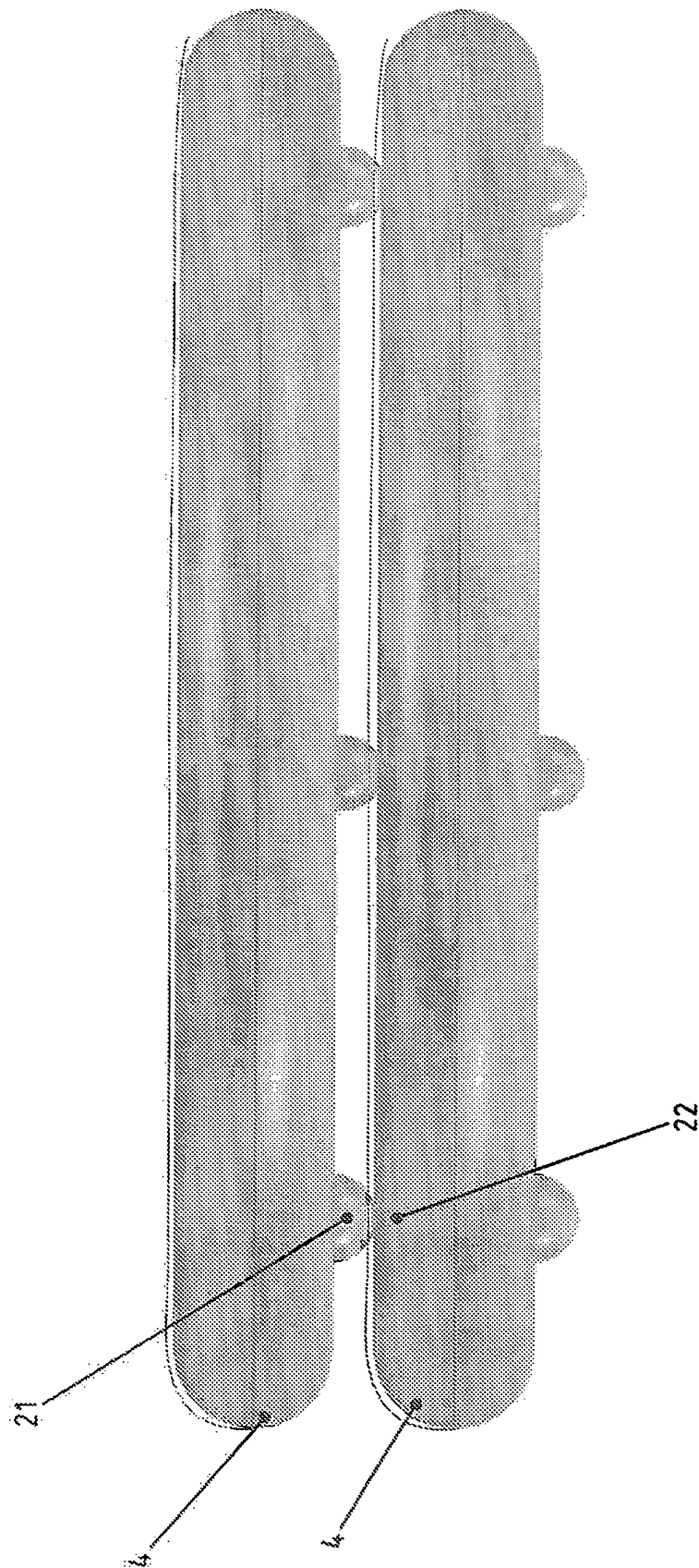


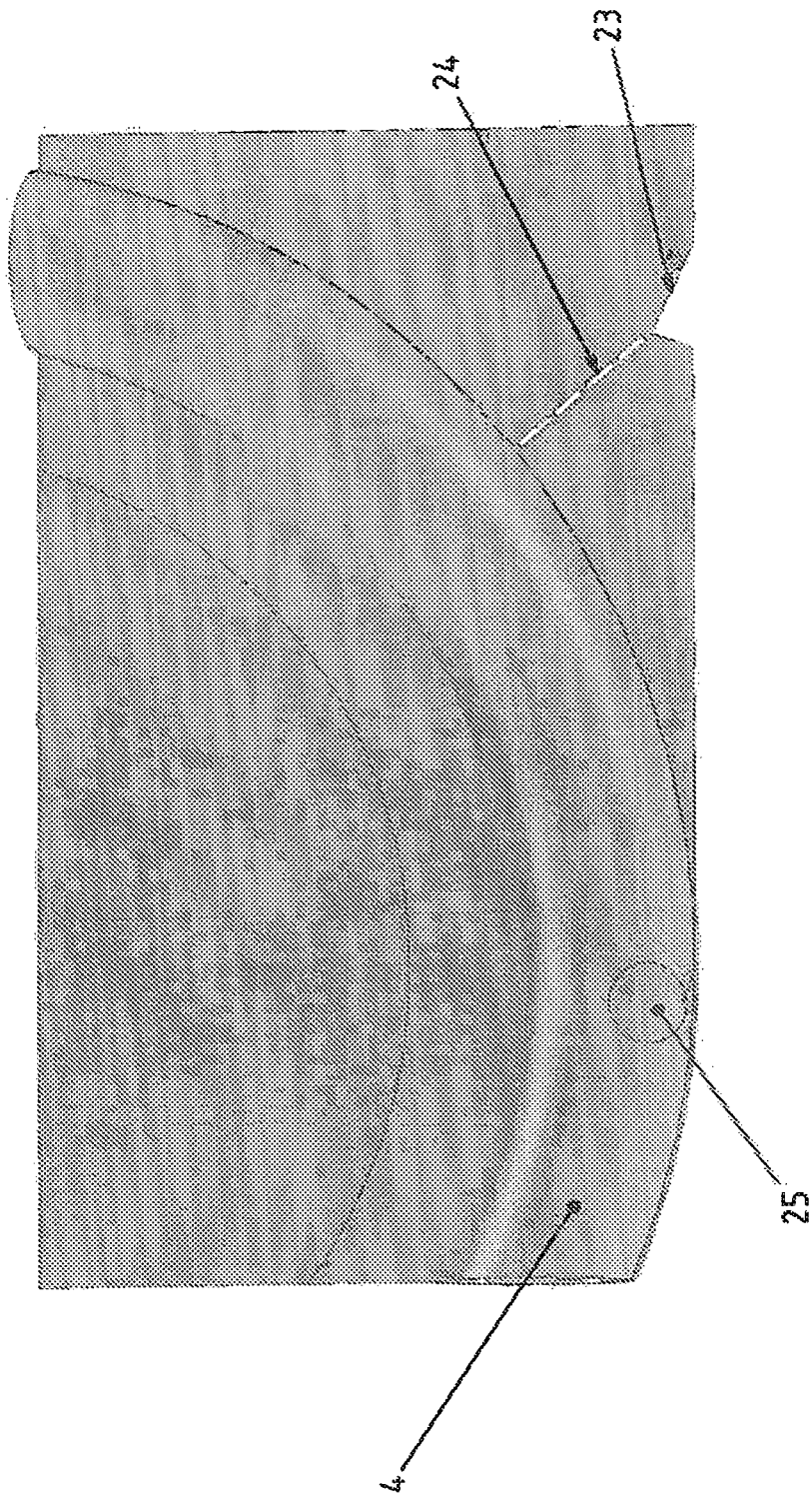
Fig. 3













**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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