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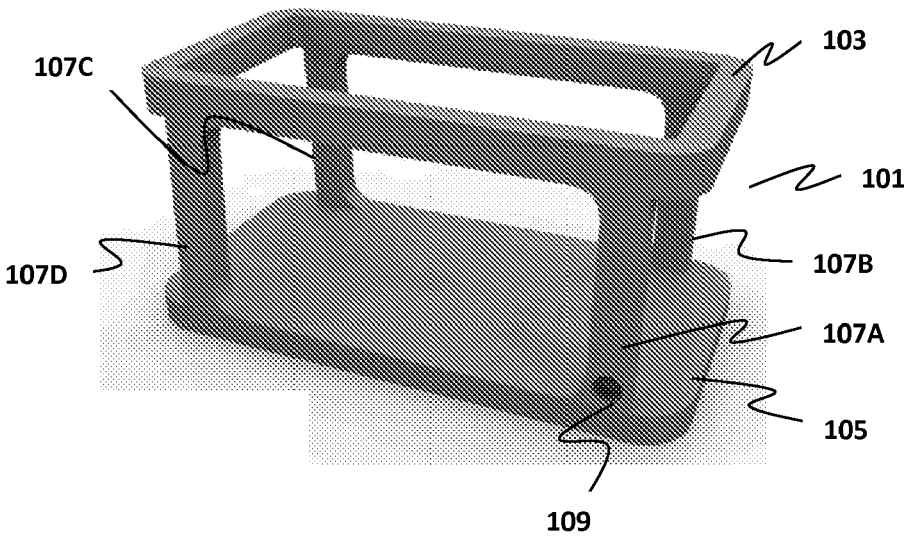
(54) Inflatable device for receiving an infant

(57) An inflatable device for infants, the device comprising a structure formed from two or more inflatable chambers in fluid communication with a control valve, wherein the control valve comprises a single input means for receiving an inflation means and an output means in fluid communication with the inflatable chambers to enable the chambers to be inflated simultaneously by the inflation means while providing fluid separation between the chambers after inflation.

FIGURE 3



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Description

FIELD OF THE INVENTION

[0001] The present invention relates to an inflatable device for receiving an infant. In particular, the present invention relates to an inflatable device, such as a cot, crib or playpen suitable for infants.

BACKGROUND

[0002] It is known to have inflatable devices for receiving infants including cribs, carrycots, cots, playpens and the like. It will be understood that the concepts described herein may be applied to any other suitable inflatable device that may be used to hold, carry, sleep or otherwise receive an infant child. The term infant is understood to mean a child from new-born to the age of up to two years old.

[0003] In general, many of these inflatable devices have several problems such as complete failure upon receiving a puncture, instability during use, too many complex components resulting in increased cost, multiple input valves making it a time-consuming job to inflate the device and generally poor design.

[0004] Certain types of inflatable devices for infants generally have multiple individual chambers. These chambers are inflatable through separate individual input valves connected to each chamber. This arrangement requires a user to connect, disconnect and reconnect an inflation device, such as a pump for example, to each valve to fully inflate all the chambers. Further, this type of device requires multiple valve assemblies for each of the separate inflatable chambers.

[0005] Other types of inflatable device for infants generally have multiple interlinked chambers. The chambers are generally inflatable through a single input valve connected to any one of the chambers. The remaining chambers are then inflated via the single input valve through channels interconnecting the chambers. This arrangement provides no fail safe mechanism in situations when a puncture occurs in any of the chambers and so, upon receiving a puncture, the entire device becomes deflated. This deflation can result in an extremely dangerous situation when an infant is placed in the device by causing a potential health risk or injury to the infant.

[0006] An object of the present invention is to provide an inflatable device for receiving an infant that is easy to inflate and/or deflate.

[0007] A further object of the present invention is to provide an inflatable device for receiving an infant that is made of a material that is durable and rigid when inflated.

[0008] A further object of the present invention is to provide an inflatable device for receiving an infant having a rigid and self-supporting structure.

[0009] A further object of the present invention is to provide an inflatable device for receiving an infant that will not deflate upon a single chamber deflating.

[0010] A further object of the present invention is to provide an inflatable device for receiving an infant that is compact when deflated.

[0011] A further object of the present invention is to provide an inflatable device for receiving an infant that seals the inflatable chambers from each other after inflation.

[0012] A further object of the present invention is to provide an inflatable device for receiving an infant that deflates all chambers together.

[0013] A further object of the present invention is to provide an inflatable device for receiving an infant that overcomes, or at least alleviates, the afore-mentioned disadvantages.

[0014] Each object is to be read disjunctively with the object of at least providing the public with a useful choice.

SUMMARY OF THE INVENTION

[0015] It is acknowledged that the terms "comprise", "comprises" and "comprising" may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, these terms are intended to have an inclusive meaning - i.e. they will be taken to mean an inclusion of the listed components which the use directly references, and possibly also of other non-specified components or elements.

[0016] According to one aspect, the present invention provides an inflatable device for infants, the device comprising a structure formed from two or more inflatable chambers in fluid communication with a control valve, wherein the control valve comprises a single input means for receiving an inflation means and an output means in fluid communication with the inflatable chambers to enable the chambers to be inflated simultaneously by the inflation means while providing fluid separation between the chambers after inflation.

[0017] Preferably, the inflatable device may include any of the features as defined in the appended dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows the device in a rolled up state according to an embodiment of the present invention;
Figure 2 shows the device in an unrolled state according to an embodiment of the present invention;
Figure 3 shows a structure of the device after inflation according to an embodiment of the present invention;
Figure 4 shows a cover for use with the device according to an embodiment of the present invention;
Figure 5 shows a plan view of an inflated device with

a cover according to an embodiment of the present invention;

Figure 6 shows a schematic diagram describing the operation of a control valve according to an embodiment of the present invention;

Figure 7 shows a conceptual diagram of air flow into inflatable chambers of a device according to an embodiment of the present invention;

Figure 8 shows a conceptual diagram of air flow out of inflatable chambers of a device according to an embodiment of the present invention;

Figures 9A and 9B show a valve assembly in different modes according to an embodiment of the present invention;

Figure 10 shows a conceptual diagram of an inflatable device according to an embodiment of the present invention;

Figure 11 shows a conceptual diagram of an inflatable device according to an embodiment of the present invention;

Figure 12 shows a conceptual diagram of an inflatable device according to an embodiment of the present invention;

Figure 13 shows a cross sectional view of an inflating device for use with an inflatable device according to an embodiment of the present invention;

Figure 14 shows a valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

Figure 15 shows a partial exploded view of a valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

Figure 16 shows a partial assembled view of a valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

Figure 17 shows a detailed view of a valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

Figure 18 shows a nozzle assembly in attachment with a valve cluster assembly for use in a second mode according to an embodiment of the present invention;

Figure 19 shows a partial exploded view of a nozzle assembly and valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

Figure 20 shows a nozzle assembly in attachment with a valve cluster assembly for use in a first mode according to an embodiment of the present invention;

Figure 21 shows a partial exploded view of a nozzle assembly and valve cluster assembly for use with an inflatable device according to an embodiment of the present invention;

DETAILED DESCRIPTION OF THE INVENTION

First Embodiment

[0019] A first embodiment of the present invention is now described. In this first embodiment, the inflatable device for receiving an infant is an inflatable cot.

[0020] The cot device has multiple chambers and a single input channel arranged to shut off the multiple chambers after inflation. In particular, the cot has a main structure that is formed from four inflatable chambers. Each of the four inflatable chambers is connected by way of air passages to a single main control valve. That is, the chambers are in fluid communication with the control valve to enable each of the inflatable chambers to be inflated by the valve. It will be understood that the control valve may be located in any suitable position and on, or in fluid communication with, any of the chambers to enable the user to inflate and deflate the device.

[0021] The control valve has a single input port which is configured to receive any suitable type of inflation device. For example, in this embodiment, the input port is configured to receive a bicycle pump for inflating the chambers in the cot. It will be understood that alternative arrangements may be made to enable other types of inflation devices to be used.

[0022] The control valve has multiple outlet or output ports for channelling fluid (such as air) into the chambers of the cot. The air enters the individual chambers via integral fluid channels connected, and thus providing fluid communication, between each of the outlet ports and the inflatable chambers.

[0023] According to this embodiment, the control valve is arranged to enable the chambers to be inflated simultaneously by the bicycle pump while ensuring that the chambers are disconnected, separated or blocked off from each other after the cot is inflated. That is, the control valve is arranged to ensure that there is fluid separation between the chambers after inflation of the cot. The mechanism for providing this fluid separation is described in more detail below.

[0024] Figure 1 shows the structure 101 of the cot in a rolled up state. In this state, the cot is suitable for easy transportation. For example, a user may wish to take the inflatable cot with them when travelling overseas. The cot according to this embodiment is particularly designed to ensure it is both light and compact to enable it to be packed away in luggage.

[0025] The main structure in this embodiment is formed from a light and durable material known as a drop stitch material. The drop stitch material is effectively a plastic based layered material with two layers having a fine hair like stitching structure positioned in between the layers. For example, the plastic material may be a polyurethane material. The hair like structure between the layers causes restriction between the layers as the device is being inflated and so makes the layers of the inflatable structure rigid. It enables the structure to be inflated to a high pres-

sure and causes the structure to become rigid due to each layer being limited to its movement by the stitching structure.

Figure 2 shows the structure 101 of the cot in an unrolled state. It can be seen in this view that the structure 101 includes a top section 103 and a base section 105.

Figure 3 shows the main skeletal structure of the cot once it has been inflated. The structure includes the top section 103, the bottom section 105 and four upright sections 107A, 107B, 107C & 107D connecting and separating the base section from the top section.

[0026] The main control valve 109 is located within one of the upright sections 107A. The inflated structure shown in figure 3 is a sturdy and rigid structure.

[0027] The cot may include a cover 111, for example as shown in figure 4. The cover may be of any suitable material, such as a fabric for example. The cover is configured or arranged to fit over the structure after the structure is inflated. The fabric cover provides wall structure around the inflated structure to ensure the infant remains within the cot. The fabric cover is formed from a washable fabric to enable a user to easily remove the cover after use and wash it prior to subsequent use.

[0028] It will be understood that the fabric cover may increase the structure's rigidity and therefore the structural integrity of the device. Further, the cover may act either as a cosmetic or structural element, or both. Also, it will be understood that the cover may be fitted before inflation and that this may be required in order to provide structural integrity of the device.

[0029] Figure 5 shows a plan view of the inflated cot after the cover has been fitted. Approximate dimensions of the cot are also provided. The internal width is approximately 580mm. The internal length is approximately 1245mm. The external width is approximately 800mm. The external length is approximately 1465mm. The distance between each inner and outer layer of the chambers (i.e. the thickness of the sides of the inflated chamber) is thus approximately 110mm.

[0030] The inflated structure includes four inflatable chambers that are arranged to form four walls of the skeleton structure. The four inflatable chambers in this embodiment do not correspond with the four sides of the inflatable structure. However, it will be understood that the arrangement of the inflatable structures may vary and as such could correspond with each of the four sides of the structure.

[0031] Figure 6 shows a schematic diagram describing the operation of the control valve 109. An inlet channel 601 for receiving the expelled air from the inflation device (bicycle pump) is provided. The control valve 109 includes multiple output ports 603A, 603B, 603C & 603D. Each of these output ports is connected (effectively in parallel) to a separate inflation chamber 607A, 607B, 607C & 607D via a fluid channel 605A, 605B, 605C & 605D.

[0032] The output ports (603A, 603B, 603C & 603D) are arranged to allow air to enter each of the chambers (607A, 607B, 607C & 607D) simultaneously when air is provided to the cot via the inflation device. However, upon removing the inflation device the output ports (603A, 603B, 603C & 603D) are arranged to shut off each of the chambers. This makes the chambers independent of each other after inflation ensuring that if a puncture occurs in any one of the chambers or one of the chambers deflates then all other chambers are not affected thus ensuring no harm comes to the infant. The valve 109 effectively operates as a failsafe valve as will be explained in more detail below.

[0033] Conceptual diagrams are shown in figures 7 & 8 indicating the direction of air flow for each of the four chambers when inflating and deflating the cot. It will be understood that the configuration of the chambers may differ to that shown in these conceptual drawings. For example, the chambers may be separated along any suitable plane such as a vertical plane or horizontal plane. Further, it will be understood that the number of chambers may be varied.

[0034] As can be seen in figure 7, during inflation the air input via the inflation device enters the cot through the main input valve 109 into each of the four independent inflatable chambers (607A, 607B, 607C & 607D) at the same time. This provides a quick and easy way in which to inflate the cot for use.

[0035] As can be seen in figure 8, during deflation the air from the four independent (i.e. fluidly independent) inflatable chambers (607A, 607B, 607C & 607D) flows out simultaneously through the main input valve 109 and then out through the inflation device. That is, the insertion of the inflation device opens the output ports (603A, 603B, 603C & 603D) of the control valve to allow the air to be expelled from all the chambers at the same time. This provides a quick and easy way in which to deflate and repack the cot after use.

[0036] Alternatively, the inflation device may be used in reverse as a deflation device where applicable. For example, if the inflation device were a reversible electric pump in order to suck the air out of the inflatable device. This would mean that the deflation procedure is not reliant on internal pressure and gravity to exhaust the air on deflation.

[0037] Therefore, the output ports of the control valve are arranged to be in fluid communication with the inflatable chambers and input port when the inflation device is received within the input port. That is, an air flow path is provided from the input port, through the output ports to the inflatable chambers. The inflatable chambers may then be easily inflated or deflated by the user.

[0038] Figures 9A and 9B show diagrams of a control valve mechanism suitable for performing the operations of the control valve as described above. It will be understood that other valve types and valve configurations may

be used to perform the same functionality.

[0039] The valve components may be made from any suitable materials using any suitable manufacturing methods. For example, the casing and housing of the valve components may be made form a suitable plastics material which may be machined and/or injection moulded to produce the desired configuration. The spindles and pins of the device may be made from stainless steel components that are machined.

[0040] Several individual valves are integrated into a common housing to provide control over the air flow into the chambers. This effectively provides a manifold effect without the requirement of a manifold.

[0041] Figure 9A shows a control valve assembly in a first mode where an inflation device has not been inserted into the input port of the valve and as such the chambers of the cot are not being inflated.

[0042] The control valve assembly includes a core housing portion that includes a recess 903 for receiving an inflation device (not shown). Formed in a bottom wall within the recess is a channel 905 that passes through the core housing portion. The core housing portion includes an outer wall with a threaded portion 907 formed thereon. The threaded portion is arranged to screw into a corresponding threaded portion 909 formed on an outer housing 911 such that the core housing and outer housing are attached. A spindle 913 is provided that includes a connecting portion 915 connected to a head portion 917 and a tail portion 919. The head portion is located within the recess 903 while the connecting portion passes through the channel 905. The tail portion is located on the opposite side of the channel 905 to the head portion. A spring device 921 is provided around the connecting portion on the recess side of the core housing. The spring device provides a spring force between the head portion of the spindle and the bottom wall of the core housing. This spring force ensures that the spindle is in a first position (or mode) when no inflation device is inserted into the recess of the valve. That is, the tail portion of the spindle is forced by the spring action to rest on an outer base surface 922 of the core housing.

[0043] A number of recesses 923 are provided in a base surface of the outer housing 911. The number of recesses matches the number of chambers being inflated. In this embodiment, there are four recesses. It will be understood that that the figures 9A and 9B only show two recesses as the other two recesses are located immediately behind the shown recesses and are thus not visible. Located within these recesses are valve elements 925. The combination of the recesses and valve elements form the outlet or output ports of the control valve.

[0044] According to this embodiment, each outlet port is in fluid communication with a single inflatable chamber. However, it will be understood that a single outlet port may be arranged to inflate more than one chamber. For example, each outlet port may be arranged to inflate two or more chambers, where those chambers are interconnected (i.e. in fluid communication).

[0045] The valve elements may be, for example, Schrader valves which are generally used as valves on bicycle tires. However, it will be understood that other suitable types of valves may be used as an alternative. The Schrader valves include a pin 927 that is arranged to sit in a first position when not activated and causes the valve to be shut (i.e. no fluid communication between the input and output of the valve). Upon the pin being activated by applying pressure, the valve is opened. When the applied pressure is removed, the pin reverts back to its closed mode due to a spring force applied to the pin.

[0046] The tail portion of the spindle is arranged to sit above the pins of the Schrader valves without activating the Schrader valves when the control valve has not received an inflation device in the recess 903. Therefore, in this mode, the fluid channels to the separate chambers are shut off from the input of the control valve ensuring no air escapes from the inflatable valves. In other words the output port of the control valve is arranged to not provide fluid communication between the input port and inflatable chambers when the input port is not receiving the inflation means.

[0047] Figure 9B shows the control valve assembly in a second mode where an inflation device has been inserted into the input port of the valve to enable inflation (and also deflation) of the cot.

[0048] A nozzle 929 of an inflation device is shown in figure 9B having been inserted into the recess 903 of the control valve. The insertion of the pump nozzle forces the head portion of the spindle (and thus the whole spindle) in the direction of the length of the connecting portion of the spindle. The spindle thus moves against the force of the spring device 921, forcing the tail portion to push against the pins of the Schrader valves and opening up the outlet ports of the control valve. All four of the outlet ports are opened simultaneously. This ensures that there is fluid communication between each of the inflatable chambers and the inlet port of the control valve via the outlet ports and through the channel 905. The inflation device may thus be activated to inflate the chambers.

[0049] After inflation, the inflation device may be removed causing the Schrader valves to close and seal off the chambers.

[0050] Therefore, a single input multiple output control valve assembly is provided to enable inflation and deflation of multiple independent chambers while allowing the chambers to be fluidly independent of each other after inflation, i.e. after an inflation device has been removed following inflation.

Second Embodiment

[0051] According to a second embodiment of the present invention, the control valve assembly may include a single input port and a single output port. The single output may be in fluid communication along fluid channels to a manifold structure. The manifold structure

may include two or more arms providing further fluid channels to the individual independent chambers. In between the manifold fluid channels and the independent chambers are located shut off valves which may be used by the user to decide which chambers are inflated and deflated during the inflation and deflation cycles. Also, the shut off valves may be closed to fluidly separate the chambers from each other after inflation to ensure that no single chamber deflating causes other chambers to deflate, i.e. fluid separation between chambers is provided after inflation. It will be understood that the shut off valves may be manually opened and closed by a user or by using an electrical signal. Further, it will be understood that the shut off valves may be directly connected to the manifold, the inflation chambers or somewhere in between.

[0052] Figure 10 shows a conceptual diagram of this further embodiment, wherein a single input single output valve 1001 is provided. The output port is in fluid communication with a manifold 1003 and the manifold includes multiple shut off valves 1005A, 1005B, 1005C & 1005D that are in fluid communication with the inflatable chambers 1007A, 1007B, 1007C & 1007D.

[0053] It will be understood that the same outlet port arrangement may be used as in the first embodiment to ensure that the inlet port is in fluid communication with the outlet port when an inflation device is inserted, and that the outlet port of the control valve is closed when the inflation device is removed.

[0054] The use of independently controlled shut off valves allows a user to make the chambers independent after inflation. It also allows a use to choose the order and the amount of chambers that are inflated and deflated. For example, this arrangement may aid the user in inflating the cot by allowing the user to select one individual chamber at a time for inflation, thus allowing the user to inflate the chamber to a relatively high pressure when compared to inflating all chambers at the same time. Also, this arrangement allows the user to select all chambers for deflation simultaneously.

Third Embodiment

[0055] According to a third embodiment, an inline series arrangement of chambers may be provided with a shut off valve positioned in between each chamber. A single input single output valve may be used to provide inflation with the use of an inflation device.

[0056] Figure 11 shows a conceptual diagram this further embodiment. The single input single output valve 1101 is in fluid communication with a first chamber 1103. The first chamber is in fluid communication with a second chamber 1105 via a shut off valve 1107. The second chamber is in fluid communication with a third chamber 1109 via a shut off valve 1111. The third chamber is in fluid communication with a fourth chamber 1113 via a shut off valve 1115. It will be understood that the shut off valves may be manually opened and closed by a user or by using an electrical signal. Each of the shut off valves provides fluid separation between the chambers after inflation.

[0057] It will be understood that the same outlet port arrangement may be used as in the first embodiment to ensure that the inlet port is in fluid communication with the outlet port when an inflation device is inserted, and that the outlet port of the control valve is closed when the inflation device is removed.

Fourth Embodiment

[0058] According to this fourth embodiment an alternative valve arrangement is described.

[0059] Figure 13 shows a cross sectional view of a pump 1301, an inlet/outlet chamber or port 1303 and nozzle assemblies (1305, 1307) according to this embodiment of the present invention. The nozzle assemblies, pump and housing are suitable for use with an inflatable device as described above. The pump is a reversible pump that may either blow air outwards or suck air inwards thus providing a bidirectional air flow. Further, the pump may also be switched to a non-active mode to stop airflow in both directions.

[0060] Each of the two nozzle assemblies provides a different function (inflate & deflate). The nozzle assemblies (1305, 1307) physically correspond with a valve cluster assembly 1400, which includes a housing 1401 and valves 1405. The assembly 1400 is attached to the inflatable device 1403 as shown in figure 14. The valve cluster assembly 140 includes a number of valves 1405A & 1405B that are in fluid communication with individual chambers 1407A and 1407B. The valve cluster assembly 1400 is attached to the inflatable device by any suitable means, such as by welding the housing to the inflatable device. Although figure 14 only shows two valves in this cross section, the assembly has six in total in this embodiment in a 2 x 3 arrangement. Each of these valves is connected to a separate chamber in the inflatable device. It will be understood however that, as an alternative, the number and arrangement of chambers and valves may be modified depending on the device.

[0061] An inflate nozzle assembly 1305 is connected to and in fluid communication with the pump inlet/outlet chamber (port) 1303. The inflate nozzle assembly 1305 includes a number of nozzle chambers 1309 that have an aperture 1311 which provides a fluid communication path to the inlet/outlet port 1303 of the pump assembly. Across each aperture 1311 is a flapper valve 1312 that is made of a flexible non-permeable material, such as rubber, silicon, urethane or the like. The flapper valve 1312 is located on the internal side of the nozzle chamber 1309. The flapper valve 1312 allows pressurised air (generated by the pump in inflate mode) to pass from the inlet/outlet port through the aperture 1311, into the nozzle chamber 1309 and into the connected valve cluster assembly in order to inflate the inflatable device.

[0062] A deflate nozzle assembly 1307 is also connect-

ed to and in fluid communication with the pump inlet/outlet chamber (port) 1303. The deflate nozzle assembly 1307 includes a number of nozzle chambers 1313 that have an aperture 1315 which provides a fluid communication path to the inlet/outlet port 1303 of the pump assembly. Across each aperture 1315 is a flapper valve 1317 that is made of a flexible non-permeable material, such as rubber, or the like. The flapper valve 1317 of the deflate nozzle assembly is located on the external side of the nozzle chamber 1313, i.e. on the external side of the apertures 1315 and within the inlet/outlet port 1303. The flapper valve 1317 allows pressurised air to pass from nozzle chamber 1313 through the aperture 1315 to the inlet/outlet port when the pump is in deflate mode in order to deflate the inflatable device. A spigot 1319 is positioned centrally around the aperture 1315 of each nozzle chamber and passes from the aperture into the chamber. Each spigot 1319 in each chamber 1313 enables the pressurised air within each chamber of the inflatable device to be released from the inflatable device when the deflate nozzle assembly is used, as will be explained in more detail below.

[0063] The first inflate nozzle assembly 1305 is attached to the valve cluster assembly 1400 to enable the inflatable device to be inflated. The second deflate nozzle assembly 1307 is attached to the valve cluster assembly 1400 to enable the inflatable device to be deflated. Operation of these nozzles and valve cluster assembly will be explained in more detail below.

[0064] Figure 15 shows a partial exploded view of the valve cluster housing 1401 and valves 1405 that form the valve assembly 1400. Figure 16 shows a partial assembled view of the same components.

[0065] Figure 17 shows a more detailed view of the valve cluster assembly 1400 including the valves 1405 and housing 1401. The valves include a flapper valve 1701 that, when unaided, allows air to pass through the valve in one direction only via an aperture 1703 into the valve housing 1705. The valve housing 1705 is in fluid communication with the inflatable chambers of the inflatable device. Once the chambers have been inflated and no more air is being directed through the valve 1405, the air pressure in the inflatable chamber causes the flapper valve 1405 to seal against the aperture 1703 maintaining air pressure within the inflatable device. Air can only be transferred out of the inflatable chamber through the valve 1405 by moving the flapper valve 1701 away from the aperture, as explained in more detail below.

[0066] Inflation of the inflatable device is performed by attaching the inflate nozzle assembly 1305 to the valve cluster assembly 1400, as shown in more detail in figure 18. When the inflate nozzle assembly is placed within the valve cluster assembly 1400, it can be seen that pressurised air from the inlet/outlet port 1303 generated by the pump can flow (as shown by the arrows) through the apertures and flapper valves of the nozzle assembly and through the apertures and flapper valves of the valve cluster assembly to enter and inflate the inflatable chambers 1407A & 1407B.

[0067] After inflation, the inflate nozzle assembly 1305 is removed from the valve cluster assembly 1400 and the flapper valves 1701 on the valve cluster assembly seal the apertures 1703 to stop the inflatable device from deflating.

[0068] Figure 19 shows a partial exploded view of the inflate nozzle assembly 1305 and the valve cluster assembly 1400.

[0069] Deflation of the inflatable device is performed by attaching the deflate nozzle assembly 1307 to the valve cluster assembly 1400, as shown in more detail in figure 20. When the deflate nozzle assembly is placed within the valve cluster assembly 1400, the spigots 1319 within the nozzle chambers 1313 push through the apertures 1703 in the valve cluster assembly to move the flapper valves 1701 away from the apertures 1703 and so break the seal in the valve cluster assembly. A fluid communication path is therefore created from the inflated chambers 1407A & 1407B through the apertures 1703 & 1315, past the flapper valves 1317 and into the inlet/outlet port 1303. With the pump switched on in deflate mode, the air is therefore quickly evacuated out of the inflatable chambers in the inflation device as shown by the arrows.

[0070] After deflation, the deflate nozzle assembly 1307 is removed from the valve cluster assembly 1400, and the inflatable device may be stored away.

[0071] Figure 21 shows a partial exploded view of the deflate nozzle assembly 1307 and the valve cluster assembly 1400.

Further Embodiments

[0072] It will be understood that the embodiments of the present invention described herein are by way of example only, and that various changes and modifications may be made without departing from the scope of invention.

[0073] It will be understood that the concepts described in the above embodiments may be combined in any suitable way to form different embodiments. For example, Figure 12 shows a conceptual arrangement using a combination of the features of the second and third embodiments described above. That is, a control valve 1201 has a single input and single output mechanism that is in fluid communication with a first inflatable chamber 1203. The first inflatable chamber is in fluid communication with a first shut off valve 1205. The output of the first shut off valve is in fluid communication with a manifold 1207 as described in an embodiment above. The manifold is in fluid communication with three other chambers (1209, 1211, 1213) via three further shut off valves (1215, 1217, 1219).

[0074] Further, it will be understood that the concept as described with reference to figure 6 may be combined with the manifold concept of figure 10 and/or the inline concept of figure 11.

[0075] It will be understood that, as an alternative, the device described in the above embodiments may be any other suitable inflatable device for receiving an infant, such as an inflatable carrycot, crib, playpen or the like. That is, it will be understood that the device may be modified by arranging or modifying the shape of the inflatable chambers and/or structure, or arranging or modifying the arrangement or configuration of the chambers and/or structure to provide any suitable different use.

[0076] Further, it will be understood that the number of inflatable chambers in the device may vary. For example, the number of inflatable chambers may be two or more.

[0077] Further, it will be understood that the input port may be configured to receive any other suitable type of inflation device. For example, the input port may be configured to more easily enable a user to manually inflate the chambers in the cot by mouth by providing a self sealing tube which opens upon expressing air into the tube and closes off the inflatable chambers when air is no longer being expressed into the tube. Alternatively, the input port may be configured or adapted to receive any one of a hand pump, motorised pump, electrical pump, mechanical pump, air compressor or the like.

[0078] Further, it will be understood that the device may also be arranged to receive a fluid other than air. For example, the device may be adapted to receive a liquid, such as water for example, for inflating the device chambers.

[0079] Further, it will be understood that the material used to form the main structure of the device may be any other suitable type of material. For example, the material may be any suitable type of plastics, polyurethane or PVC type material. It may also be, for example, any suitable type of sonically welded film or the like. Further, any suitable non-rigid material manufactured as a film may be used. Also a thermoplastic or urethane material manufactured as a film may be used.

[0080] Further, it will be understood that the structure may be of any suitable configuration. For example, the structure may consist of four solid walls and a base portion. Alternatively, it may consist of multiple support pillars (i.e. more or less than four as shown in the above embodiments).

[0081] Further, it will be understood that the device may be deflated by reversing the operation of the inflation device in order to suck the air out of the inflation chambers.

[0082] Further, it will be understood that the device may consist of four inflatable chambers that form only the walls of the main structure and that a further inflatable chamber forms an inflatable base of the structure. Alternatively, the device may comprise a separate base for insertion within the skeleton structure.

[0083] Further, it will be understood that the outer housing of the control valve along with the attached or inserted Schrader valves (or the like) may be fitted to any suitable type of valve, such as spring actuated valve. For example, the outer housing may be retro-fitted to any suitable existing valve structure, such as an RIB valve generally used in inflatable devices for example, to provide a control valve that can perform the functions herein described.

[0084] Further, it will be understood that the structure may include a re-enforced base fabric forming a lower base portion of the device to minimise the risk of the device becoming punctured through the base.

[0085] Further, it will be understood that any suitable form of tubing, such as plastic, PVC or polyurethane tubing, may be used between the control valve and the inflatable chambers to provide fluid communication between these elements.

Claims

1. An inflatable device for infants, the device comprising a structure formed from two or more inflatable chambers in fluid communication with a control valve, wherein the control valve comprises a single input means for receiving an inflation means and an output means in fluid communication with the inflatable chambers to enable the chambers to be inflated simultaneously by the inflation means while providing fluid separation between the chambers after inflation.

2. The device of claim 1, wherein the structure comprises four inflatable chambers arranged to form four walls of a skeleton structure suitable for receiving an infant.

3. The device of claim 2, wherein the structure further comprises a fifth inflatable chamber arranged to form an inflatable base.

4. The device of claim 1, wherein the two or more inflatable chambers are fluidly independent.

5. The device of claim 1, wherein the control valve is a failsafe valve.

6. The device of claim 5, wherein the output means of the control valve is arranged to be in fluid communication with the inflatable chambers only when the single input means is receiving the inflation means.

7. The device of claim 1, wherein the output means of the control valve comprises multiple output ports in fluid communication with the inflatable chambers.

8. The device of claim 7, wherein each output port is in fluid communication with a single inflatable chamber, or with two or more inflatable chambers.

9. The device of claim 7, wherein the control valve com-

prises a spindle in communication with the input means and output means, where the spindle is arranged to set the control valve in an inflation mode upon receiving the inflation means and further arranged to set the control valve in a non-inflation mode when the inflation means is not being received.

10. The device of claim 9, wherein the control valve further comprises a housing and a spring means, wherein the spring means is arranged between the spindle and the housing to set the control valve in the non-inflation mode when the inflation means is not being received.

11. The device of claim 1, wherein the output means of the control valve comprises a single output port in fluid communication with a manifold and the manifold comprises multiple shut off valves in fluid communication with the inflatable chambers.

12. The device of claim 11, wherein the control valve comprises a spindle in communication with the input means and single output port, where the spindle is arranged to set the control valve in an inflation mode upon receiving the inflation means and further arranged to set the control valve in a non-inflation mode when the inflation means is not being received.

13. The device of claim 12, wherein the control valve further comprises a housing and a spring means, wherein the spring means is arranged between the spindle and the housing to set the control valve in the non-inflation mode when the inflation means is not being received.

14. The device of claim 1, wherein the device further comprises a fabric cover arranged to fit over the structure.

15. The device of claim 14, wherein the fabric cover is arranged to reinforce and/or increase rigidity to the device.

FIGURE 1

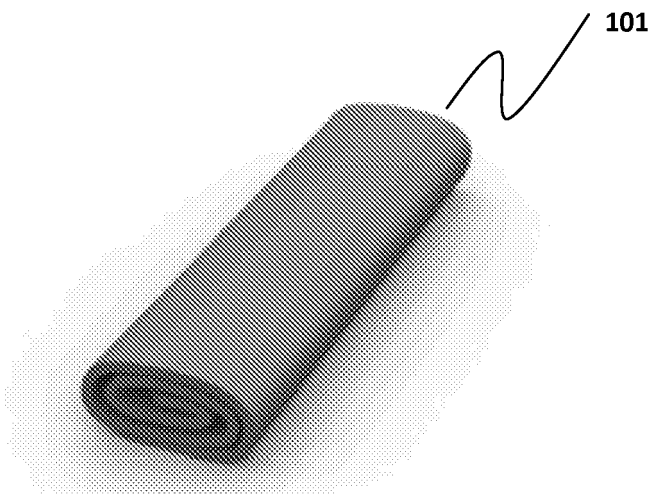


FIGURE 2

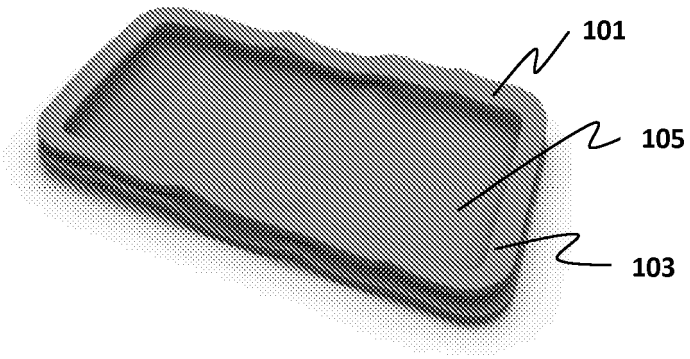


FIGURE 3

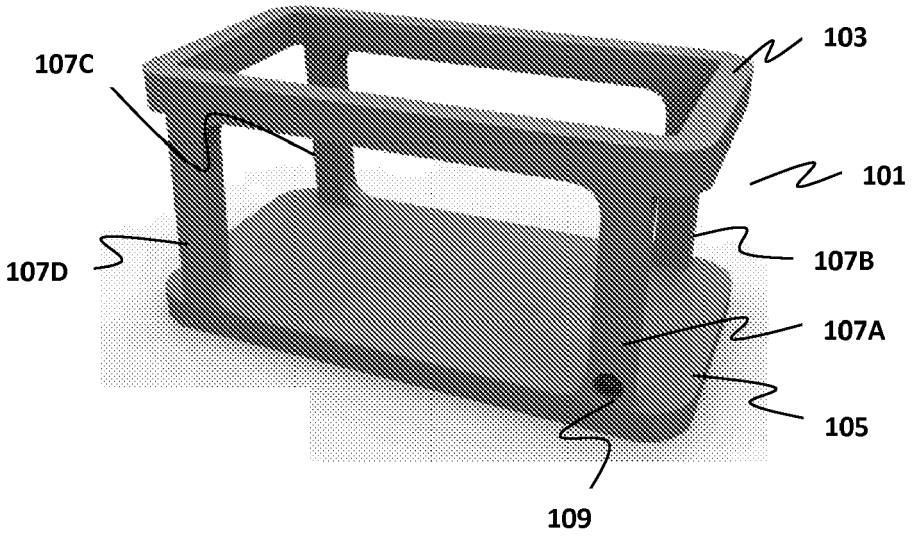


FIGURE 4

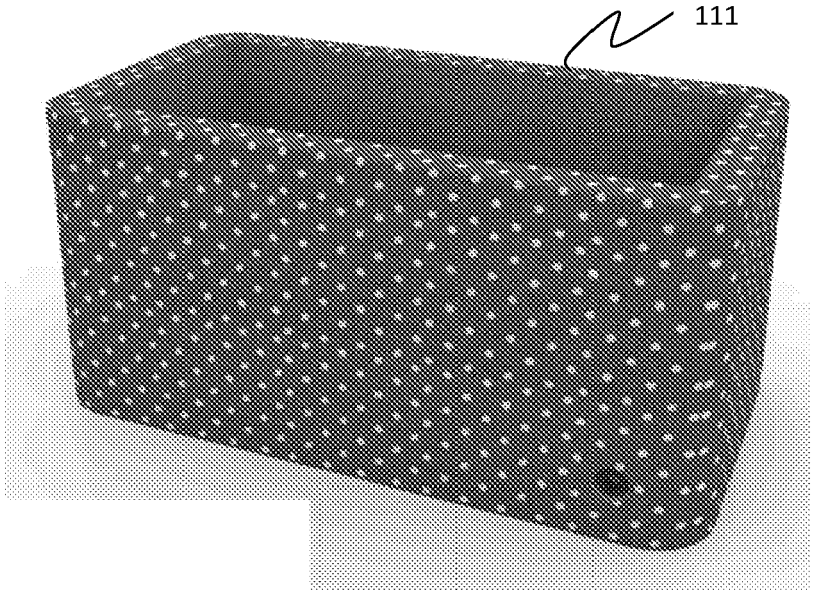
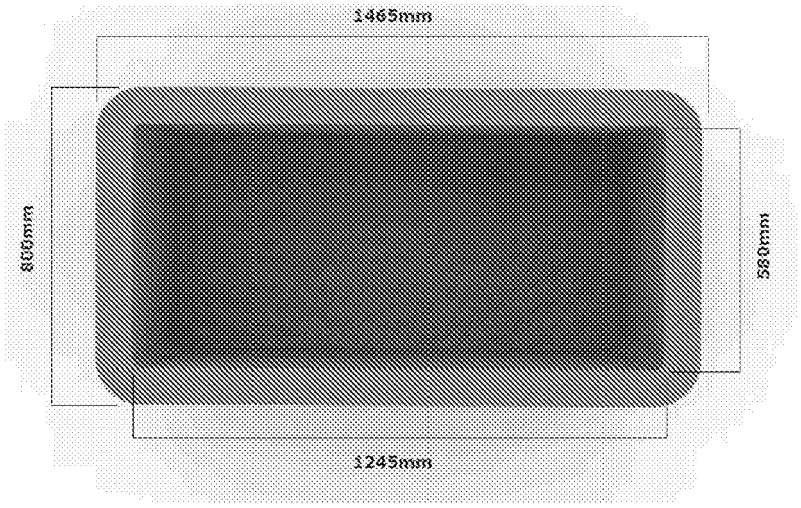


FIGURE 5



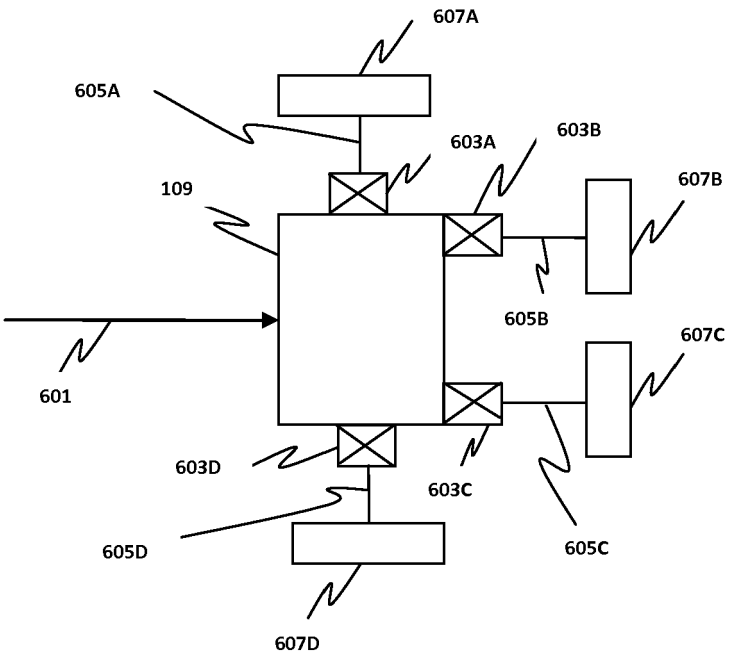


FIGURE 6

FIGURE 7

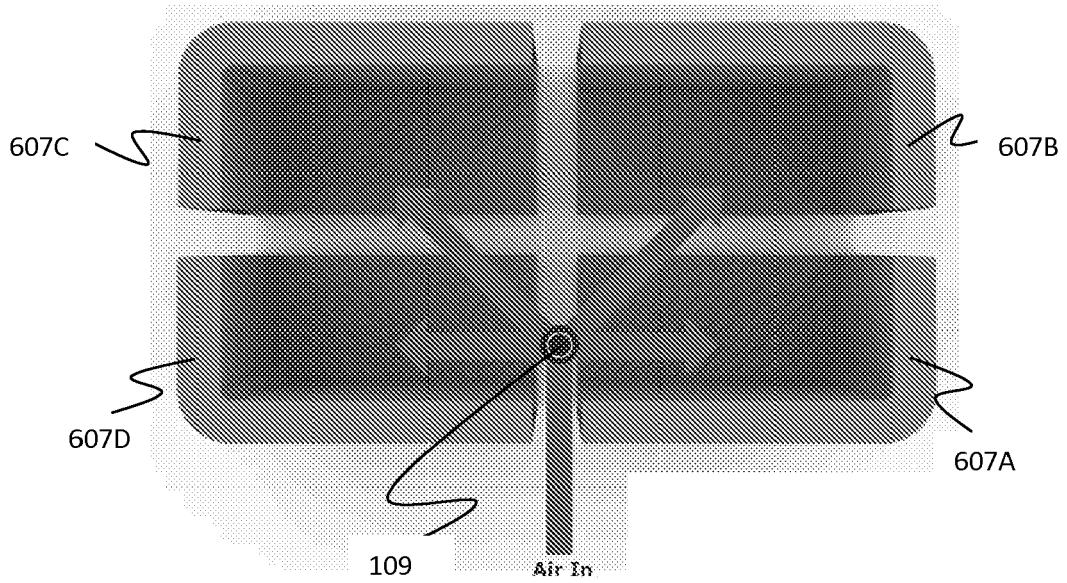
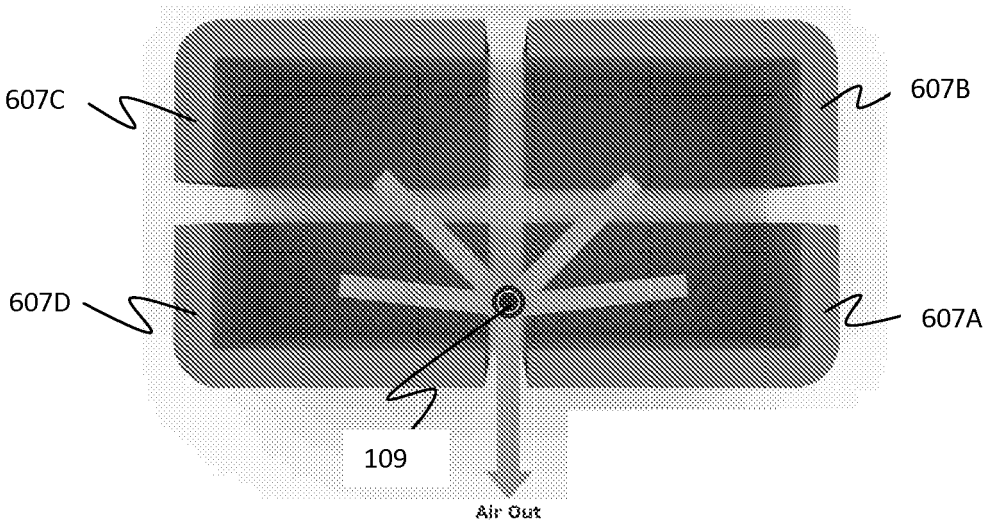


FIGURE 8



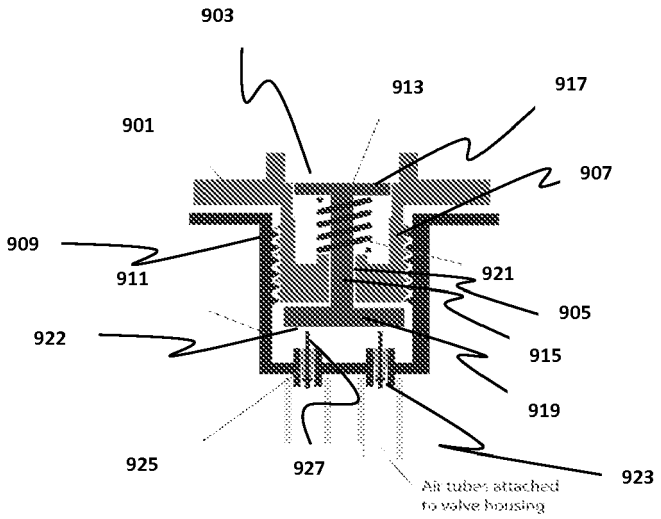


FIGURE 9A

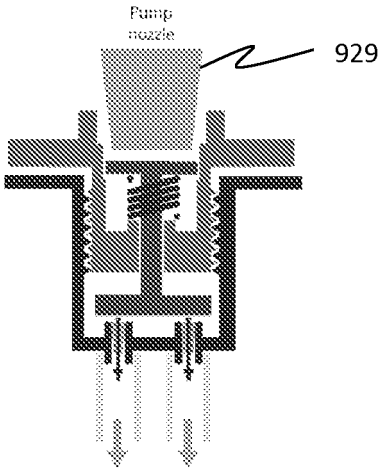


FIGURE 9B

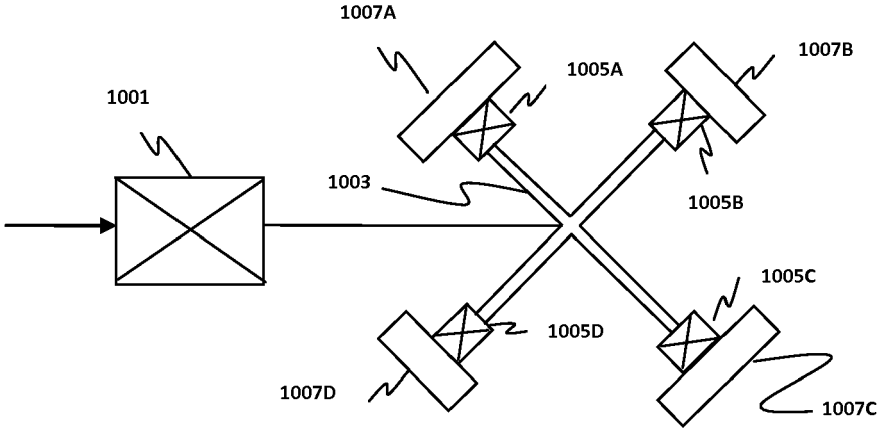
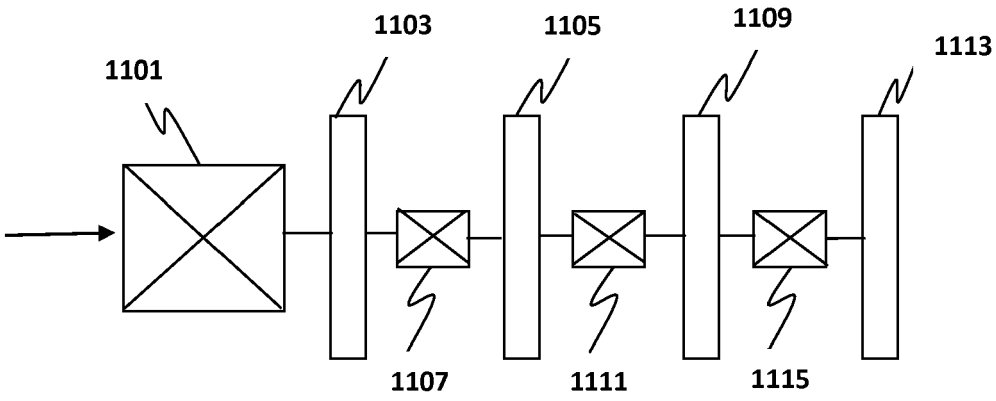


FIGURE 10



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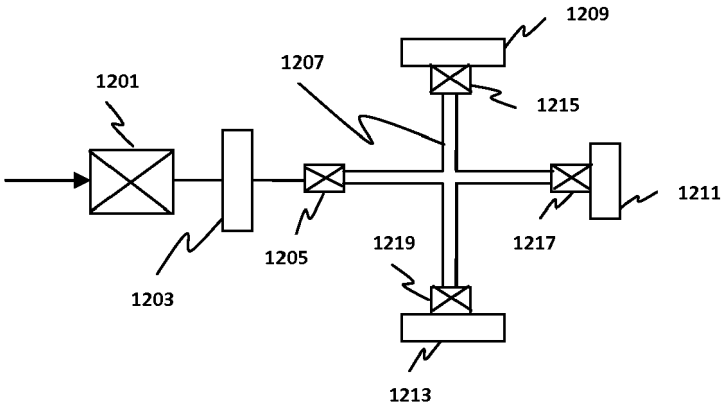

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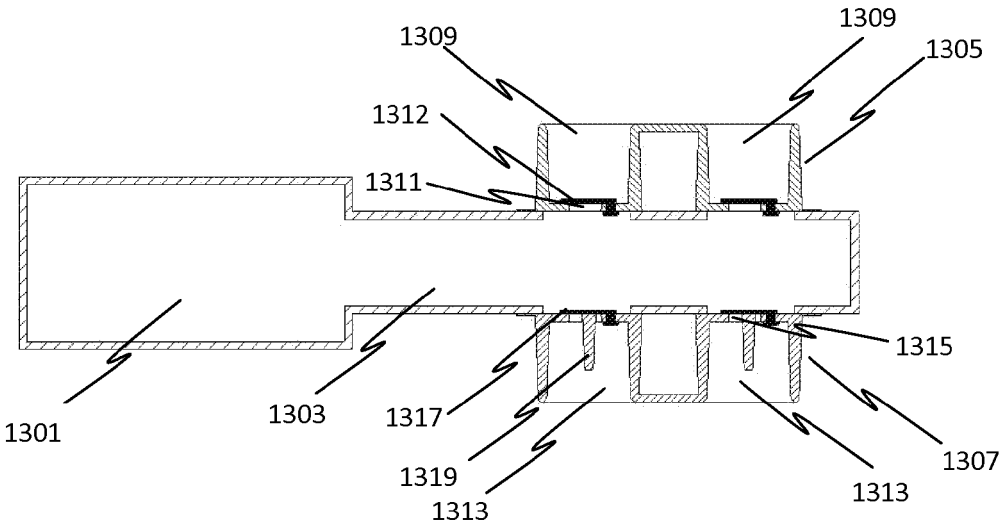

FIGURE 13

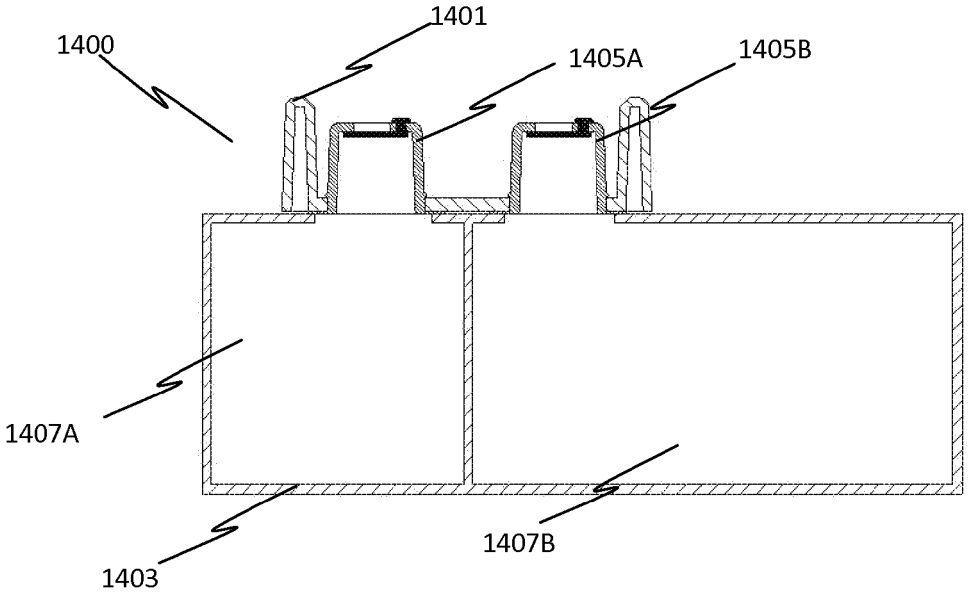

FIGURE 14

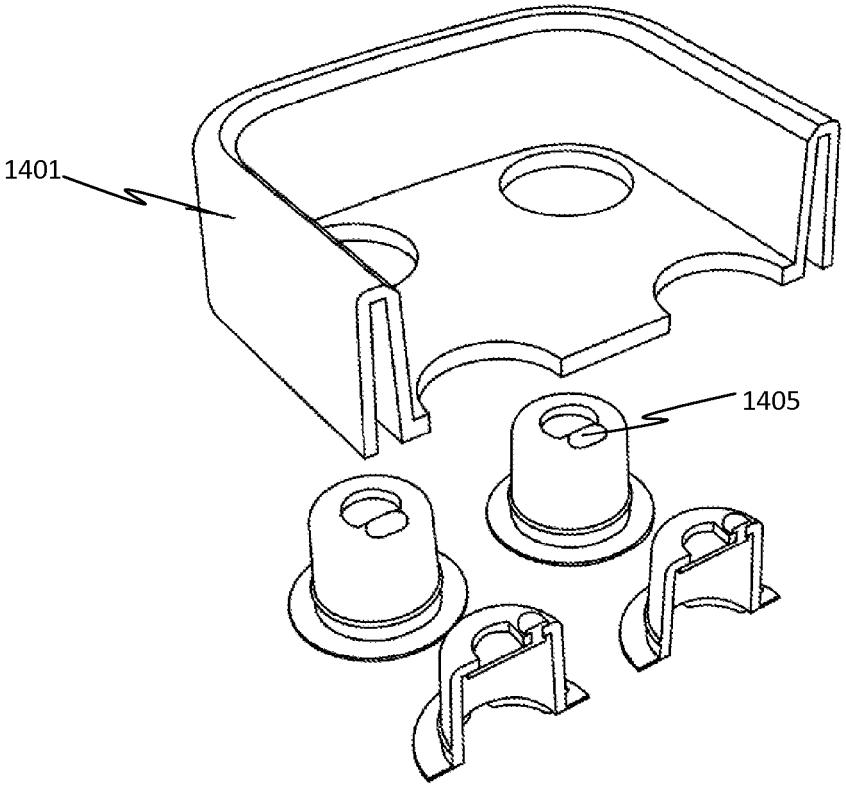

FIGURE 15

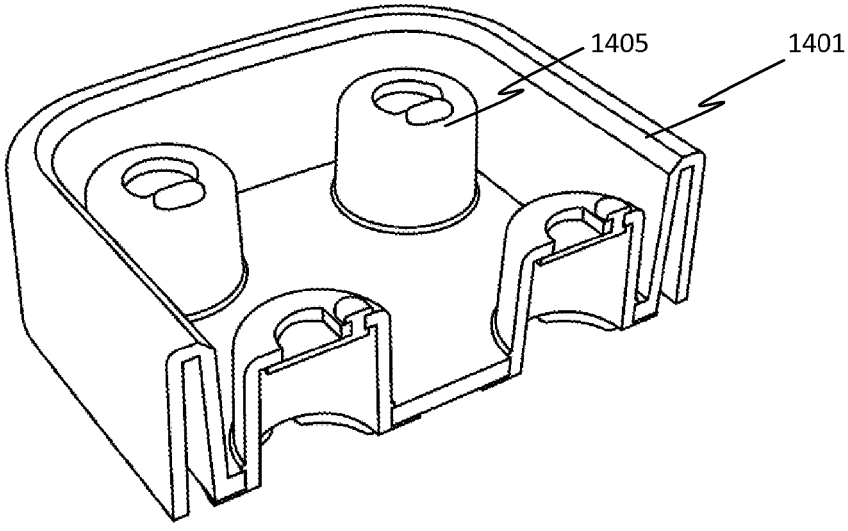

FIGURE 16

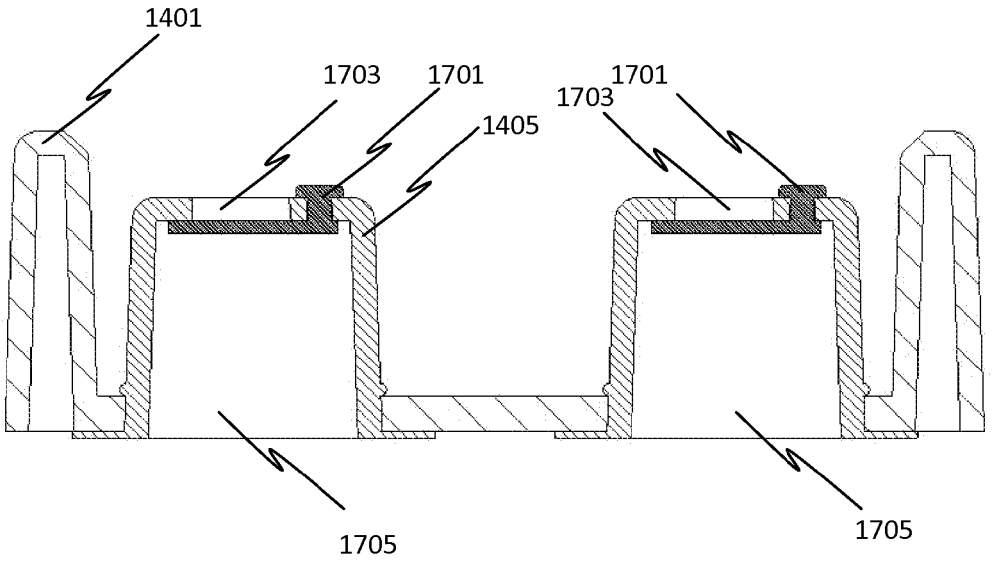

FIGURE 17

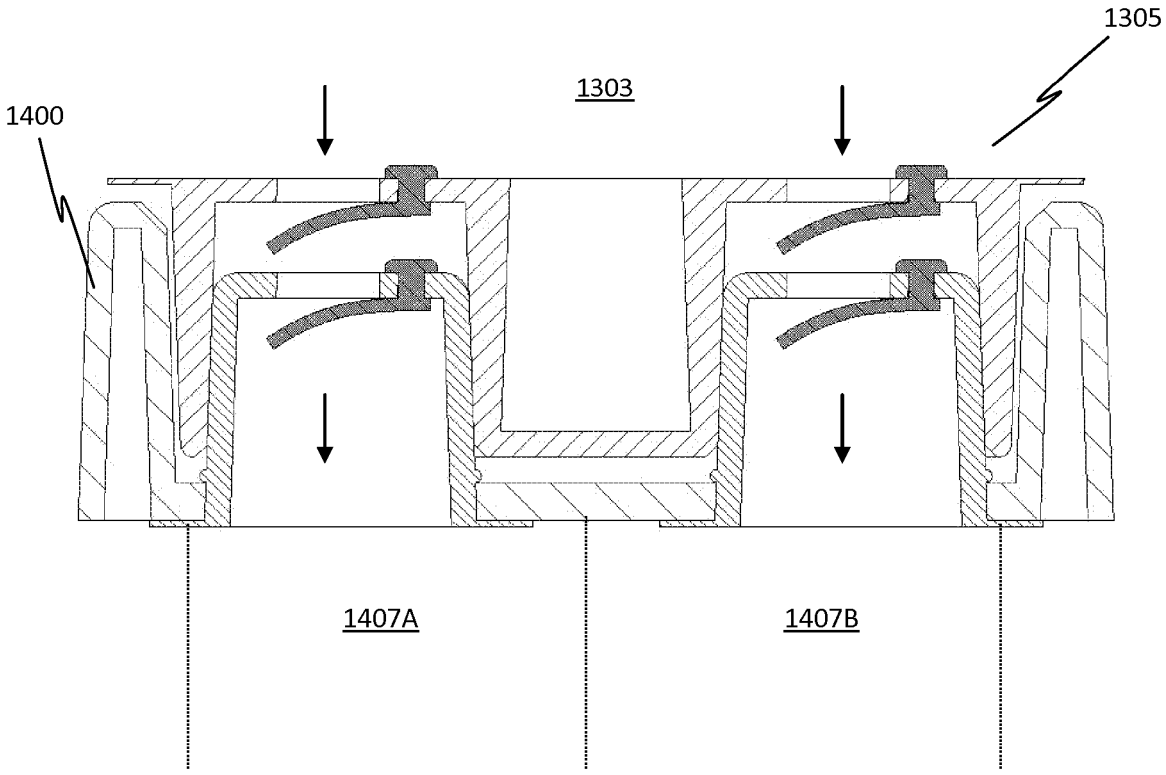

FIGURE 18

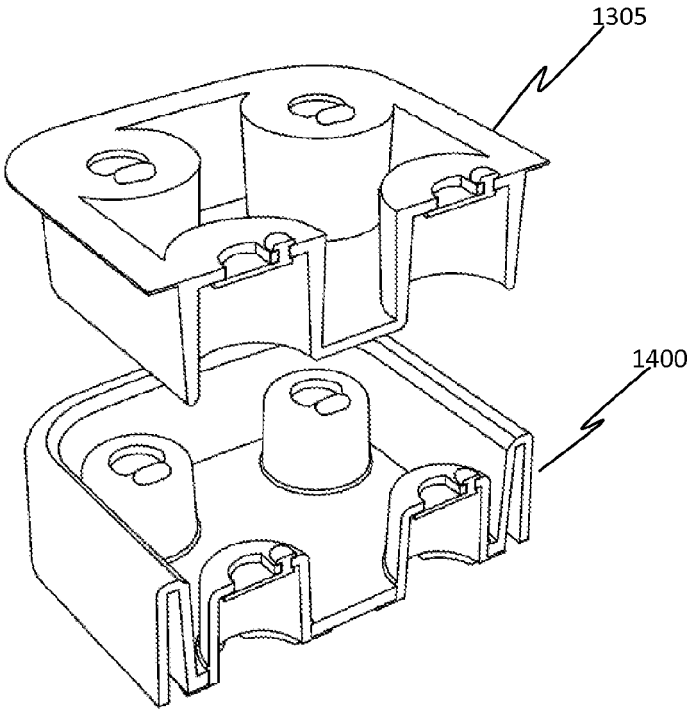

FIGURE 19

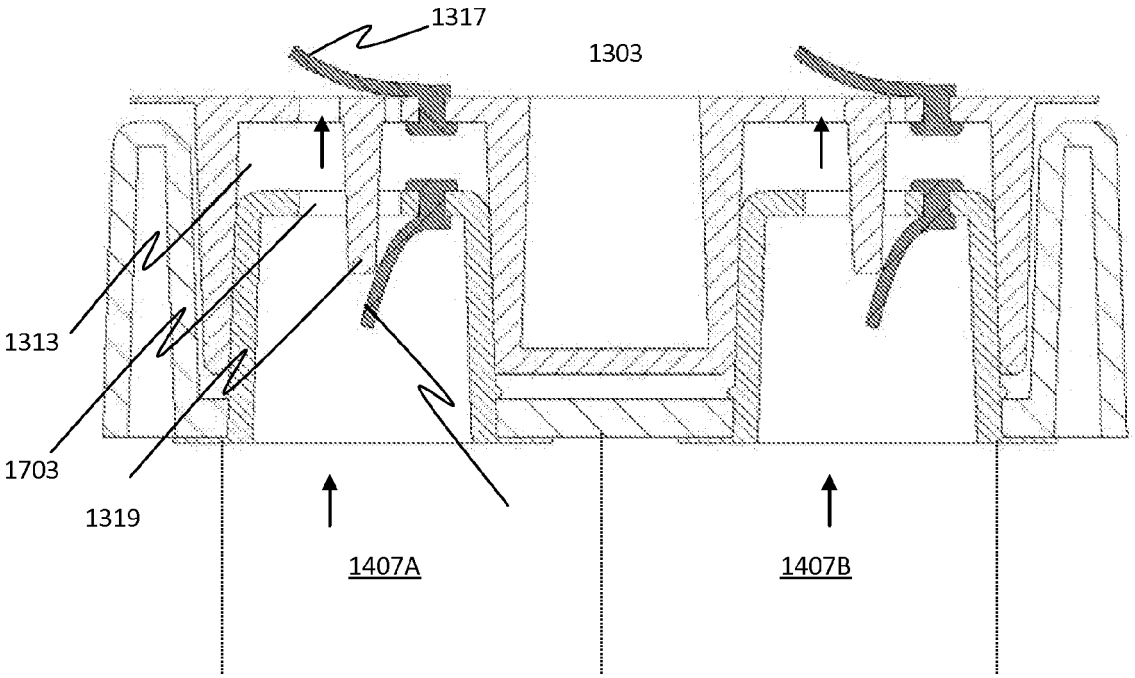

FIGURE 20

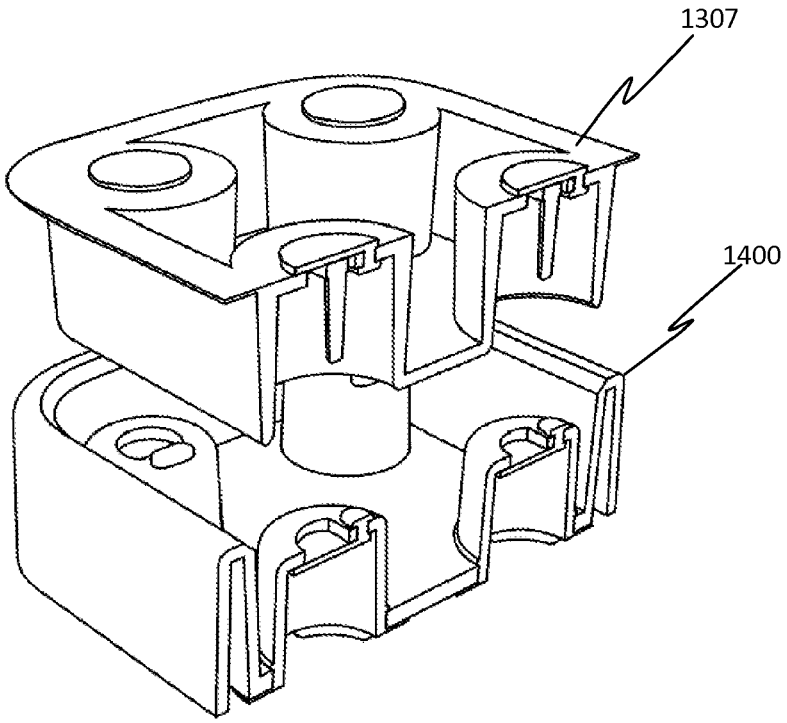

FIGURE 21

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EUROPEAN SEARCH REPORT

Application Number
EP 11 17 2177

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	US 6 799 338 B1 (HSIA BEN MING [US]) 5 October 2004 (2004-10-05) * column 3, line 44 - column 5, line 63 * * figures 2-8 *	1-4,7,8	INV. A47D7/00 A47D13/06
X	US 5 291 623 A (ARTZ LAWRENCE [US]) 8 March 1994 (1994-03-08) * column 2, line 45 - column 4, line 54; figures *	1,4,7,8	
A	DE 199 44 846 A1 (HABOR FELICITAS [DE]) 25 May 2000 (2000-05-25) * abstract; figures *	1-15	
A	US 4 815 153 A (BLESER SANDRA L [US] ET AL) 28 March 1989 (1989-03-28) * abstract; figures *	1-15	

TECHNICAL FIELDS SEARCHED (IPC)

A47D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 July 2011	MacCormick, Duncan

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 17 2177

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27-07-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82