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(72) Inventor; and
(71) Applicant : **BANTJES, Neville Don** [ZA/ZA]; Onze Rust Farm, Vlaeberg Road, 7600 Stellenbosch (ZA).

(72) Inventors: **KRIGE, Retief Pieter**. **MULDER, Roelof**.

(74) Agent: **BRIAN BACON INC.**; 2nd Floor, Mariendahl House, Newlands on Main, Main Road, 7700 Newlands (ZA).

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(54) **Title**: DISPENSER TO BE WORN ON THE PERSON

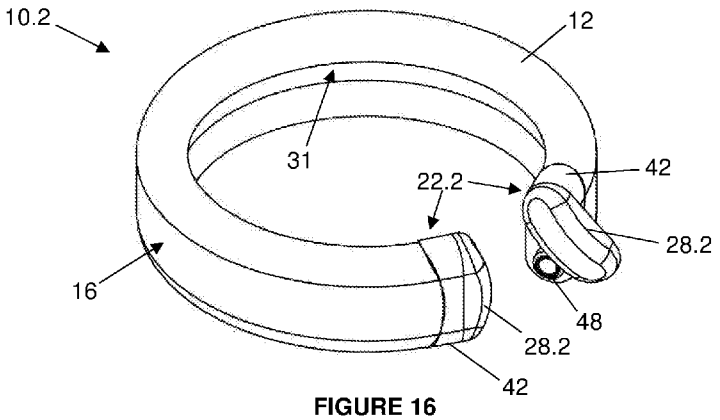

FIGURE 16

(57) **Abstract**: A wearable dispenser in the form of an armband (10) comprises an elongate body (12) of flexible material that defines a discharge opening (18) at its one end and an internal cavity (14) along its length, that is in communication with the discharge opening (18). A closure element (28) can selectively open and close the discharge opening (28) and a piston in the form of a ball (40) is provided inside the cavity (14) that seals against internal walls of the cavity (14) and can slide longitudinally along the cavity (14) to drive a fluid from the cavity to the discharge opening 18. An elongate spine element (34) extends along the length of the body (12) and is attached to the body (12).

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DISPENSER TO BE WORN ON THE PERSON

FIELD OF THE INVENTION

This invention relates to dispensers for fluids such as sanitizers, preparations for topical application, or the like, which dispensers can be worn on the person, preferably in the form of an armband that can be worn on the wrist.

BACKGROUND TO THE INVENTION

Many fluids that are frequently required, such as hand sanitizers, sunscreens, moisturizers, insect repellents, or the like, are often not applied as frequently as would be desirable, because they are not conveniently available to the user. Alternatively, these fluids are applied when required, but doing so involves the inconvenience of obtaining the fluid when required, or of carrying the fluid, e.g. in a dispensing bottle in a satchel, but having the fluid available when needed requires that the user needs to foresee the need for the fluid in advance and ensure that it is available – which users frequently forget. Further, the dispensing operations often include cumbersome or wasteful dispensing and/or applying actions, e.g. needing both hands for the dispensing action.

The present invention seeks to provide convenient means for carrying a fluid on the person of a user and conveniently dispensing the fluid, when required. The invention further seeks to provide for convenient replenishment of the fluid carried on the user's person and the invention seeks to be cost-effective. Lastly, the invention seeks to avoid a need to size apparatus to suit different users.

SUMMARY OF THE INVENTION

According to the present invention there is provided a dispenser comprising:

an elongate body of flexible material, said body defining a discharge opening at one end of the body and defining a longitudinal internal cavity with a substantially uniform cross-sectional shape, said internal cavity being in flow communication with said discharge opening;

a closure element configured for selectively opening and closing said discharge

opening;

a piston disposed inside the internal cavity, said piston sealing against internal walls of the internal cavity and said piston being configured to slide longitudinally along the internal cavity;

an elongate spine element that extends longitudinally along the body and to which the body is attached.

The spine element is plastically deformable and/or is resiliently flexible. The term "plastically deformable" is akin to "malleable", "pliable" and "ductile" and is used herein to denote deformation that is not immediately reversed by elasticity or like properties of the material, but it does not exclude the possibility that the deformation may be partially elastic, may be reversed in part over time, or the like.

The spine element may extend longitudinally inside the body or the spine element may extend externally to the body. The spine element may comprise a length of metal wire.

The piston may be spherical and may fit inside the internal cavity with an interference fit. The term "piston" is used herein to denote any element that can drive a fluid along an elongate cavity while sealing against walls of the cavity and the word itself is not limited to any shape of the piston or to any means of imparting motion on the piston.

The body may define two or more of the internal cavities, each in flow communication with one of the discharge openings and closure elements and two of the discharge openings may be on opposing ends of the body.

Each of the internal cavities may extend along the entire length of the body and may be in flow communication with a vent opening at the end of the body that is opposite from its discharge opening. The body may be an extrusion.

The dispenser may include at least one end cap attached to and end of the body and the closure element may form part of the end cap. Preferably, the dispenser includes two end caps, at the opposing ends of the body.

The dispenser may include a fluid inside each of the inner cavities, between the piston and the discharge opening of the inner cavity.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the present invention, and to show how it may be put into effect, the invention will now be described by way of non-limiting example, with reference to the accompanying drawings in which:

Figure 1 shows a three-dimensional view of a first embodiment of a wearable dispenser according to the present invention, in a straight condition;

Figure 2 shows a three-dimensional view of the dispenser of Figure 1, in a curved condition, in use around the wrist of a wearer;

Figure 3 shows a side view of the dispenser of Figure 1, in its curved condition;

Figure 4 shows a bottom view of the dispenser of Figure 1, in its curved condition;

Figure 5 shows an end view of the dispenser of Figure 1, in its curved condition;

Figure 6 shows a cross-sectional view of a body of the dispenser of Figure 1;

Figure 7 shows a bottom view of the dispenser of Figure 1, in its straight condition;

Figure 8 shows a bottom view of the dispenser of Figure 1, in its straight condition, with one end cap opened and on end cap removed;

Figure 9 shows a three-dimensional view of a second embodiment of a wearable dispenser according to the present invention, in a curved condition;

Figure 10 shows a side view of the dispenser of Figure 9;

Figure 11 shows an end view of the dispenser of Figure 9;

Figure 12 shows a bottom view of the dispenser of Figure 9;

Figure 13 shows a sectional side view of the dispenser of Figure 11, taken at XIII-XIII;

Figure 14 shows a cross sectional view of the dispenser of Figure 10, taken at XIV-XIV;

Figures 15 and 16 show three-dimensional views of the dispenser of Figure 9, from a different angle, with its lids closed in Figure 15 and with one lid opened in Figure 16;

Figure 17 shows the same three-dimensional view of an end cap of the dispenser of Figure 9 and a length of a spine element of the dispenser;

Figure 18 shows a side view of the end cap and spine element of Figure 17;

Figure 19 shows a sectional view of the end cap and spine element of Figure 18, taken at XIX-XIX;

Figure 20 shows an exploded side view of the end cap and spine element of Figure 17; and

Figure 21 shows an exploded top view of the end cap and spine element e of Figure 17.

DETAILED DESCRIPTION OF THE DRAWINGS

Referring to the drawings, a wearable dispenser in the form of an armband according to the present invention is generally identified by reference number 10 and the first embodiment of an armband, shown in Figures 1 to 8, is identified by suffix 1, whereas the second embodiment of an armband, shown in Figures 9 to 21, is identified by suffix 2. Parts that are common between the two embodiments are identified by the same reference numbers, with suffixes used to distinguish between the two embodiments, where necessary.

Referring to Figures 1 to 8, in the first embodiment, the armband 10.1 includes a flexible, elongate body 12 that defines at least one, but any number - preferably two, internal cavities 14 that extend longitudinally inside the body. The body 12 can be moulded or made in any desired process, but it is preferably an extrusion with a uniform cross-sectional profile as shown in Figure 6, with the two cavities 14 extending along the entire length of the body. The body 12 can be made of any suitably flexible material, such as silicon, or other elastomers. The body 12 preferably defines a flat surface 16 on which graphics, printing, or the like can be applied conveniently.

Each cavity 14 is cylindrical in shape in this embodiment and has a piston in the form of a sphere or ball (not shown in Figures 1 to 8) inside it. Each ball fits snugly inside its cavity 14 with an interference fit and seals against the internal walls of the cavity, but can slide longitudinally along the cavity in a sealing manner, to act as a piston.

Each cavity 14 extends between the ends of the body 12 and is thus open at the opposing ends of the body and is in flow communication with a discharge opening 18 at

one end of the body and a vent opening 20 at the other end of the body. However, in other embodiments of the invention, the cavity need not have a vent opening. In the armband 10.1, the two cavities 14 have opposing orientations, so that at each end of the body 12, the discharge opening 18 of one cavity is adjacent the vent opening 20 of the other cavity.

Two identical caps 22 are provided at the ends of the body 12 and each cap includes a shell 24 that is hinged in clam-shell-fashion and clips closed around the relevant end of the body 12, covering the discharge opening 18 of one cavity 14 and vent opening 20 of the other cavity 14. However, a dispensing opening 26 is defined in the shell 24 and is in register with the discharge opening 18 and can be closed by a re-sealable, hinged closure element in the form of a lid 28.1 that clips releasably over the dispensing opening.

The armband 10.1 is shown in Figure 8 with one cap omitted (shown at the lower end of the drawing) and with the other cap 22 in an open condition, before being fitted to the end of the body 12. Inside the cap 22, grip formations 30 are provided, which grip the end of the body 12 with pressure / friction, when the shell 24 is closed. The grip formations 30 are centrally positioned in the cap 22 and are received in a longitudinal groove 31 that extends along the length of the body 12, so that pressure from the grip formations on the body do not affect the cylindrical internal profiles of the cavities 14. Adjacent the grip formations 30, two pins 32 are shown, which pierce the body 12 when the shell 24 is closed, but the pins are offset from the centre of the cap 22, so that they pierce only one of the cavities 14 (shown on the left in Figure 8) and they do so adjacent its vent opening 20. Instead, or in addition, the cap 22 could include pins that attach to the end of the body 12 with a snap fit, or any other mechanical attachment. The shell 24 fits on the discharge opening 18 (of the cavity 14 shown on the right in Figure 8) in a sealing manner (even though this is not shown in the drawings), but the engagement between the shell 24 and the vent opening 20 is not sealed, so that the vent opening is in flow communication with the outside of the cap 22.

Various other embodiments of caps are possible, which fit on the end of the body 12 to

close off the discharge opening 18, preferably in a sealing manner, with a re-sealable lid.

An elongate spine element in the form of a metal wire 34 extends along a central passage 36 inside the body 14, along the entire length of the body. The wire 34 is reasonably stiff and can retain its shape when exposed to light loads, but the wire is also plastically deformable and can be shaped by hand to lend the body 12 an unlimited number of shapes. More particularly, the wire 34 can be curved to give the body 12 the curved shape shown in Figures 2 to 5, which allows it to be worn around a wearer's wrist, but the wire can be shaped to adjust the curvature of the body, to straighten the body as shown in Figures 1, 7 and 8, or the wire can be shaped to lend various shapes to the body, allowing the armband 10.1 to be used as a toy, to be attached to articles for storage, etc. The wire 34 allows the body 12 to be shaped repeatedly to a multitude of shapes, so that the armband 10.1 is very versatile.

The ability to adjust the shape and/or curvature of the body 12, by bending the wire 34, allows adjustment of the armband 10.1 to fit comfortably around varying wrist sizes. The ends of the armband 10.1 can be spaced a small distance apart, as shown in Figures2 to 4, to fit around larger wrists, the ends can meet, or they can overlap to extend around a smaller wrist. The body 12 can also be given a helical shape (or an unlimited variety of other shapes), if desired and these changes in curvature and/or shape would not affect the aesthetic appeal or the functionality of the armband 10.1. Using the adjustable curvature of the armband 10.1 to keep it in position, also obviates the need for a clasp or other connector between the ends of the body 12, so that the armband can be fitted, adjusted, removed, used as dispenser, etc. easily and comfortably, without the inconvenience or cost of a connector.

The wire 34 can be co-extruded with the body 12, the body can be extruded around the wire, or the wire can be inserted inside the central passage 36 after the body has been extruded (or formed otherwise) and in the embodiment showed in Figures 1 to 8, ends of the wire protrude on the opposing ends of the body and are angled to form anchor formations 38 that keep the wire in place inside the central passage. The anchor

formations 38 are received in recesses formed in the shells 24 of the caps 22, at each of the two vent openings 20.

The wire 34 can be metal, e.g. galvanised mild steel, or it can be any other suitably stiff, plastically deformable material, e.g. a suitably deformable polymer. However, the wire 34 should preferably be of a material that is soft and pliable and is resistant to work-hardening. The armband 10 is intended to be easily deformable by hand and accordingly, the wire 34 is relatively thin – its thickness being selected to provide appropriate stiffness (i.e. resistance to bending).

Various other forms of spine elements can be provided, e.g. other formations embedded inside the body 12 or external formations and as an example, the spine element could comprise a thin metal plate extending around the outer periphery of the body, along the flat surface 16 – the spine performing the same functions of stiffness and deformability as the wire 34.

A fluid is provided inside each cavity 14, between the ball and the discharge opening 18 and the fluid is normally sealed from the atmosphere by the lid 28.1 closing the dispensing opening 26 and discharge opening 18 and by the ball sealing against the inside of the cavity 14. The armband 10 is worn comfortably around the user's wrist; much like any other armband and it is thus continuously available to the user, without any significant discomfort or inconvenience.

If the fluid needs to be dispensed, the armband 10 can remain in place, or it can be removed from the wearer's arm, or any other place where it was permanently or temporarily attached or store. The lid 28.1 is opened by hand and the ball is pushed along the cavity 14 towards the discharge opening 18, to urge the fluid along the cavity in piston-fashion and expel the fluid via the discharge opening and dispensing opening 26. The ball is pushed along the cavity by pressing on the outside of the body 12 and this can be done with the thumb of the user's free hand if the armband 10.1 remained in place on a wearer's wrist, or it can be done in any convenient way by pinching the body 12 adjacent the ball, on the side of the ball facing the vent opening 20, by sliding a

finger along the body 12 towards the discharge opening 18, or the like.

The fluid can be a liquid, or can be more viscous, e.g. a gel or a paste. Further, depending on the type of fluid, it can wet the inner walls of the inner cavity 14, which could lubricate the longitudinal movement of the ball along the inner cavity. The armband can be used to dispense various fluids, including, but not limited to sunscreen, moisturiser, hand-cleaner, disinfectant, or the like.

The armband 10.1 can be disposable or it can be re-filled. If the fluid needs to be replenished, an opening of a container filled with the fluid is brought into alignment with the dispensing opening 26 and the container is pressed against the cap 22 to seal around the dispensing opening. Fluid is expelled from the container (e.g. by pressing on the walls of a flexible container) and the fluid is urged under pressure into the cavity 14 and pushes the ball towards the vent opening 20.

When the ball moves along the cavity 14, air flows into the cavity or out of the cavity at the vent opening 20, which is not sealed.

Figures to 9 to 21, in the second embodiment, the armband 10.2 also includes a body 12 with substantially the same cross sectional profile as in the first embodiment, defining two parallel cavities 14, a groove 31 and a flat surface 16. The armband 10.2 also includes pistons in the form of balls 40 that fit inside the cavities 14 with an interference fit and one such ball is shown in Figure 14. Further, the armband 10.1 has an internal spine element in the form of a metal wire 34, substantially identical to the first embodiment, apart from the manner in which the ends of the wire are anchored at the ends of the body 12.

The primary differences between the first embodiment and the second embodiment of the armband lie in the end caps. The end caps 22.2 of the second embodiment of the armband 10.2 are shown in detail in Figures 17 to 21, along with a length of the wire 34 near the end of the end cap.

Each end cap 22.2 comprises a cap body 42 with two hollow spigots 44 and 46, which are receivable in a sealing manner, inside the discharge opening 18 and adjacent vent opening 20, respectively, at one end of the body 12 of the armband 10.2. (The discharge and vent openings 18,20 are not identified in Figures 9 to 21, but they are the same in the second embodiment, as shown in Figure 8.) The discharge spigot 44 fits on the discharge opening 18, so that the hollow inside of the spigot is in communication with the fluid-filled inside of the cavity 14 and is in communication with the internal passage of a hollow protruding spout 48. The vent spigot 46 fits in the vent opening 20 of the adjacent cavity 14 and the hollow inside of the vent spigot is in communication with the air-filled inside of the cavity 14 and it is open to the outside of the cap body 42.

The end cap 22.2 includes a lid 28.2 with a short shaft 50 that fits inside the vent spigot 46 with clearance, so that the vent opening 20 is not sealed by the shaft 50. The shaft 50 is held in place inside the vent spigot 46 with a key formation 52 at its remote end that protrudes from the end of the vent spigot, inside the cavity 14. The lid 28.2 can pivot about the shaft 50 between a closed position in which the lid covers the spout 48 in a sealing manner, and an open position, shown in Figure 16, in which the lid clears the spout and fluid can be dispensed freely from the cavity 14, via the discharge spigot 44 and spout 48.

Each end of the wire 34 has a flattened part 54 that is locked inside a recess inside the cap body 42 in bayonet fashion. Various other non-round formations at the ends of the wire 34 can be received in the cap bodies 42 or other means can be used to anchor the ends of the wire at opposing ends of the body 12. Similarly, various other forms of closures could be used to close the discharge opening 18, but the end caps 22.2 hold various advantages, including cost-effective assembly, ease of use, resistance to fouling of the spout with fluid, and the like.

In other embodiments, the spine element could be partly or entirely elastic, imparting a curved shape to the armband 10 and causing the armband to curve around a wearer's arm. In such a case, the armband 10 can be straightened by hand and can be held in a straight condition, but would return to its curved shape when released.

CLAIMS

1. A dispenser (10) comprising:
   an elongate body (12) of flexible material, said body (12) defining a discharge opening (18) at one end of the body (12) and defining a longitudinal internal cavity (14) with a substantially uniform cross-sectional shape, said internal cavity (14) being in flow communication with said discharge opening (18);
   a closure element (28) configured for selectively opening and closing said discharge opening (18);
   a piston (40) disposed inside the internal cavity (14), said piston (40) sealing against internal walls of the internal cavity (14) and said piston (40) being configured to slide longitudinally along the internal cavity (14); and
   an elongate spine element (34) that extends longitudinally along the body (12) and to which the body (12) is attached.

2. A dispenser (10) according to claim 1, wherein the spine (34) element is plastically deformable.

3. A dispenser (10) according to claim 1 or claim 2, wherein the spine element (34) is resiliently flexible.

4. A dispenser (10) according to any one of the preceding claims, wherein the spine element (34) extends longitudinally inside the body (12).

5. A dispenser (10) according to any one of claims 1 to 3, wherein the spine element extends externally to the body.

6. A dispenser (10) according to any one of the preceding claims, wherein the spine element comprises a length of metal wire (34).

7. A dispenser (10) according to any one of the preceding claims, wherein the piston (40) is spherical.

8. A dispenser (10) according to any one of the preceding claims, wherein the piston (40) fits inside the internal cavity (14) with an interference fit.

9. A dispenser (10) according to any one of the preceding claims, wherein the body (12) defines a plurality of the internal cavities (14), each of said internal cavities (14) being in flow communication with one of the discharge openings (18).

10. A dispenser (10) according to claim 9, wherein two of the discharge openings (18) are on opposing ends of the body (12).

11. A dispenser (10) according to any one of the preceding claims, wherein the internal cavity (14) extends along the entire length of the body (12) and is in flow communication with a vent opening (20) at the end of the body (12) that is opposite from the cavity's discharge opening (18).

12. A dispenser (10) according to any one of the preceding claims, wherein the body (12) is an extrusion.

13. A dispenser (10) according to any one of the preceding claims, which includes at least one end cap (22) attached to and end of the body (12).

14. A dispenser (10) according to claim 13, wherein the closure element (28) forms part of the end cap (22).

15. A dispenser (10) according to claim 13 or claim 14, which includes two end caps (22), at the opposing ends of the body (12).

16. A dispenser (10) according to any one of the preceding claims, which includes a fluid inside each of the inner cavities (14), between the piston (40) and the discharge opening (18) of the inner cavity (26).

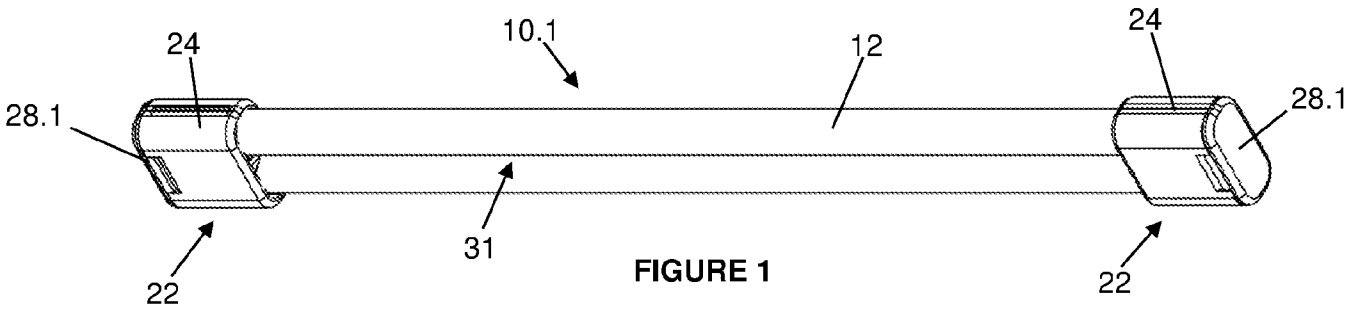

FIGURE 1

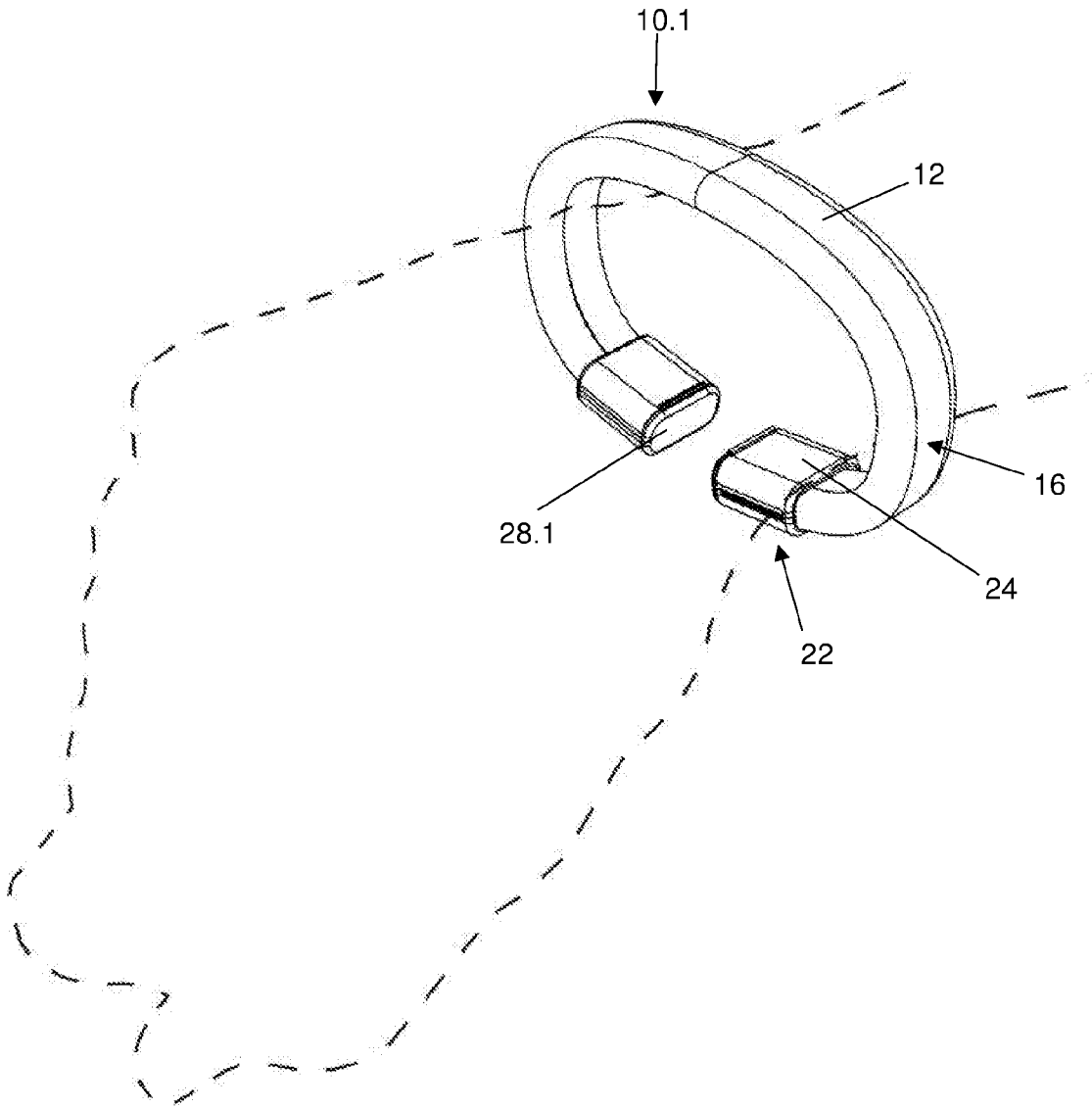

FIGURE 2

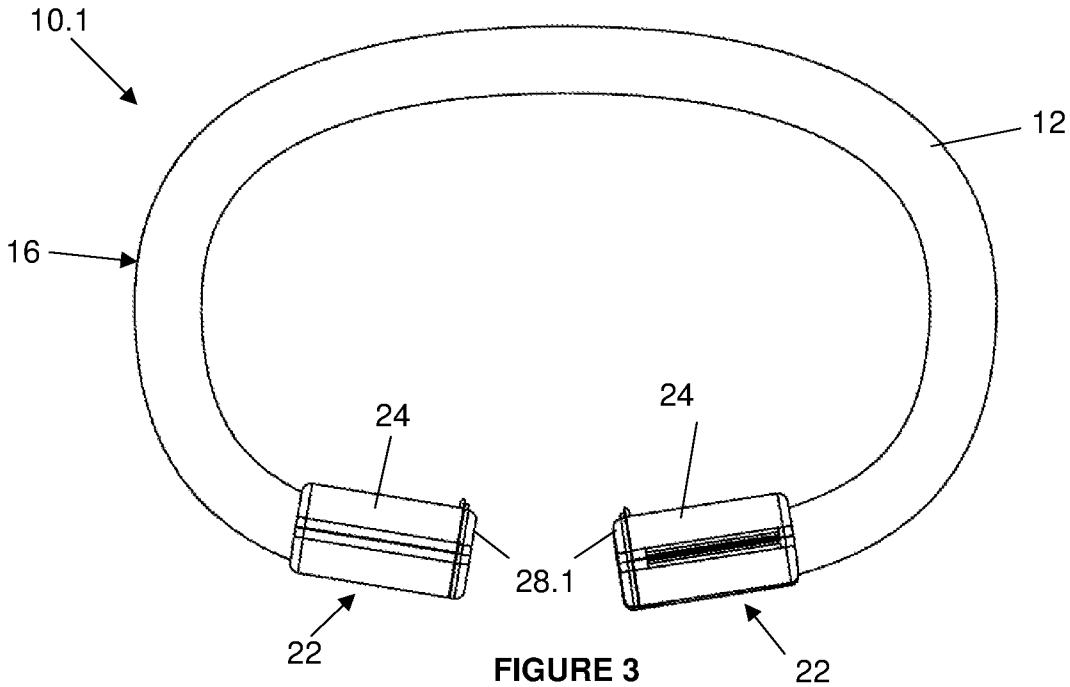

FIGURE 3

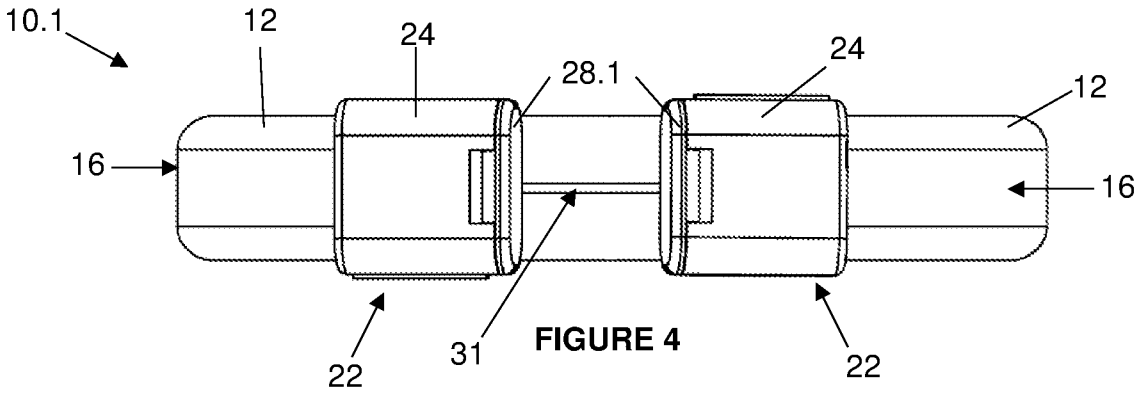

FIGURE 4

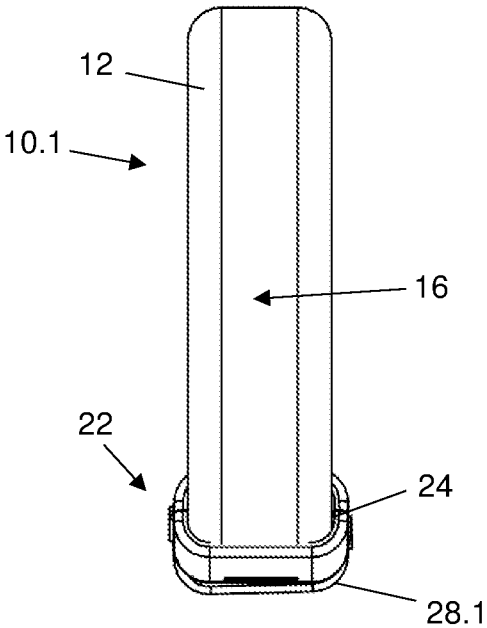

FIGURE 5

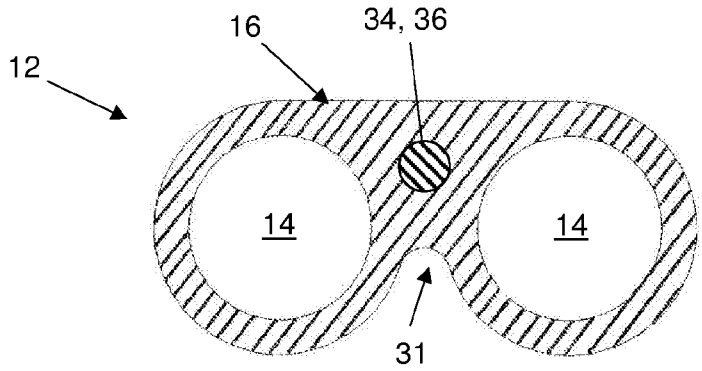

FIGURE 6

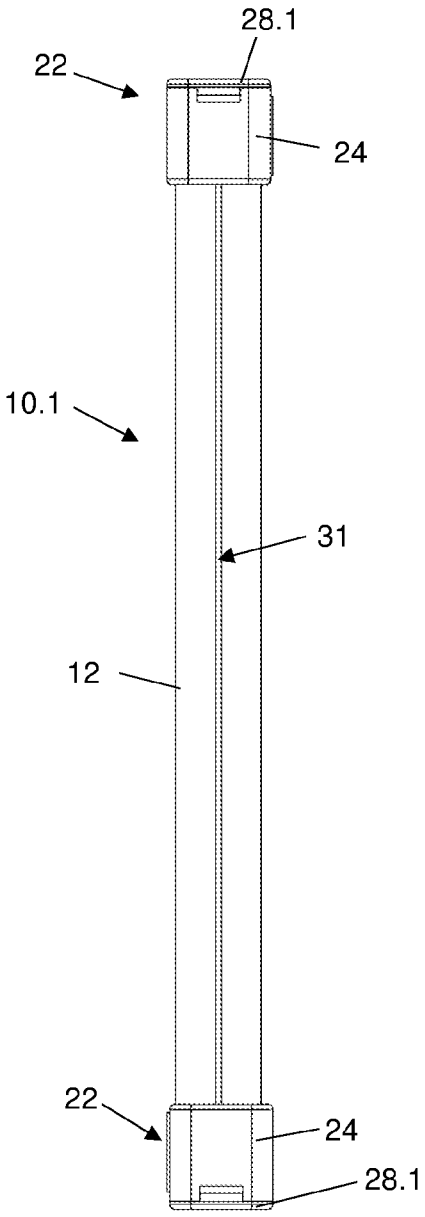

FIGURE 7

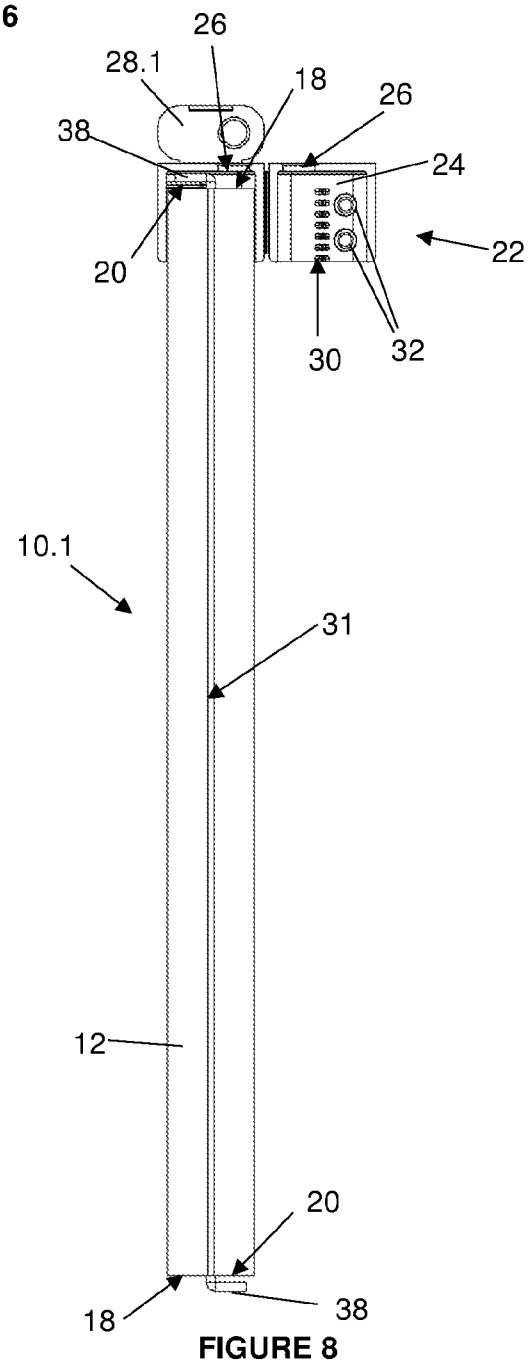

FIGURE 8

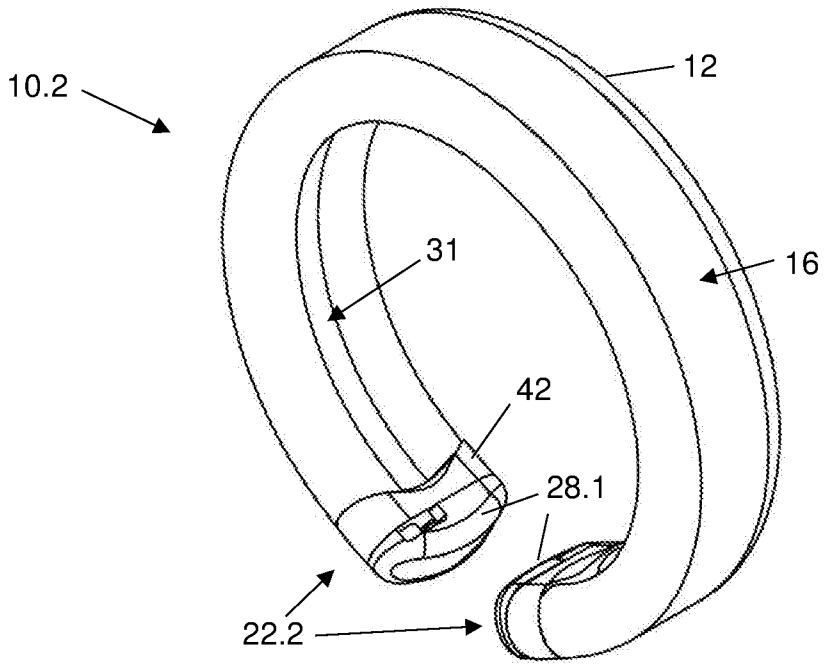

FIGURE 9

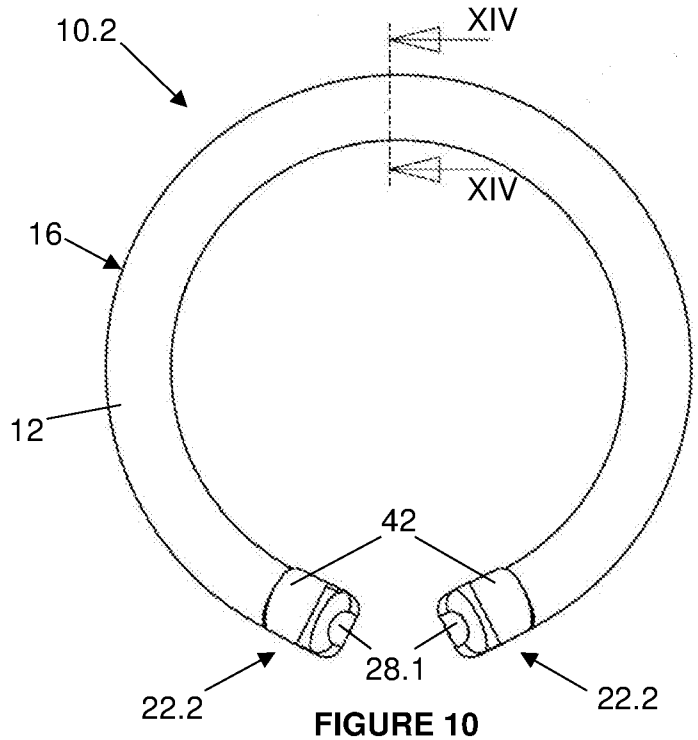

FIGURE 10

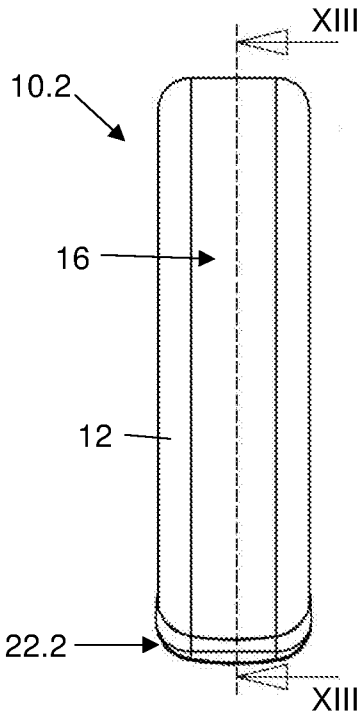

FIGURE 11

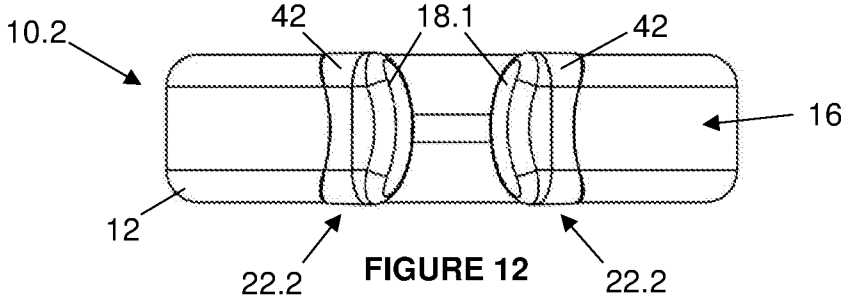

FIGURE 12

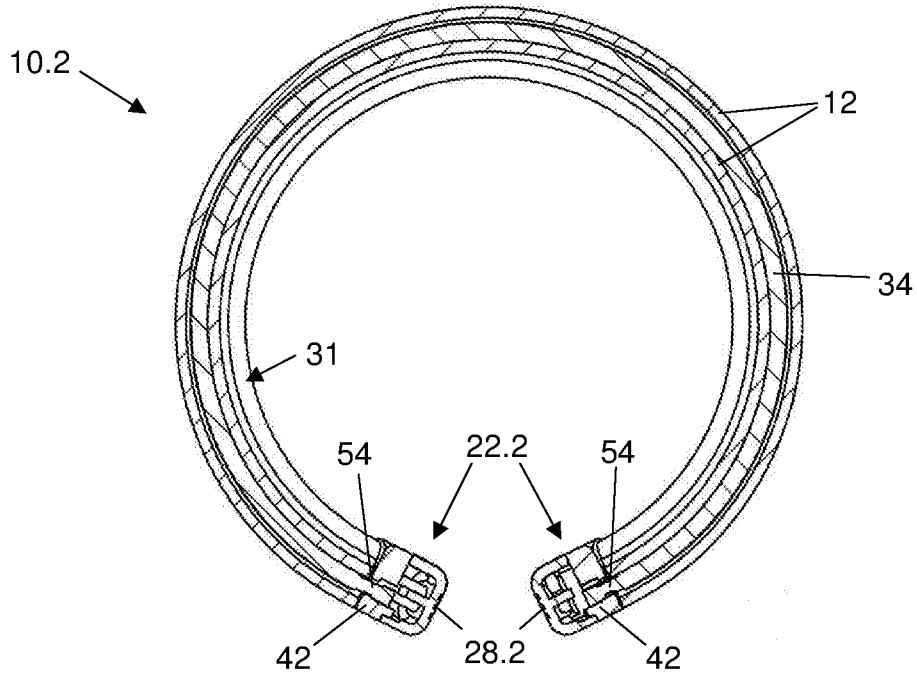

FIGURE 13

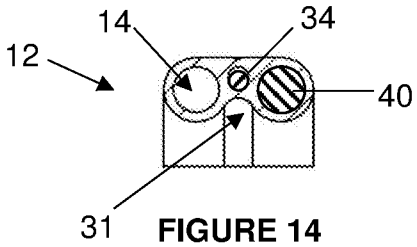

FIGURE 14

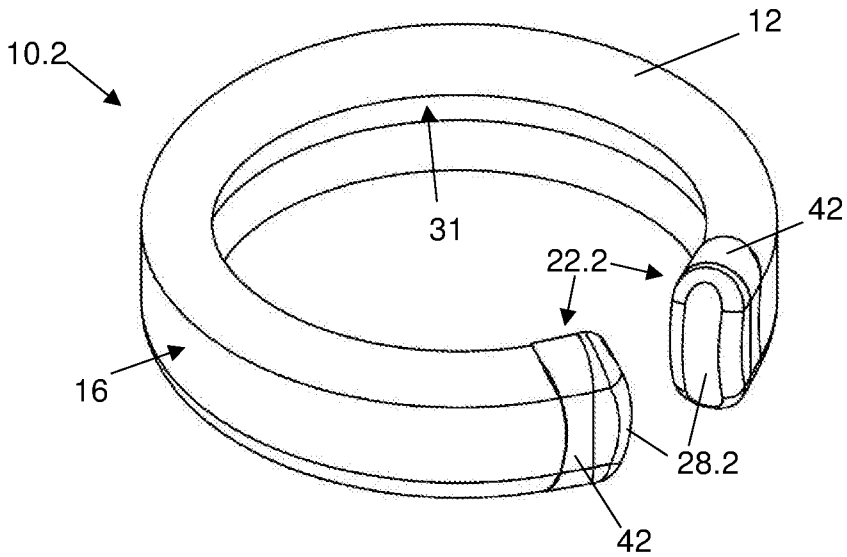

FIGURE 15

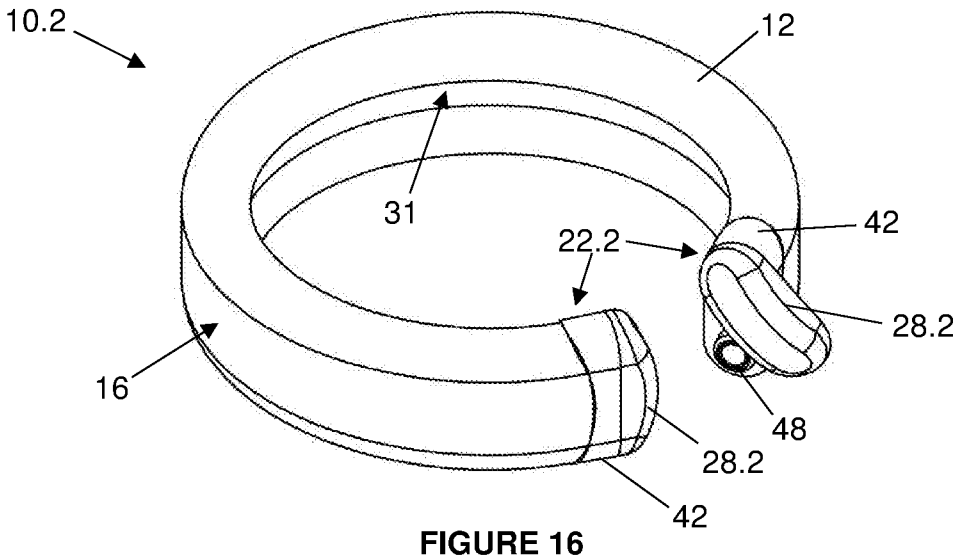

FIGURE 16

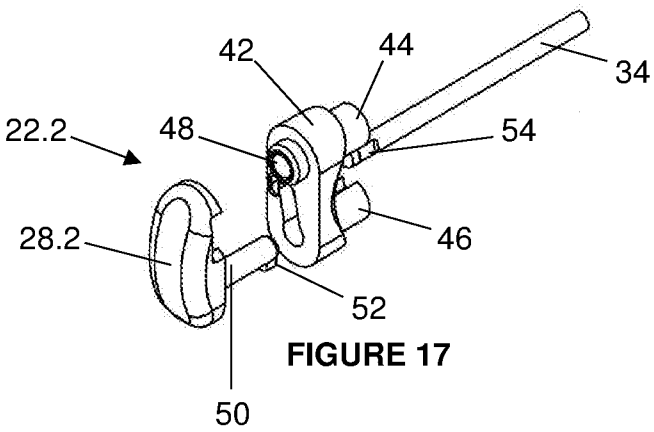

FIGURE 17

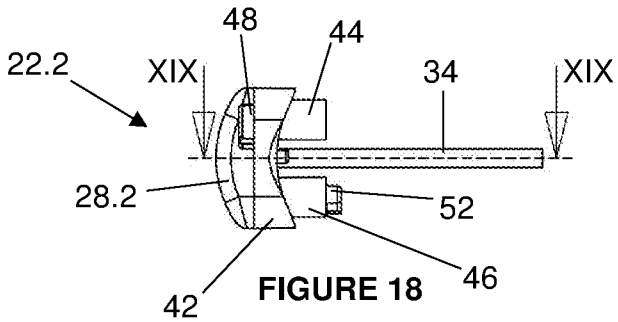

FIGURE 18

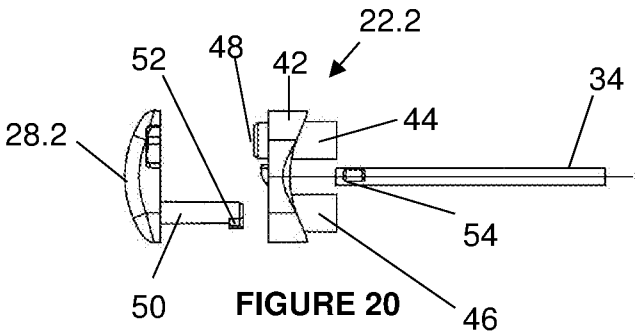

FIGURE 20

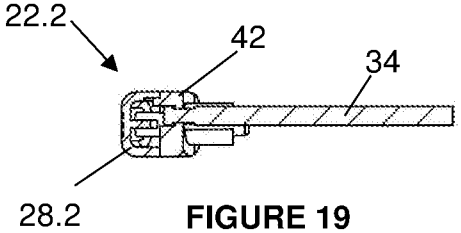

FIGURE 19

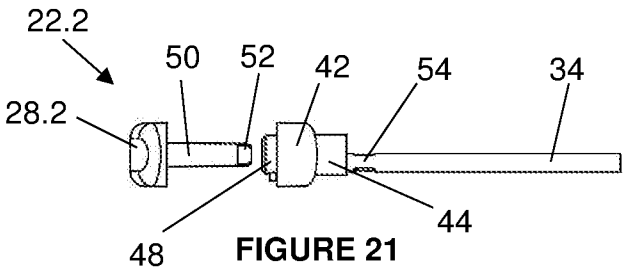

FIGURE 21

INTERNATIONAL SEARCH REPORT

International application No.

PCT / IB 2016/056584

A. CLASSIFICATION OF SUBJECT MATTER

IPC: ***A44C 5/00*** (2006.01); ***A44C 15/00*** (2006.01); ***A47K 5/12*** (2006.01); ***A61M 35/00*** (2006.01); ***B67D 1/00*** (2006.01); *A45F 3/00* (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A44C, A47K, A61M, B67D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIAP, EPODOC, fulltext databases

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2011127293 A1 (PASCATORE AMANDA R) 02 June 2011 (02.06.2011) fig. 1, 4, 12, 14A, [0016]-[0020], [0033], [0034], [0073]-[0075], [0083]-[0085], [0087], claim 1; in combination with D3	1-11, 13-16
Y	EP 0066016 A1 (CHUDZIKOWSKI) 08 December 1982 (08.12.1982) fig. 1-3, p. 1 line 24 - p. 5 line 4, claims 1-2; in combination with D3	1-8, 10-16
Y	US 2014103082 A1 (SCHALLER et al.) 17 April 2014 (17.04.2014) fig. 1-3, [0003], [0005], [0013], [0063], [0123], [0128]-[0129], [0135]; in combination with D1 or D2	1-16

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 February 2017 (27.02.2017)	01 March 2017 (01.03.2017)
Name and mailing address of the ISA/AT Austrian Patent Office Dresdner Straße 87, A-1200 Vienna Facsimile No. +43 / 1 / 534 24-535	Authorized officer STEINZ-KRISMANIC C. Telephone No. +43 / 1 / 534 24-387

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT / IB 2016/056584

Patent document cited in search report			Patent family member(s)			Publication date
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			EP	A2	2507141	2012-10-10
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EP	A1	0066016	EP	A1	0066016	1982-12-08
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			PH	A1	12015500829	2015-07-13
			CA	A1	2888605	2014-04-24
			JP	A	2016501784	2016-01-21
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			RU	A	2015118413	2016-12-10
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			SG	A	11201502773W	2015-05-28
			WO	A1	2014060924	2014-04-24