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(54) Ball bladder holding a device

(57) A ball bladder comprises an outer wall and at least one inner wall where the at least one inner wall has mounting means to hold a device at a center position of the ball. The outer wall as well as the inner wall may be built from multiple pieces. The mounting means may comprise a single pocket or two pockets which are located at opposite sides of the inner wall. The inner wall may have an opening at this position. The device may be a passive or active device such as a magnet, a radio receiver/transmitter or a sensor. An electric wire or antenna may be provided to be connected with the device.

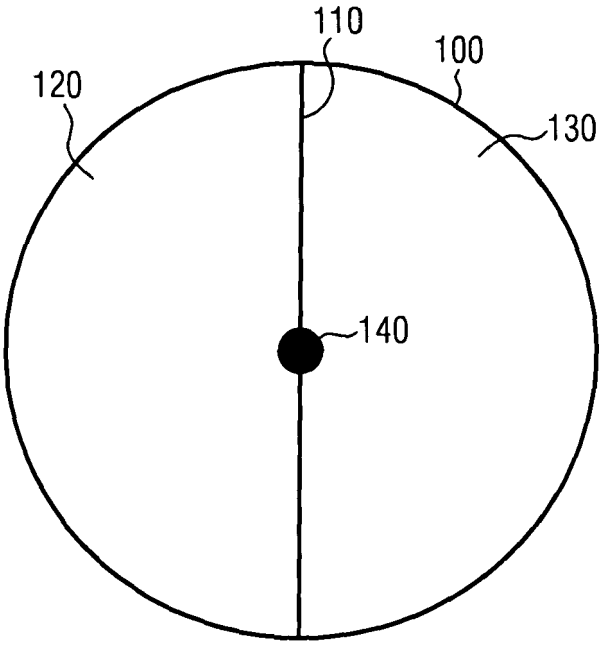

FIG. 1A

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The invention generally relates to ball bladders and more particularly to ball bladders having at least one inner wall in addition to the outer wall.

2. Related Art

[0002] Sports balls, such as soccer balls are known in the art as including a bladder which is made of elastic material and which contains the air at a certain pressure necessary for the ball to have the desired jump capabilities.

[0003] From DE 39 18 038 C2, a bladder for a ball is known that has a number of chambers. These chambers are made by having inner walls within the outer wall. The inner walls have air holes to allow air flowing from one chamber to another chamber.

SUMMARY OF THE INVENTION

[0004] While the conventional ball bladders are optimized with respect to the desired mechanical properties of the ball, such as the jumping behavior, the invention has been made to add further functionality to the ball. To achieve this, the invention provides a ball bladder having mechanical means on at least one inner wall to hold a device at a center position of the ball. The device may be a passive device such as a magnet, or an active device such as an electronic chip, a sensor or a radio transmitter or receiver. Thus, besides the mechanical properties already achieved by conventional ball bladders, the ball bladder of the invention is additionally prepared to hold a device to achieve further functionalities.

[0005] The invention is what is described in the independent claims. Preferred embodiments are defined in the dependent claims.

[0006] By having the mounting means affixed to an inner wall of the ball bladder, only a minimum number of additional mechanical pieces are required to hold the device. Further, by holding the device at a center position of the ball, there is substantially no inference on the mechanical behavior of the ball.

[0007] To hold the device, the mounting means of at least one inner wall may have one or two pockets to facilitate inserting the device when manufacturing the ball. When there are two pockets located on opposite sides of the inner wall, it is easiest to insert the device as the person manufacturing the ball does not need to find the correct orientation of the inner wall since the device can be inserted into the mounting means from both sides of the inner wall. This is particularly helpful if there is an opening in the inner wall between both pockets.

[0008] When the device is an active device, the ball bladder may advantageously further have at least one electrically conductive wire and/or antenna. The wires and antennas may be used to feed electric power to the device or may be required by the device to successfully achieve its functionality as a radio transmitter or receiver, or sensor, etc. When having the wires and antennas provided as part of the ball bladder, the electrical behavior of the device is secured and the manufacturing process significantly facilitated.

[0009] Moreover, it is possible to optimize the number, size, type and/or position of any wire or antenna together with the optimization of the mechanical behavior of the ball. For instance, if the ball bladder is built from multiple seam-welded pieces, the wire/antenna optimization may take account of the elasticity of the seams with respect to the desired ball jump capabilities. In this regard, it may be particularly advantageous to have at least some of the wires or antennas placed at least in part along a welded seam.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The accompanying drawings are incorporated into and form a part of the specification for the purpose of explaining the principles of the invention. The drawings are not to be construed as limiting the invention to only the illustrated and described examples of how the invention can be made and used. Further features and advantages will become apparent from the following and more particular description of the invention, as illustrated in the accompanying drawings, wherein:

Figure 1 A is a cross-sectional view of a ball bladder having two chambers and holding a device, according to an embodiment;

Figure 1 B is a cross-sectional view of a ball bladder having four chambers and holding a device, according to an embodiment;

Figure 2A illustrates a quarter piece of an outer wall of the ball bladder according to an embodiment;

Figure 2B illustrates an inner wall of the ball bladder according to an embodiment;

Figure 2C illustrates another inner wall of the ball bladder according to an embodiment;

Figure 3 illustrates a center cross arrangement built from the inner wall of Figure 2B and two pieces of the inner walls shown in Figure 2C, according to an embodiment;

Figure 4 illustrates the outer wall of the ball bladder according to an embodiment, built from multiple pieces;

Figure 5A illustrates an inner wall of the ball bladder according to an embodiment, holding a device connected to two electrically conductive wires;

Figure 5B illustrates an inner wall holding a device connected to an antenna, according to an embodiment;

Figure 5C illustrates another embodiment of an inner wall carrying a device having an antenna;

Figure 6 illustrates an inner wall having welded seams and electrically conductive wires placed along a seam;

Figure 7A is a top view on an inner wall of the ball bladder according to an embodiment, having a pocket to hold a device;

Figure 7B is a cross-sectional view of the inner wall of Figure 7A when there is only one pocket;

Figure 7C is a cross-sectional view of the inner wall of Figure 7A having two pockets at opposite sides of the inner wall, and an opening between the two pockets, according to an embodiment; and

Figure 7D is a top view of an inner wall having two pockets at opposite sides of the inner wall where the openings of the pockets are turned by 90 degrees with respect to each other, according to an embodiment.

DETAILED DESCRIPTION OF THE INVENTION

[0011] The illustrative embodiments of the present invention will be described with reference to the figure drawings wherein like elements and structures are indicated by like reference numbers.

[0012] Turning now to the drawings, and in particular, to Figures 1 A and 1 B, the ball bladder of the embodiments has an outer wall 100, 150 and at least one inner wall 110, 160, 170. For instance, the embodiment of Figure 1A may have one inner wall whereas the ball bladder of Figure 1B may have two inner walls. It is noted that each of the depicted inner walls may be built from multiple pieces which could each be regarded as an inner wall. For instance, the inner wall 160 may be provided as one piece whereas the left side and the right side of 170 can be provided separately as different inner walls. In this example, the ball bladder of Figure 1 B would include three inner walls.

[0013] It is noted that further embodiments exist having more than one, two or three inner walls. In particular, the invention is not restricted to a certain number of inner walls.

[0014] The ball bladder of Figure 1A is shown to have two chambers 120, 130 separated by the inner wall 110. The ball bladder shown in Figure 1B is shown to have four chambers. It is noted that further embodiments exist where the number of chambers deviates from two or four. In fact, the invention is not restricted to a certain number of chambers, and embodiments may exist which have one, three, five or any other number of chambers.

[0015] It is further apparent from the embodiments of Figures 1A and 1B that a device 140, 180 is located at a center position of the ball bladder. In the present embodiments, the center position of the ball bladder is the same as the center position of the ball having incorporated the ball bladder. It is however noted that where the center position of the ball bladder deviates from the center position of the ball, embodiments may exist where the device is located at a center position of the ball bladder, and other embodiments exist where the device is positioned at a center position of the ball. In this regard, "center position" may refer to the geometric center or to the mass center.

[0016] It is further noted that Figures 1A and 1 B depict a device 140, 180 to be of a circular shape. This is not intended to be limiting the invention to devices of only this shape. Rather, the device may have any size or shape.

[0017] In an embodiment, the outer wall 100, 150 of the ball bladder may be built by attaching together multiple pieces. For instance, Figure 2A depicts an embodiment of a quarter piece 200 which may be used to manufacture an outer wall. In this embodiment, four quarter pieces 200 are used, and these four quarter pieces are attached together at the longer portions of the welded seams 210. This results in a substantially spherical-shaped outer wall having openings at the upper end and the lower end. To close these openings, two end pieces 400, 410 can be used as shown in Figure 4. One of the end pieces may have a valve which is necessary to pump air into the ball bladder.

[0018] Turning now to Figure 2B, an embodiment of an inner wall 220 is shown. The inner wall 220 has a number of air holes 230 to allow the chambers to exchange air whenever the ball is deformed. It is noted that the invention is not limited to a certain number of air holes, and embodiments may exist having zero or only one air hole in an inner wall. It is however noted that the number of ten to fifteen air holes is found to be particularly advantageous with respect to allowing an efficient air exchange between the chambers with substantially no negative influence on the mechanical properties of the inner wall of the ball bladder.

[0019] Further, the inner wall 220 of Figure 2B schematically shows the center position 250 where mounting means to hold a device may be positioned. As described in more detail below, the inner wall may also have an opening in the center position.

[0020] Figure 2C shows another embodiment of an inner wall 260 having air holes 270 and a center position. Like the inner wall of Figure 2B, where the border of the inner wall may be prepared to be affixed to the outer wall

of the ball bladder using welded seams 240, the inner wall 260 of Figure 2C may have similar seams 280.

[0021] It is further apparent from Figure 2C that the inner wall 260 is substantially half the size of the inner wall 220 of Figure 2B. In this embodiment, an even number of the inner wall 260 may be preferably used to manufacture a ball bladder according to an embodiment. For instance, two pieces of the inner wall 260 shown in Figure 2C are necessary. In another embodiment, the number of inner walls may be odd.

[0022] It is further apparent from Figure 2C that there is a recess at the center position. This recess may be provided to create a free space for the device and the mounting means if the mounting means are affixed to another inner wall, such as the inner wall 220. Figure 3 illustrates a center cross arrangement where the inner wall 220 and two pieces of the inner wall 260 are mounted together. In this embodiment, the inner wall 220 will have mounting means (not shown in Figure 3, but described in more detail below) at the center position, i.e., at the point where the three axes 300, 310, 320 coincide. There may be a recess in the inner wall 260 on the upper side of the inner wall 220. In an embodiment, there may be a second recess in the inner wall 260 on the other side of the inner wall 220.

[0023] As mentioned above, the device may be a passive device such as a permanent magnet, or an active device. For instance, the device may be a chip having data processing capabilities, or a sensor such as a magnetic or electric field sensor. The device may also have radio transmitter, receiver or transceiver capabilities in any suitable electromagnetic frequency range, including that of wireless transmissions. The device may be capable of performing near-field, far-field, short-range, mobile or satellite communications.

[0024] Figures 5A, 5B and 5C depict exemplary arrangements of active devices 500 which have electrically conductive wires 510, 540 and/or antennas 530, 540 mounted on an inner wall such as the inner wall 220 shown in Figure 2B. The wires may be used to feed electric power to the device. For instance, the device may include a battery which can be charged through the wires 510. In this embodiment, the wires have some connections 520 which may be positioned at one of the end pieces 400, 410 of the outer wall of the ball bladder.

[0025] The electric wires may be also used to read out data from the device. For instance, the device may include one or more sensors which collect data during a sports game. Such data may include one or more of the following: the position of the ball, its velocity, acceleration, momentum and/or spin.

[0026] Figures 5B and 5C depict devices 500 having antennas 530, 540. The antennas may be RFID, Bluetooth, or WLAN antennas or antennas of any other type. Although Figures 5B and 5C show antennas having two or four symmetrical parts, other embodiments exist where antennas have only one part or consist of three, five or any other number of symmetrical or asymmetrical parts. If the antenna has symmetrical parts, preferred embodiments position these parts in a symmetrical manner as shown in Figures 5B and 5C. If the antenna consists of only one part, this part may preferably be of a circular shape and positioned around the device.

[0027] As mentioned above, the ball bladder of some of the embodiments may have seams to connect the various bladder parts of the outer wall and/or inner wall. The elasticity of the seams may be optimized with respect to the desired ball jump capabilities or with respect to other mechanical properties of the ball or ball bladder. In embodiments where one or more of the inner walls have one or more electric wires and the wires have at least one of their ends connected to the device, the number, size, type and/or position of any wire may be optimized together with the seams' elasticity. This may also be the case with antennas. Figure 6 depicts an example where an electrically conductive wire 600 is placed along a welded seam. In further embodiments, not all parts of the wire need to be placed along a welded seam. The inner end 620 of the wire 600 is prepared to be connected to the device, while one or more of the other ends 610 of the wire 600 may, in an embodiment, be connected to some electric contacts, similar to 520 shown in Figure 5A.

[0028] It is noted that Figures 5A, 5B, 5C and 6 depict various wire/antenna arrangements, but this is not intended to limit the invention. Further wire/antenna arrangements are possible in other embodiments. It is further noted that combinations of the depicted or the other possible embodiments may be made as well. For instance, a ball bladder may have electric wires for power feeding and/or sensor functionalities in addition to antennas, or an electrical wire may also have antenna functionality.

[0029] Turning now to Figures 7A to 7D, embodiments are depicted of how the mounting means can be realized in certain embodiments.

[0030] In Figure 7A the inner wall 700 has affixed a pocket 710, which may be manufactured by seaming a cover piece with welded seam 720. The pocket 710 has an opening through which a device can be inserted when manufacturing the ball bladder. In Figure 7A, this opening is located on the right side of the pocket.

[0031] Figure 7B is a cross-sectional view of the single side pocket. The cover 730 is located at the upper side of the inner wall to form the pocket.

[0032] Figure 7C depicts another embodiment having two pockets 740, 750, one on each side of the inner wall. In addition, there is an opening 760 between the pockets. The device is intended to be placed within this opening 760. Thus, the device can be inserted from both sides of the inner wall, i.e., via pocket 740 or alternatively, via pocket 750.

[0033] Figure 7D depicts a further embodiment of a dual pocket ball bladder where the pocket on the upper side of the inner wall has an opening 770 directed to the right side whereas the pocket on the bottom side of the inner wall has an opening 780 directed downwards. Thus,

the openings 770, 780 of both pockets are directed 90 degrees apart from each other. It is noted that other embodiments exist where the openings of the pockets are directed generally towards non-opposite sides. Having positioned the pockets in this way has the advantage of facilitating the manufacturing process, as it reduces the risk of the device slipping out of the pocket of the opposite side by mistake when pushing the device too much into the pocket.

[0034] As mentioned, the various pieces of the inner and outer walls of the ball bladder as well as the mounting means, such as pockets, may be attached together using welded seams. In further embodiments, the device may be additionally or alternatively mounted on TPU (thermo plastic elastomeric) material and glued at the center of the bladder. For example, Fuller Ultraflex 4817 E glue can be used for this purpose. The bladder may then be sealed by means of a glued TPU sticker, which is heated up to, e.g., 50 °C.

[0035] While the invention has been described with respect to the physical embodiments constructed in accordance therewith, it will be apparent to those skilled in the art that various modifications, variations and improvements of the present invention may be made in the light of the above teachings and within the purview of the appended claims without departing from the scope of the invention. In addition, those areas in which it is believed that those of ordinary skill in the art are familiar, have not been described herein in order to not unnecessarily obscure the invention described herein. Accordingly, it is to be understood that the invention is not to be limited by the specific illustrative embodiments, but only by the scope of the appended claims.

Claims

1. A ball bladder comprising:

an outer wall (100, 150); and
at least one inner wall (110, 160, 220, 260, 700), wherein the at least one inner wall has mounting means (710-750) to hold a device (140, 180, 500) at a center position (250) of the ball.

2. The ball bladder according to claim 1, wherein said outer wall is built by attaching together four quarter pieces (200) and two end pieces (400, 410).

3. The ball bladder according to claim 1 or 2, wherein said at least one inner wall comprises a first inner wall (220, 700) and two second inner walls (260), said first and second inner walls being mounted to form a center cross arrangement within said outer wall.

4. The ball bladder according to one of claims 1 to 3, wherein said outer wall and/or said at least one inner wall are built from multiple seam-welded pieces.

5. The ball bladder according to one of claims 1 to 4, wherein said mounting means comprises a single pocket (710, 730) located at one side of said at least one inner wall (700).

6. The ball bladder according to one of claims 1 to 4, wherein said mounting means comprises a first pocket (710, 740) located at one side of said at least one inner wall (700) and a second pocket (710, 750) located at the other side of said at least one inner wall.

7. The ball bladder according to claim 6, wherein said at least one inner wall has an opening (760) to hold said device, and said first and second pockets cover said opening.

8. The ball bladder according to claim 6 or 7, wherein said first and second pockets each have an opening (770, 780) to insert said device into the respective pocket, wherein the openings of the first and second pockets are directed towards non-opposite directions.

9. The ball bladder according to one of claims 1 to 8, wherein said device is passive magnet.

10. The ball bladder according to one of claims 1 to 8, wherein said device (500) is an active device capable of receiving or transmitting radio signals and the ball bladder further comprises:

an antenna (530, 540) to be connected to said device when mounted by said mounting means.

11. The ball bladder according to one of claims 1 to 8 or 10, wherein said device (500) is an active device and the ball bladder further comprises:

at least one electrically conductive wire (510, 600) to feed electric power to said device when mounted by said mounting means.

12. The ball bladder according to one of claims 1 to 8 or 10 or 11, wherein said device (500) is a sensor device and the ball bladder further comprises:

at least one electrically conductive wire (510, 600) to be connected to said device when mounted by said mounting means, said at least one electrically conductive wire being required by said device to perform its sensor functionality.

13. The ball bladder according to claim 11 or 12, wherein said at least one inner wall is built from multiple seam-welded pieces (220, 260, 700) and said at

least one electrically conductive wire is placed at least in part along a welded seam.

14. The ball bladder according to one of claims 1 to 13, further comprising:

said device mounted by said mounting means.

15. A ball having the ball bladder of one of claims 1 to 14.

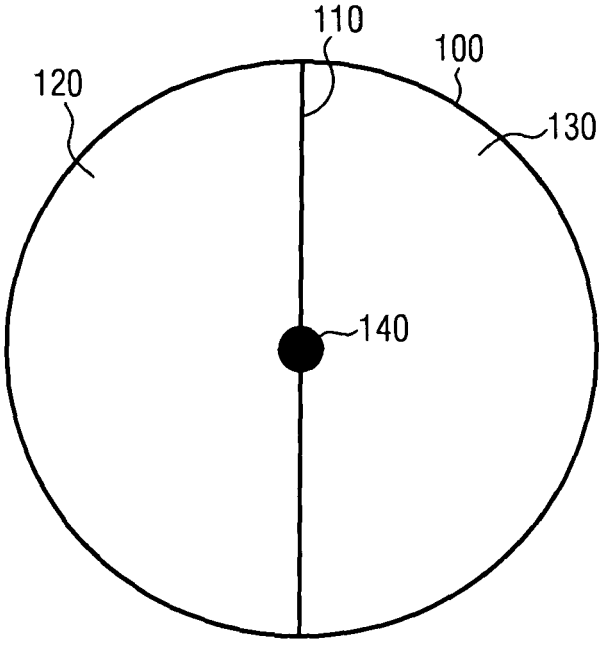

FIG. 1A

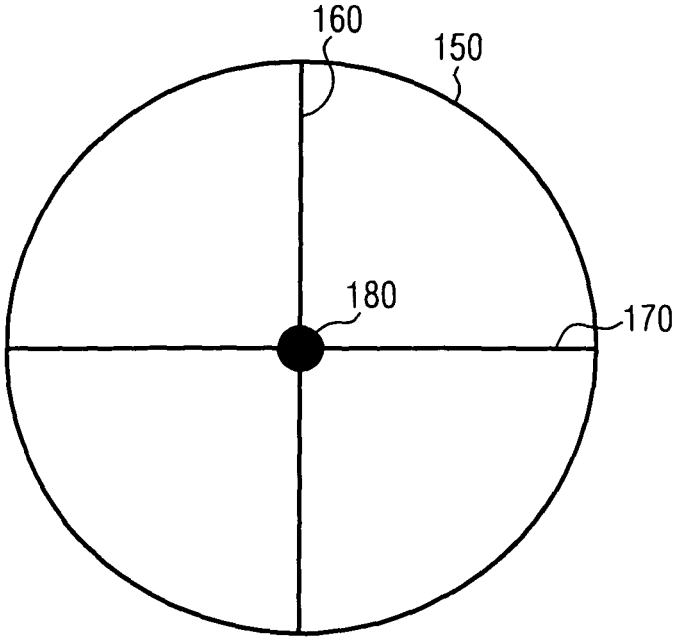

FIG. 1B

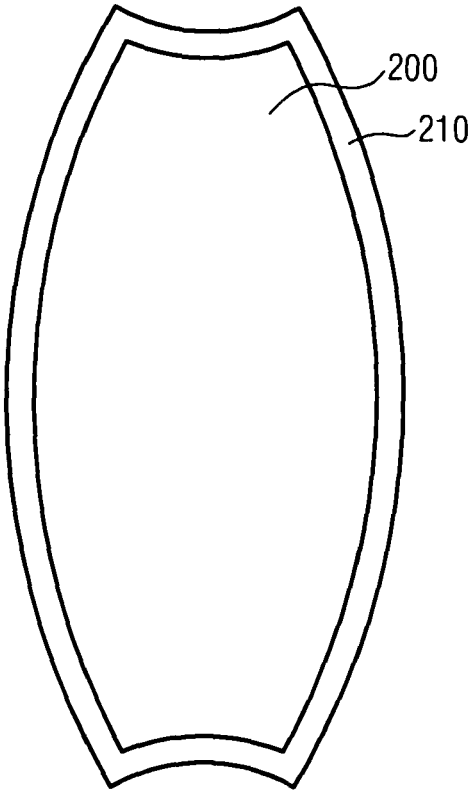

FIG. 2A

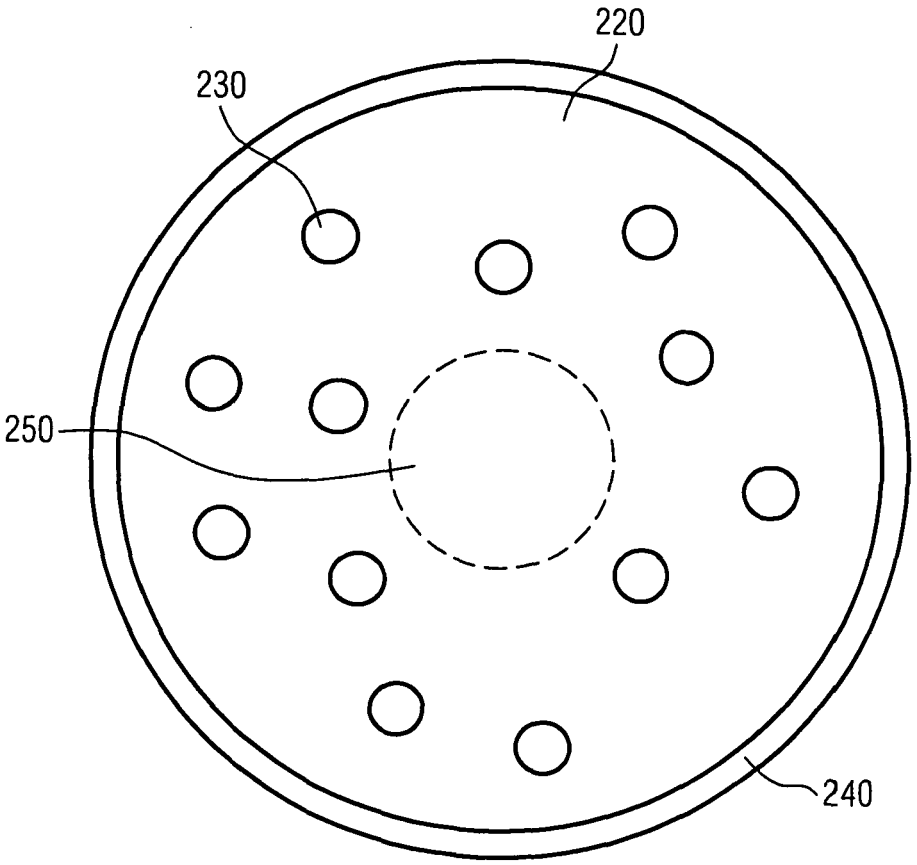

FIG. 2B

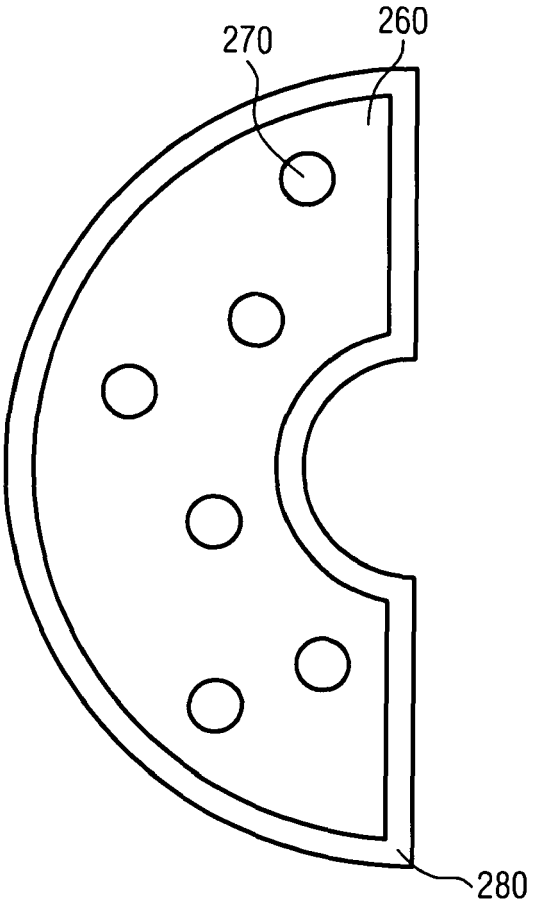

FIG. 2C

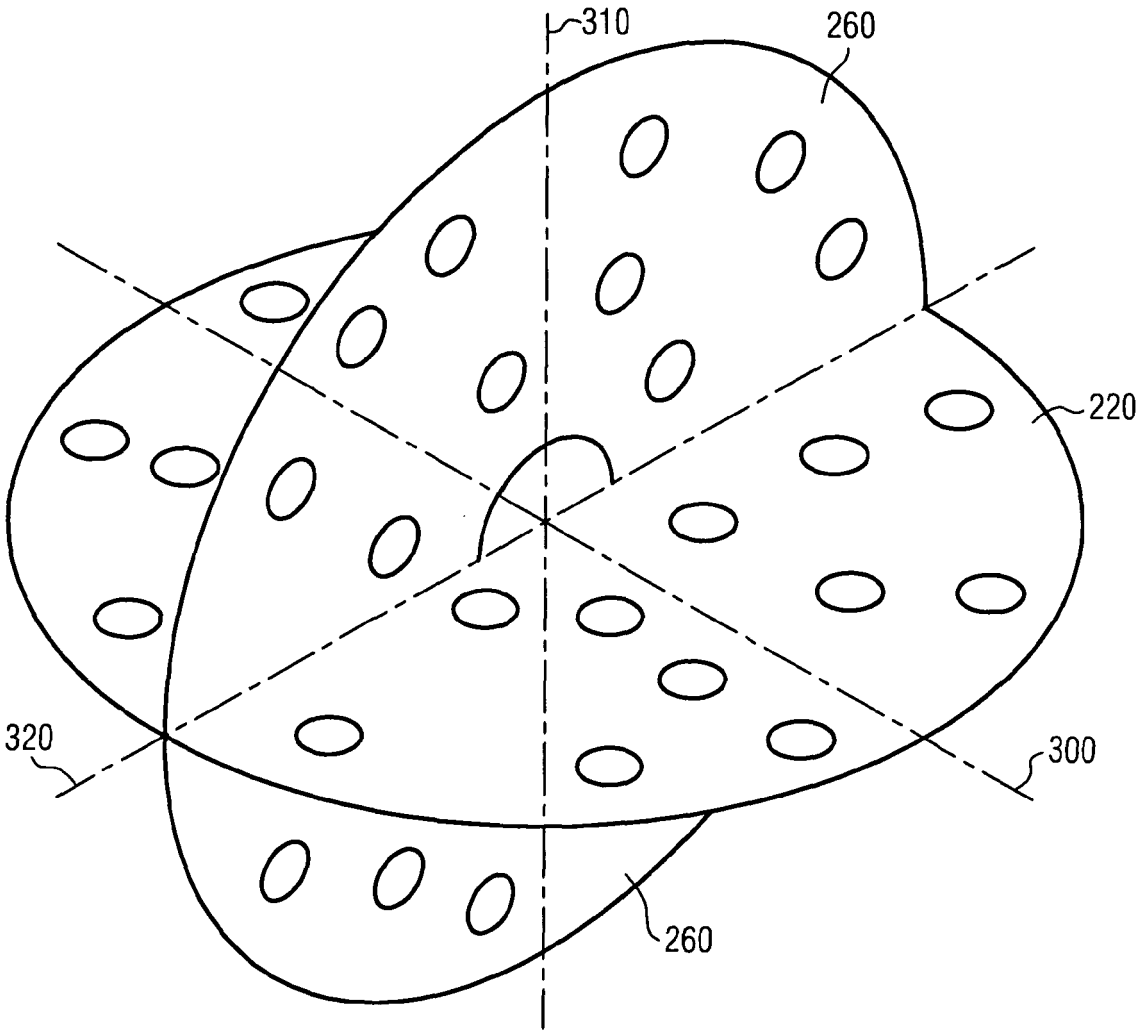

FIG. 3

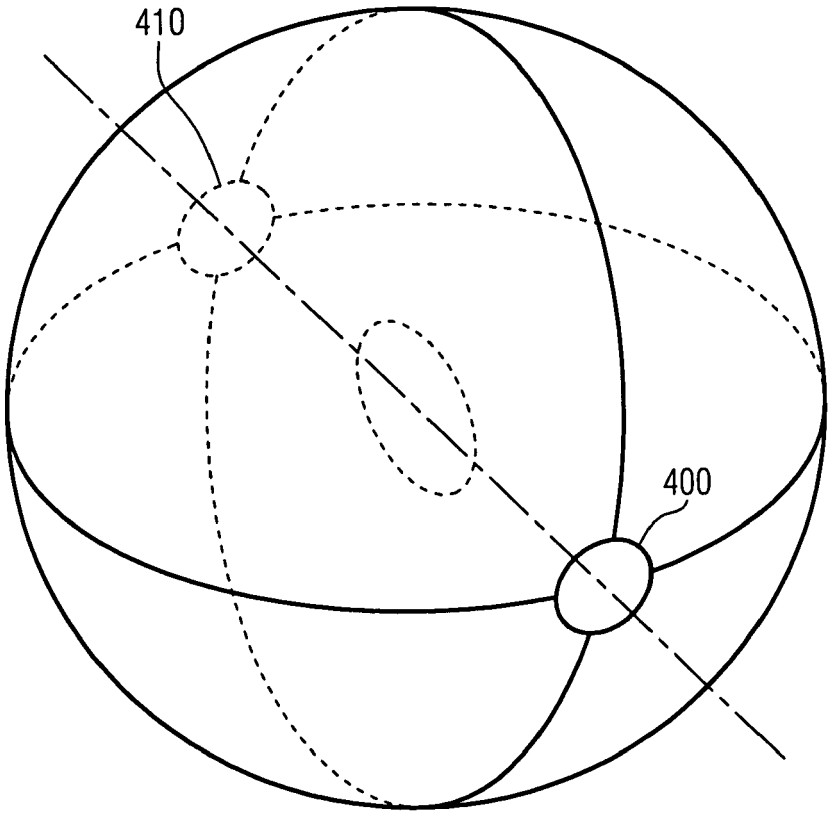

FIG. 4

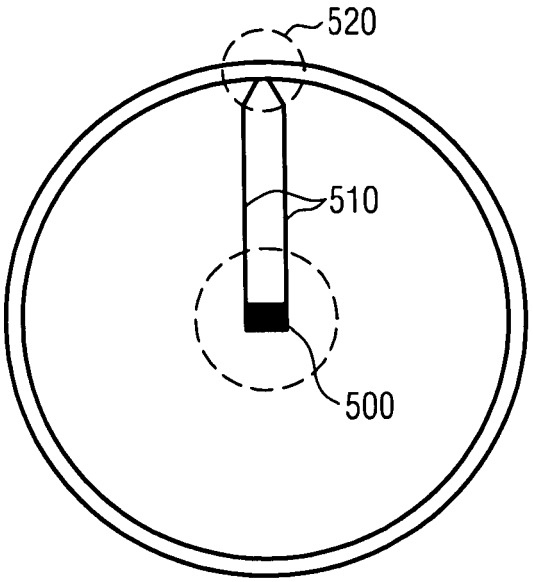

FIG. 5A

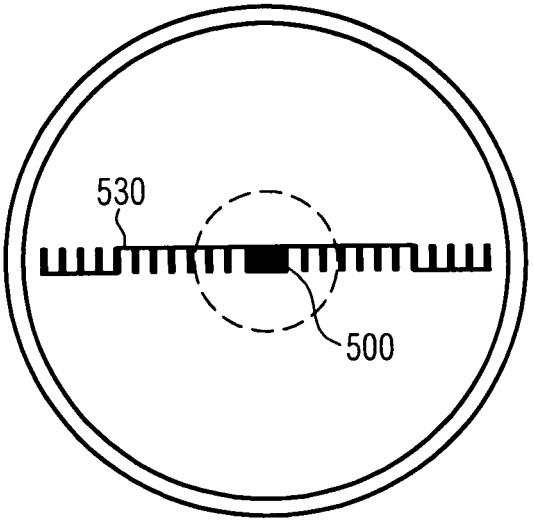

FIG. 5B

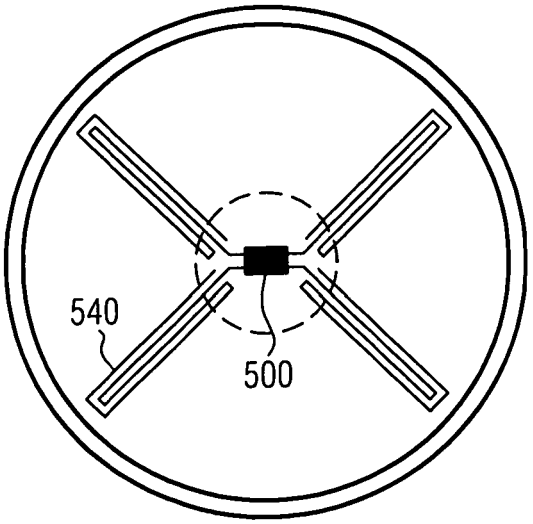

FIG. 5C

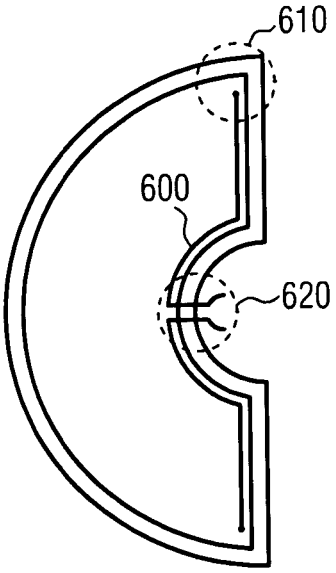

FIG. 6

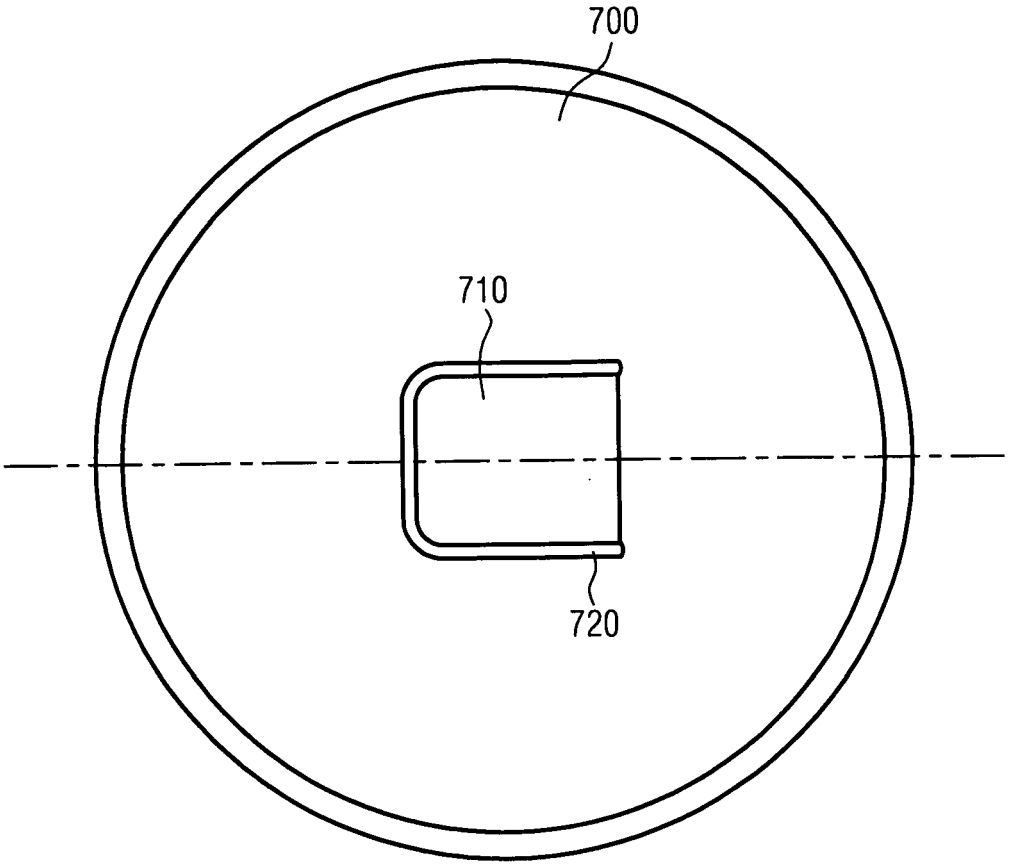

FIG. 7A

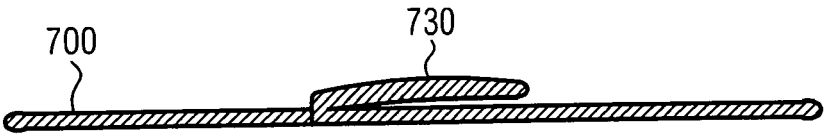

FIG. 7B

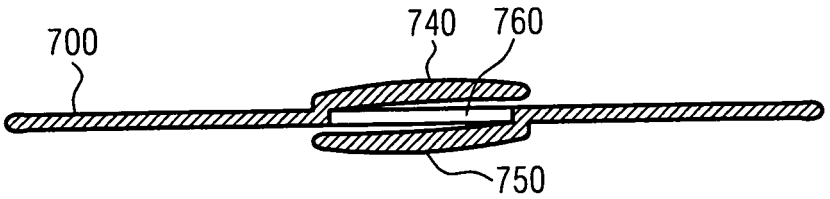

FIG. 7C

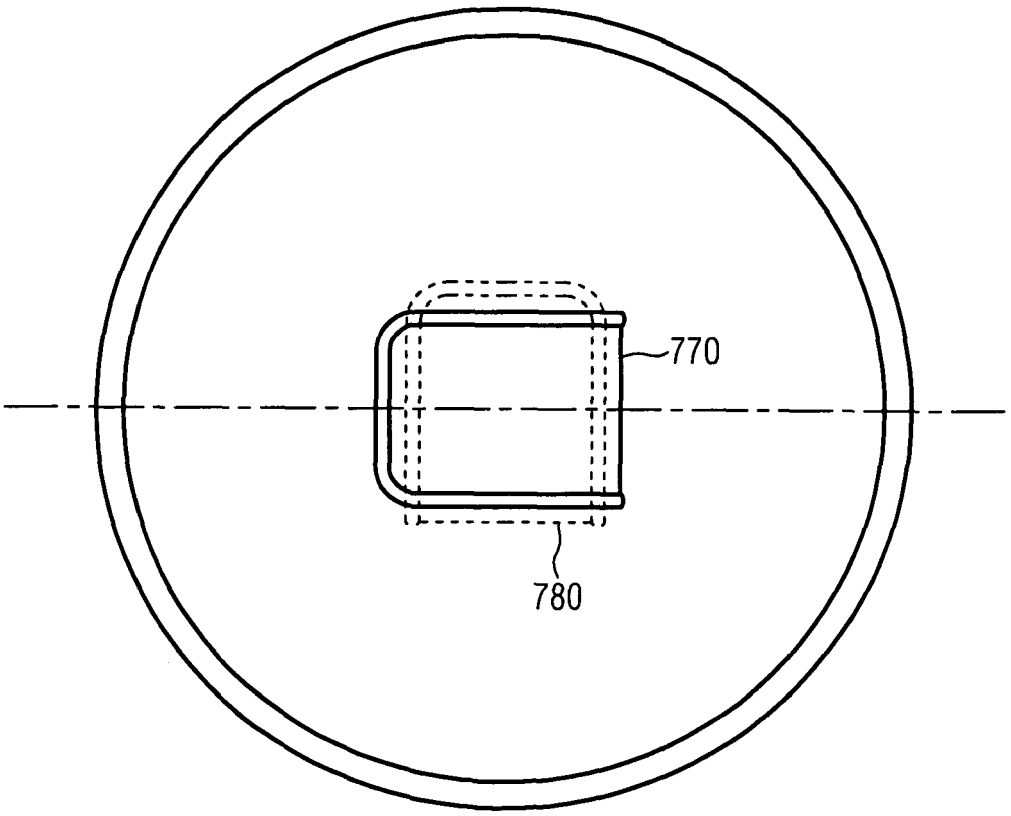

FIG. 7D

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EUROPEAN SEARCH REPORT

Application Number
EP 11 00 0822

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 1 637 192 A1 (ADIDAS INT MARKETING BV [NL]) 22 March 2006 (2006-03-22) * paragraph [0041] - paragraph [0050]; figures 1-3 *	1-8, 10-15	INV. A63B41/00 A63B41/02
X	WO 2004/026411 A1 (CRUCIANI GABRIELE [IT]) 1 April 2004 (2004-04-01) * page 7, line 1 - line 13; figures 1-6 *	1,5,9, 14,15	
A	DE 103 61 826 A1 (KATZ JOHANNES [DE]) 28 July 2005 (2005-07-28) * paragraph [0009] - paragraph [0040]; claims 1-23; figures 1-6 *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 May 2011	Jekabsons, Armands

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 00 0822

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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10-05-2011

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REFERENCES CITED IN THE DESCRIPTION

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