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(54) **FITNESS TRAINING AID**

(57) A fitness training aid including a flexible, impermeable membrane defining a chamber fillable at least in part with a first flowable material and at least in part with a second flowable material, at least closure coupled to the membrane, at least one gripping member coupled to the membrane, and at least one wall positioned within the chamber. The closure positionable between at least one open position enabling the first and/or second flow-

able materials to be introduced within the chamber, and a closed position that seals the first and/or second flowable materials within the chamber. The at least one wall and the membrane define at least first and second compartments within the membrane. The at least one wall enables fluid communication of the first and/or second flowable materials between the first and second compartments.

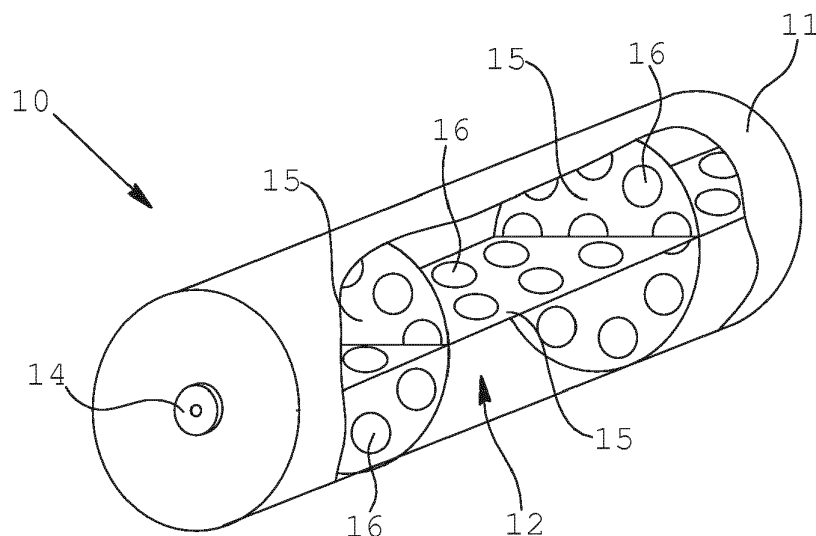


Fig. 3

Description

[0001] The invention relates to a fitness training aid, and in particular to an aid comprising a mass to be lifted and gripped to enable training exercises to be performed.

[0002] Various types of fitness training aids are known, such as kettlebells, dumb-bells, weight bars or similar. These known aids, which allow users to perform a multitude of exercises to train different muscles of the body, have intrinsic limitations, however, due to their shape. In particular, these aids generally comprise a rigid or substantially rigid body, with a center of gravity that is fixed with respect to the geometry of the body. The load of these aids is therefore described as stable.

[0003] In some training contexts, both at competitive and non-competitive level, and for rehabilitation, it is advantageous to be able to use aids or equipment that, either directly or indirectly, exert a variable or instable load on the body of the athlete or patient. Patent application WO 2005/075026 A1 describes a training aid comprising a flexible jacket or bag that can be partially filled with a liquid or with loose solid particles. The remaining empty volume of the bag may be filled with compressed air so as to make the outer form defined and stable.

[0004] During these exercises, in which the aid is moved by the athlete, the liquid inside the bag moves continuously, at different speeds depending on the movements of the athlete. The movement of the liquid therefore generates a continuous variation in the aid's center of gravity that is often sudden and not foreseeable by the athlete. By varying the percentage of air and liquid inside the bag it is possible to vary the overall mass of the aid. However, this aid does not make it possible to control the movement of the liquid inside the bag, for example between opposing walls. When performing rapid movements, the excessively fast movement of the liquid can generate recoil due to the inertia generated by the impact of the liquid against the internal walls of the bag.

[0005] In an implementation of patent application WO 2005/075026 A1 the internal volume of the jacket is divided into different compartments, not communicating with one another, each filled with a filler of a different type and weight (liquid, solid particles, etc).

[0006] This implementation makes it possible to control the aid's center of gravity, for example by filling a compartment with a heavier filler. However, the use of different fillers, particularly if they are not liquids, may be impractical for some users or applications when one considers how different users, for example in a gym, may want to choose the load and type of instability they want in the aid before performing the exercise. In this context, the object of the present invention is to propose a training aid that solves the problems of the prior art described above.

[0007] The aim of the present invention is therefore to propose a training aid that can provide an instable load that is controlled at least in part. Another aim of the present invention is to propose a training aid that makes

it possible to control the degree of instability following movements of the aid in different directions. A further aim of the present invention is to provide a training aid that makes it possible to vary the total load, or mass, in a simple and practical manner. In addition to the above-mentioned aims, a further aim of the present invention is to provide a training aid that is economical and simple to manufacture.

[0008] These aims are achieved by a training aid comprising: a flexible, impermeable membrane defining a chamber that can be filled at least in part with a liquid; at least one opening on said membrane, associated with closing means for sealing the chamber once said liquid has been inserted; and at least one handle for grasping the aid and performing a training exercise.

[0009] When the aid is configured for use, the chamber is occupied partly by the liquid, for example water, and the remaining part by a gas, for example air. Preferably, the gas is inserted into the chamber at a pressure higher than atmospheric pressure so as to stretch the membrane and give the aid its final shape for use.

[0010] According to the invention, the chamber comprises at least two compartments in fluid communication with one another and at least one partial wall separating said compartments yet allowing the passage of liquid. The function of the wall is therefore to regulate the flow of liquid from one compartment of the chamber to another. This makes it possible to limit the inertial force that the aid discharges onto the person performing the exercise in the event of abrupt variations in the direction and/or sense of movement.

[0011] In one aspect of the invention, at least one portion of the perimeter of said wall is attached to the inner surface of the membrane. The perimeter of the wall may therefore have a shape substantially the same as the cross-section of the membrane at the point where it is attached, or it may have a different shape.

[0012] In the second case, the passage of the liquid may also occur in noncontact zones between the wall and the inner surface of the membrane. In another aspect of the invention, on the surface of the wall there are one or more openings that act as a passage for the liquid between the compartments. Advantageously, said openings may have a substantially circular perimeter. In fact, this shape makes it possible to uniformly distribute the force of tension generated by the thrust of the moving fluid.

[0013] According to an implementation of the invention, the openings have the same passage area to allow a homogeneous flow of liquid between the compartments regardless of the position of the aid and of the way in which it is grasped by the user. To that end, the openings, as an alternative to or jointly with the above statement, may be distributed on the surface of the wall in a pattern having at least one axis of symmetry and preferably at least two axes of symmetry.

[0014] According to another aspect of the invention, the aid may comprise two or more walls substantially

parallel to one another. These walls therefore define a plurality of compartments next to one another. This implementation is particularly effective when the aid has an elongated tubular shape, for example cylindrical. With this type of aid, in fact, the effects of inertia and recoil can be felt more when the liquid moves along the axis of the tubular element. In this case, the walls can therefore be placed next to one another along said axis of the tubular element.

[0015] According to another implementation, the aid may comprise at least two walls intersecting with one another. In this implementation, each compartment is in communication with at least two other adjacent compartments. This implementation on the other hand is more effective when the chamber has a more regular shape, for example spherical, parallelepiped or substantially cubical.

[0016] According to another aspect of the invention, the ratio P between the area of passage of the fluid and the surface area occupied by the wall, between two adjoining compartments, is preferably between 0.5 and 3 and more preferably between 0.7 and 2. More precisely, this ratio relates to the free surface for the passage of fluid with respect to the surface occupied by the wall material. As this value increases, the passages have a greater area, therefore allowing a more rapid flow of liquid. When there are several walls in the chamber, they may have the same ratio value P or different values from one another. For example, said ratio P may be the same for all parallel walls next to one another along the same direction.

[0017] In another aspect of the invention, the training aid may comprise reinforcing strips on the outer surface of the membrane. Preferably, said strips are placed in the zone where the wall is connected to the internal surface of the membrane. The membrane in said zones therefore has less flexibility, enabling it not to deform as a result of the forces exerted on it by the walls when they in turn are struck by the moving liquid.

[0018] Advantageously, said reinforcing strips can act as a support for connecting gripping means to the training aid. Further characteristics and advantages of the present invention will become more apparent from the description of an example of a preferred, but not exclusive, embodiment of a training aid, as illustrated in the accompanying figures

[0019] This invention will become more fully understood from the following detailed description, taken in conjunction with the accompanying drawings described herein below, and wherein like reference numerals refer to like parts.

Figure 1 is a perspective view of a training aid in accordance with one implementation of the present invention.

Figure 2b is a longitudinal cross-sectional view of the training aid of FIG. 1, and taken along line A - A

of FIG. 2b.

Figure 2b is a transverse cross-sectional view of the training aid taken along line B - B of FIG. 2a.

Figure 3 is a side perspective view of a training aid in accordance with another implementation of the present invention shown with a portion of the membrane removed.

Figure 4 is a side perspective view of a training aid in accordance with another implementation of the present invention shown with a portion of the membrane removed.

[0020] With reference to FIGS. 1 and 2, the training aid indicated as a whole by the number 10 comprises a membrane 11 delimiting or defining a chamber 12 on the inside of the membrane. The membrane 11 is body having a wall that is made of a material impermeable to fluids. In one implementation, the membrane is made of a flexible material, such as a plastic. In other implementations, the membrane may be formed of polyvinyl chloride (PVC), polyurethane (TPU), synthetic rubber (CSM), chlorosulfonated polyethylene (CPSE), other polymeric materials or combinations thereof. In other implementations, the membrane 11 can be formed as a rigid, non-flexible body. The chamber 12 can be filled at least in part with a liquid L or small particles. The liquid can be water or other liquids with a similar viscosity. In other implementations, the liquid can have a higher viscosity and/or density than water. The small particles can be sand, or beads, pellets, balls, flakes, and/or pieces formed of a plastic material, a metal, a polyurethane, stone, glass, an elastomeric material, a thermoset material, and combinations thereof. The aid 10 can include a re-closable opening 13 to enable the liquid, the small particles, or combinations thereof to be added or removed from the chamber 12 of the membrane 11. Preferably, the remaining volume of the chamber 12 is filled with a gas G, for example compressed air. In other implementations, the gas may be ambient air, nitrogen or combinations thereof. The opening 13 is associated with a closure 14 positionable between a closed position and at least one open position. When closed, the closure 14 assists in sealing the chamber 12. When opened, the liquid or particles can be added to or removed from the chamber 12.

[0021] Preferably, the closure 14 is configured to be reclose-able so as to be opened and closed so as to allow the chamber to be filled or emptied several times. Advantageously, the closure 14 can also be used to allow pressurized gas to be inserted into the chamber. In other implementations the closure 14 can be first and second spaced apart closures with the first closure configured for the adding or removal of the liquid or particles, and the second closure configured for adding or releasing gas into the chamber 12. In one implementation, the membrane 11 is formed of a flexible material and can be

shaped in such a way that, once the chamber 13 has been filled and sealed, the training aid takes on a specific shape for use. In the implementations illustrated in FIGS. 1 and 3, the training aid can have, for example, an elongated tubular shape, more precisely a cylindrical shape. In other implementations, the aid 10 can be formed in other shapes, such as, for example, spherical, hemispherical, irregular, generally polygonal or combinations thereof.

[0022] According to the invention, the membrane 11 is shaped in such a way that, once the chamber 12 has been filled and sealed, the training aid takes on a specific shape for use. In the implementations of FIGS. 1 and 3, the training aid 10 has, for example, an elongated tubular shape, more precisely a cylindrical shape. The tension of the membrane 11, and therefore the stiffness of the training aid 10, can be regulated by increasing or decreasing the pressure of the gas in the chamber 12.

[0023] According to the invention, the chamber 12 comprises at least two compartments in fluid communication with one another. In the implementation of FIG. 1, the chamber 12 comprises three compartments 12a, 12b, 12c, with the compartments separated by one or more walls 15 having one or more openings 16 to allow the liquid L to flow from one compartment 12a, 12b or 12c to an adjoining compartment 12a, 12b or 12c. In other implementations, the aid 10 may include 3, 4, 5 or more walls to defining 3, 4, 5 or more compartments.

[0024] In practice, the wall 15 serves to limit the speed with which the fluid moves between the ends of the chamber, especially when the aid is moved quickly. In the implementation illustrated, the wall 15 comprises a lamina, the perimeter 15a of which is connected to the inner surface 11 a of the membrane 11.

[0025] The lamina or wall 15 may be made of the same material as the membrane 11 or in another material. In the first case, the wall 15 or lamina can be thicker than the membrane 11 so as to have less flexibility and to give the aid greater stability when in use. Alternatively, the lamina may be substantially rigid. Suitable materials for the wall 15 include, for example, polycarbonate, polyethylene (PE), polyvinyl chloride (PVC), polypropylene, polymethylmethacrylate (PMMA). Polycarbonate, other polymeric materials or combinations thereof.

[0026] The one or more openings 16 in the wall 15 enable the liquid to pass through the opening from one of the chambers 12, 12b or 12c to another of the chambers 12a, 12b or 12c. The openings 16 act as passages for the transfer of the liquid L between compartments. The size, number, and or position of the openings 16 in the wall 15 enable the flow of the liquid or particles to be controlled or governed. The total area of the openings with respect to the cross-section of the aid at the point where the wall is attached determines the speed at which the liquid can flow from one compartment of the chamber to another. The number of openings 16 and their size is chosen based on the damping effect one wishes to achieve on the liquid L inside the chamber 12.

[0027] In one implementation, each wall 15 defines a fluid passageway area that is composed of the collective area of the one or more openings 16 in the wall 15 or the porosity or permeability of the wall 15. In one implementation, the fluid passageway ratio of the wall is the fluid passageway area over the surface area occupied by the wall 15. In one implementation, the fluid passageway ratio is within the range of 0.5 and 3. In another implementation, the fluid passageway ratio is within the range of 0.7 and 2. The openings 16, preferably, are circular in shape so as to avoid forces being concentrated on the edge of the openings, which could cause lacerations to the lamina. In other implementations, the openings can be form of other shapes such as polygonal, oval, irregular, or combinations thereof. Advantageously, said openings 16 are distributed on the surface of the wall in such a way that the passage of the fluid is homogeneous and independent of the orientation of the aid in space.

[0028] In the implementation illustrated, the openings 16 are arranged in a circular series around the axis of the tubular body. In alternative implementations, the wall 15 may be connected to the inner surface of the membrane only by one part of its perimeter. The passage of liquid may therefore be in the space between the wall and the inner surface of the membrane 11. The wall may also comprise several separate laminas connected independently to the inner surface 11 a of the membrane 11.

[0029] In another implementation, the wall 15 may comprise a permeable, fibrous, natural or synthetic fabric. In this case also, by adopting a more or less permeable fabric, it is possible to vary the speed at which the liquid passes through the wall 15 to move from one compartment to another adjacent compartment. In another implementation, the wall may be formed partially of a permeable material and partially of a non-permeable material with or without openings.

[0030] According to the invention, the chamber 12 may be provided with several walls 15. In the implementation shown in FIG. 1, the walls 15 are arranged next to one another along the axis of the tubular body and parallel to one another. In this way, the damping effect on the inertia of the liquid is felt when the movement of the liquid L inside the chamber 12 takes place in a direction substantially parallel to the axis of the tubular body.

[0031] In one implementations, the aid can include one or more handles or gripping members. In one implementation, there may be reinforcing strips 17 on the outer surface of the membrane 11. Preferably, said strips are placed on the membrane in the zone where the walls 15 are connected to the inner surface 11 a. The function of the strips is to make the membrane less deformable underneath as a result of the forces exerted on it by the walls when they are struck by the moving liquid.

[0032] The training aid according to the invention is provided with gripping members 18, such as handles or similar, for example, so that the aid can be grasped and moved when performing training exercises. In one implementation, the gripping members 18 can be a pair of

spaced-apart handles to facilitate the grasping and maneuvering of the aid 10.

[0033] FIG. 3 illustrates another implementation of the fitness training aid 10. The chamber 11 can be provided with two spaced-apart transversely extending walls 15 within the chamber 12, and a third wall 15 longitudinally extending between the first and second spaced apart walls 15. The walls 15 can be substantially perpendicular to one another. The training aid configured in such a way makes it possible to dampen the inertia of the liquid L when it moves around the chamber 12, in different directions. Starting from this implementation, it is possible to vary the number of walls 15, arranging them partly parallel and partly transversal to one another. In other implementations, other numbers of walls or configurations of walls can be used to provide different properties, flow-rates, etc. of the liquid or particles within the membrane 11.

[0034] FIG. 4 illustrates a training aid 10 where the membrane 11, once it has been filled with the liquid L and the gas G, takes on a substantially spherical shape. In this implementation also, it is preferable to arrange at least two walls 15 transversal and intersecting with one another, so as to obtain a response from the aid that is as uniform as possible and independent of the grip position. The remaining characteristics of the training aid are the same as those described for the implementation shown in figure 1.

[0035] While the preferred embodiments of the invention have been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention. One of skill in the art will understand that the invention may also be practiced without many of the details described above. Accordingly, the present invention is intended to include all such alternatives, modifications and variations set forth within the spirit and scope of the appended claims. Further, some well-known structures or functions may not be shown or described in detail because such structures or functions would be known to one skilled in the art. Unless a term is specifically and overtly defined in this specification, the terminology used in the present specification is intended to be interpreted in its broadest reasonable manner, even though may be used conjunction with the description of certain specific embodiments of the present invention.

Claims

1. A fitness training aid comprising:

a flexible, impermeable membrane defining a chamber fillable at least in part with a first flowable material and at least in part with a second flowable material;
at least one closure coupled to the membrane, the closure positionable between at least one

open position enabling the first and/or second flowable materials to be introduced within the chamber, and a closed position that seals the first and/or second flowable materials within the chamber;

at least one gripping member coupled to the membrane; and

at least one wall positioned within the chamber, the at least one wall and the membrane defining at least first and second compartments within the membrane, the at least one wall enabling fluid communication of the first and/or second flowable materials between the first and second compartments.

2. The fitness training aid of claim 1, wherein at least one portion of the at least one wall is attached to an inner surface of the membrane.

3. The fitness training aid of claim 1 or 2, wherein the at least one wall includes at least one opening for facilitating the transfer of the first and/or second flowable materials from one compartment to another.

4. The fitness training aid of claim 3, wherein the at least one opening is circular in shape.

5. The fitness training aid of claim 3 or 4, wherein the at least one opening is at least first and second openings.

6. The fitness training aid of claim 3, wherein the first and second opening have substantially the same size or different size.

7. The fitness training aid of any one of the previous claims, wherein the at least one wall defines a fluid passageway area and a fluid passageway ratio, wherein the fluid passageway ratio of is within the range of 0.5 and 3.

8. The fitness training aid of any one of the previous claims, wherein the at least one wall is at least first and second walls.

9. The fitness training aid of claim 8, wherein the first and second walls are substantially parallel to each other or angled with respect to each other.

10. The fitness training aid of claim 8, wherein the at least first and second walls is at least first, second and third walls.

11. The fitness training aid of claim 10, wherein the first and second walls are substantially parallel to each other, and wherein the third wall is substantially perpendicular to at least one of the first and second walls.

12. The fitness training aid of any one of the previous claims, wherein the membrane has a cylindrical shape.

13. The fitness training aid of any one of the previous claims, wherein the membrane has spherical shape. 5

14. The fitness training aid of any one of the previous claims, wherein the first flowable material is a liquid. 10

15. The fitness training aid of any one of the previous claims, wherein the first flowable material is a plurality of small solid particle.

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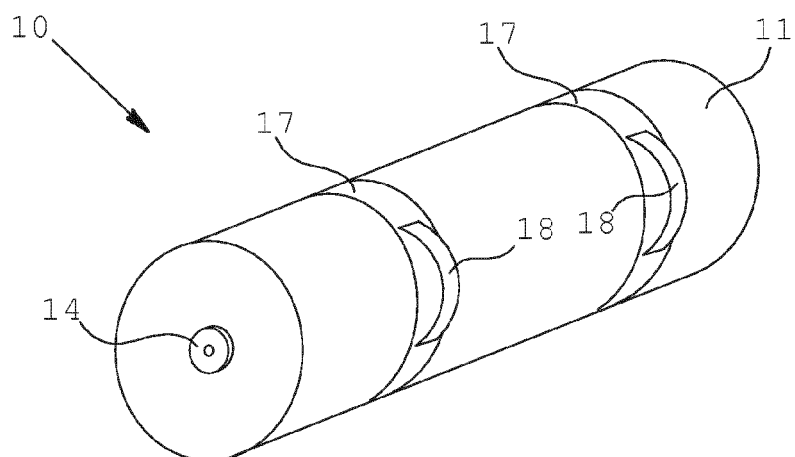


Fig.1

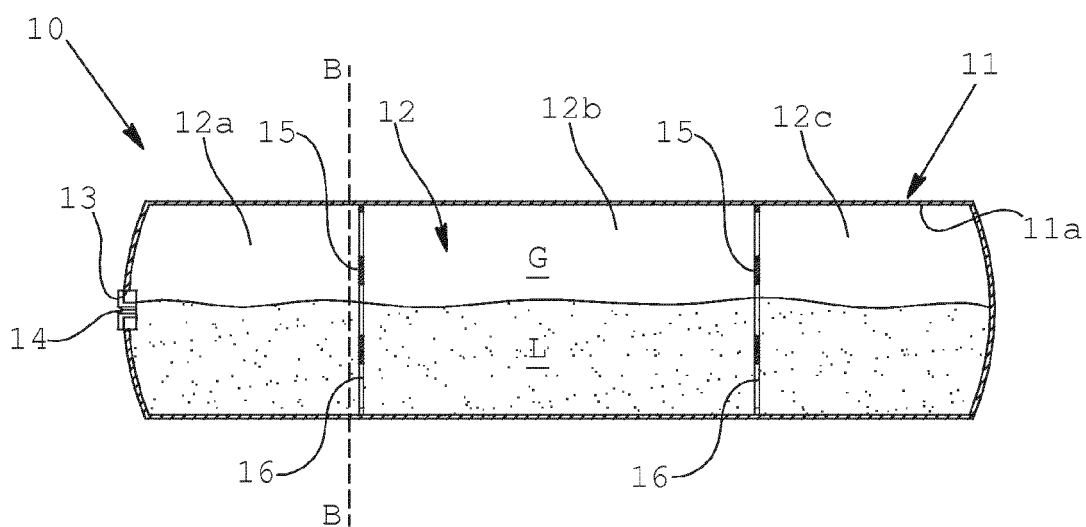


Fig.2a

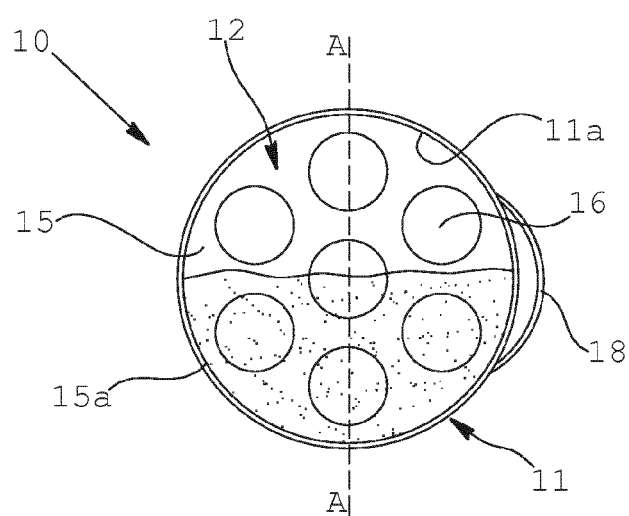


Fig.2b

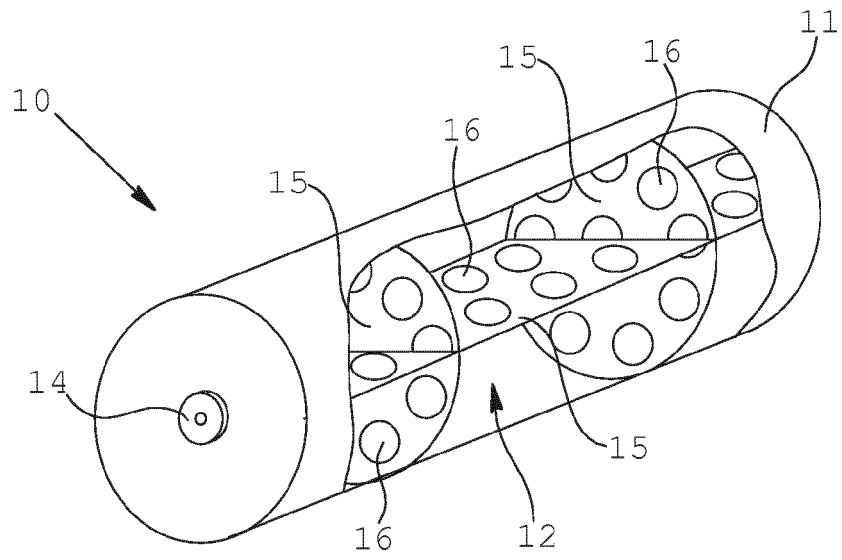


Fig.3

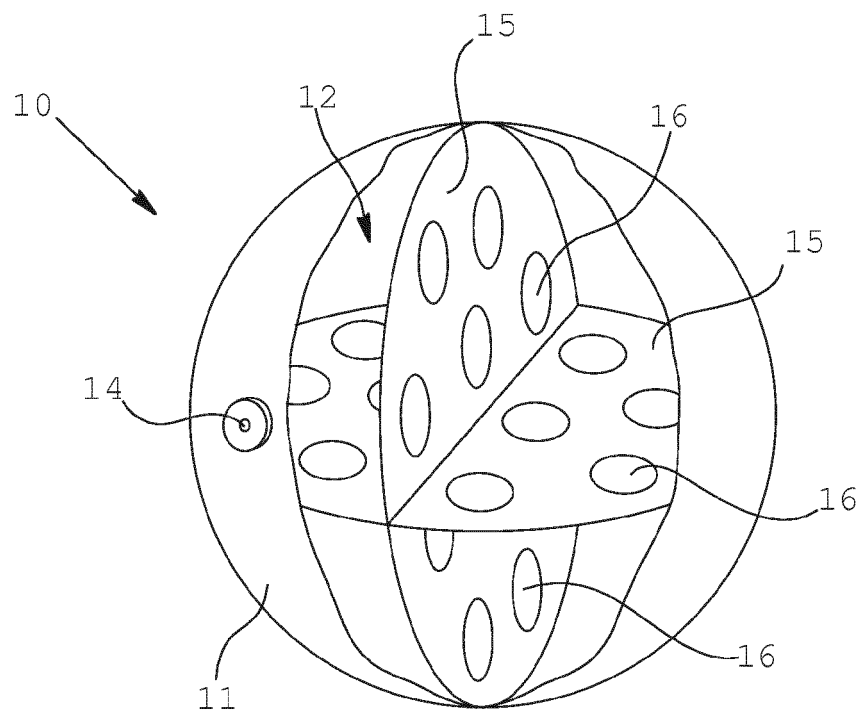


Fig.4



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 Application Number
 EP 16 16 4327

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 September 2016	Examiner Squeri, Michele
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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