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(54) **INTERFACE FOR PRODUCTS INTENDED TO RECEIVE A CONNECTOR PART**

(57) The invention concerns an interface for textile products (40) intended to receive a connector part, such as a socket (10) or a plug (50), in a detachable and orientable manner, said interface comprising a first flexible part (1) intended to be attached to said textile, a second

rigid part (2) fixed to said first part and comprising orientation means allowing said connector part to be fixedly oriented with respect to said first part in at least one position.

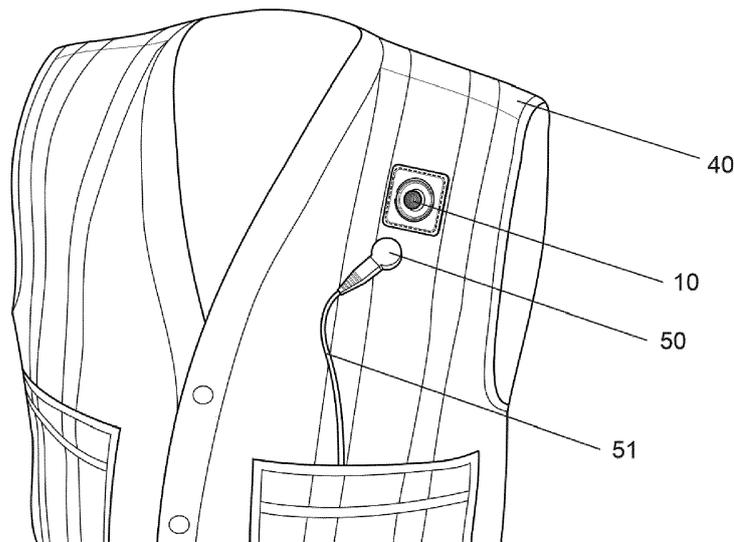


FIGURE 9

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Description

TECHNICAL FIELD

[0001] The present invention concerns the field of connectors and their use in combination with wearable products such as e-textile based products, garments etc. E-textiles may be defined as a combination of textiles (fabric) and electronic components to create wearable technology within clothing. They are also known as smart textiles or digital textiles. As examples, such e-textiles are used in the medical field, sports, military etc.

[0002] More specifically, the present invention concerns connection means used in such wearable products.

BACKGROUND ART

[0003] In recent years, so-called wearable products, in which devices such as sensors and communication devices operate as they are being worn by a user have attracted a lot of attention and been extensively developed. Such a wearable products are electrically connected to external devices like measuring devices or power sources etc. used to transmit information or to receive power supply. While an electrical connection can be established via a connector attached to a garment, said connection has to be disconnected for example when the wearable product is removed in case of a replacement or when the product has to be washed. Indeed, it is costly to destroy products such as garments if they still comprise connectors parts and they may not be washed (for example) in such case as the washing may damage the attached connector parts.

[0004] An electrical connection of the wearable product may be made using a snap button connector, such that when the wearable product is to be washed (for example), the electrical connection via the snap button connector can be disconnected by detachment of the male part from the female part.

[0005] Such a connecting system is however quite primitive and allows only one contact between the two parts. Nowadays, connectors usually comprise several contacts allowing several devices or sensors to be connected with the same cable and connector.

[0006] In the context of the present invention, a connector will be understood as the physical and electrical assembly of two parts such as a base and a plug. Examples of such connectors are given in the following publications: US 2018/0323556, WO 2019/193564 and WO 2019/193567.

SUMMARY OF THE INVENTION

[0007] It is an aim of the present invention to overcome the defects of the prior art and to improve the systems used.

[0008] A further aim of the present invention is to pro-

vide a system (such an interface) which allows a simple and safe combination of a connector with a product, such as a garment made of e-textile.

[0009] These aims and others will become more readily apparent from the following description of several embodiments of the present invention.

[0010] In embodiments the present invention concerns an interface for products, such as but not limited to e-textile products, intended to receive a connector part, such as a socket/base or a plug, in a detachable and orientable manner, wherein said interface comprises a first flexible part intended to be attached to said product, a second rigid part fixed to said first part and comprising orientation means allowing said connector part to be fixedly oriented with respect to said first part in at least one position.

[0011] In embodiments the orientation means comprise notches or a particular shape (such as triangle, square, oval, star, etc.). The notches may have the shape illustrated in the drawings or another shape (round, square etc.).

[0012] In embodiments the orientation is in four positions at least. Less than four is possible, and more than four is also possible depending on the circumstances and application of the present invention.

[0013] In embodiments the invention concerns a combination comprising an interface and a connector part as described in the present application, wherein said connector part comprises complementary means cooperating with the orientation means of the interface to ensure a fixed position of the connector part in the oriented position chosen relatively to the interface.

[0014] In embodiments the complementary means comprise a complementary shape to the orientation means.

[0015] In embodiments the combination comprises locking means for making the connector part integral with the interface.

[0016] In embodiments the locking means comprise a clip, such as a circular clip.

[0017] In embodiments the connector part comprises circular tracks. In other embodiments, the tracks may have another shape (for example straight or semi-circular etc.).

[0018] In embodiments the invention concerns a textile product, such as for example a "wearable" e-textile product, comprising at least one interface as defined in the present application or a combination as defined in the present application. The product may be a garment, a vest, a clothing or a piece of equipment. Other products are also possible in the frame of the present invention as described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Figure 1 illustrates a back view of a part of the inter-

face according to an embodiment of the present invention;

Figure 2 illustrates a front view of a part of the interface according to an embodiment of the present invention;

Figure 3 illustrates a back view of a connector part according to an embodiment of the present invention;

Figure 4 illustrates a front view of a connector part according to an embodiment of the present invention;

Figure 5 illustrates a side view of a connector part according to an embodiment of the present invention;

Figure 6 illustrates parts of an embodiment of the invention before assembly;

Figures 7 and 8 illustrate an embodiment of the present invention in assembled state;

Figure 9 is an example of a wearable product comprising a system according to the present invention;

Figure 10A to 10E illustrate additional embodiments of the present invention.

DETAILED DESCRIPTION

[0020] In an embodiment, the interface according to the present invention comprises a first part 1 that is attached to the textile. The attachment may be done using different techniques, such as sewing, gluing, ultrasonic bonding/welding, etc. The first part 1 is preferably made of a soft material, or semi-rigid material.

[0021] Typical materials for the first part include for example thermoplastic elastomers, such as rubber, silicon and/or other equivalent materials or a mix thereof, all suitable for the intended use.

[0022] Attached to this first part 1, the interface comprises a second part 2 that is preferably rigid and which comprises orientation means 3 suitable for orienting a connector part 10 (for example a base or a plug) that will be mounted on this interface in a set or predetermined position. To this effect, and as will be explained hereunder, the second part comprises an insertion opening 4 to receive the connector part.

[0023] Typical materials for the second part include for example polymers (such as polyphthalamide - PPA). Other suitable materials for the intended use are possible such as metals, ceramics and/or mix thereof etc.

[0024] The first and second part are attached together by suitable methods such as gluing, welding, bonding, co-extrusion, over-molding, mechanical attachment (riv-

eting, snap-riveting, insertion etc.)

[0025] The orientation means 3 comprise for example notches or a particular shape (triangle, square, oval, star, etc.) that will fit with a corresponding shape present on the connector part 10 such that when the connector part 10 is assembled with the second part 2, they both remain in a fixed position relatively to each other. Other shapes are for example illustrated in Figure 10A.

[0026] In the example of figure 1, four notches 3 are represented which will allow four oriented position of the connector part 10. To this effect, the connector part 10 (see figures 3 and 4) comprises a corresponding or complementary orientation part 11 which has a shape or parts matching the second part 2, such as its orientation means 3. As illustrated in figures 3 and 4, the part 11 comprises four extensions 12 which are meant to cooperate with the notches 3 of the second part 2 for example by insertion. This allows the connector part 10 to be attached to the second part in a fixed orientation. In the example of figure 1, there are four possible orientations (every 90°). Of course, it is possible to provide more than four or less than four possible orientations of the connector part 10 with respect to the first part 1 of the interface by using an appropriate number of notches and extensions allowing a plurality of orientations. The number of orientations may also be defined by the corresponding shapes used on the second part 2 and on the connector part 10. The connector part is for example a base as described in US 2018/0323556, WO 2019/193564 and WO 2019/193567 with conductive tracks 13 and an electrically connected cable 30.

[0027] It is also possible to use other equivalent means than the notches 3 and extensions 12 of figures 1, 3 and 4. The matching may be achieved through specific shapes (triangle, square, oval etc., see the examples illustrated in Figures 10A to 10E). the aim being to fix the connector part 10 in a defined position with respect to the first part 1, and by consequence with respect to the object to which the first part 1 is attached. This orientation capability allows to orient the connected cable 30 with respect to the first part/ the garment 40 (see figure 9) which can be important depending on the position of the connector part 10 on the garment 40 as a set orientation of the cable 30 may be necessary or preferred by a user/wearer.

[0028] Figure 5 illustrates a side view of the connector part 10. On this view a groove 14 is shown the use of which will be explained later in the present description.

[0029] Figure 6 illustrates a back view of two parts of an embodiment of the present invention, namely the interface and the connector part 10, see the description of figures 1-5 above, before assembly by insertion of the connector part 10 into opening 4.

[0030] Figure 7 illustrates the parts of figure 6 in an assembled state.

[0031] Figure 8 illustrates a front view of the interface 1,2 with a connector part 10 inserted into the second part 2. In order to retain the connector part 10 inserted and

in an oriented position, retaining means 20 are used after insertion. For example, such retaining means may include locking or clamping ring 20, a pin, a nut which cooperates with appropriate means on the connector part 10: for example when using a clamping ring 20, the connector part may comprise a corresponding groove 14 to receive the ring 20 and retain the connector part 10 in its inserted state, or if using a nut, then the connector part will comprise a thread etc. As another equivalent solution, the retaining feature may be realized by a snap fitting of the connector part 10 in the second part 2 or bayonet-like means. Other equivalent means are of course possible in the frame of the present invention.

[0032] As illustrated in figure 9, using the means described above, it is possible to provide a product, on an e-textile product such as a garment 40 with at least one interface 1 and connector part 10 attached to said product 40. This interface 1 is attached to the textile and allows to attach/remove the connector part 10, such as a base, for wearable applications. The connector part 10 may then be connected to the other part of the connector, for example a plug 50 which is connected via cable 51 to a device or source of electricity (for example). The illustrated garment 40 has the shape of a vest or jacket but this is only for illustrative purposes and it may have any other shape of a wearable clothing or (piece of) equipment.

[0033] Figures 10A to 10E illustrate additional embodiments: In figure 10A, other shapes of notches 3 are shown, and in figures 10B to 10E, the opening 4 is illustrated in different equivalent variants of shapes (square, cross, oval, triangle) to form orientation means according to the principles of the present invention. Such shapes may be used with notches 3 or without and the possibilities are not limited to the examples given in the present application. In such case, the connector will preferably comprise an appropriate shape 11 (for example complementary) to adjust to the shape of the opening 4 and remain in an oriented position according to the principles of the present invention. In addition other equivalent retaining means (corresponding to the ring 20) may be used.

[0034] Also, the uses of the present invention are not limited to an application to e-textiles. The interface may be used with other products such as equipment, hardware products, weapons, parts thereof etc. The principle is equivalent, the first part being attached to said product and the connector part may be attached in a predetermined position on the product or removed as described in the present application.

[0035] The present description is neither intended nor should it be construed as being representative of the full extent and scope of the present invention. The present invention is set forth in various levels of detail herein as well as in the attached drawings and in the detailed description of the invention and no limitation as to the scope of the present invention is intended by either the inclusion or non-inclusion of elements, components, etc. Additional aspects of the present invention have become more

readily apparent from the detailed description, particularly when taken together with the drawings.

[0036] Moreover, exemplary embodiments have been described to provide an overall understanding of the principles of the structure, function, manufacture, and use of the systems and methods disclosed herein. One or more examples of these embodiments are illustrated in the accompanying drawings. Those skilled in the art will understand that the systems and methods specifically described herein and illustrated in the accompanying drawings are non-limiting exemplary embodiments and that the scope of the present invention is defined not solely by the claims. The features illustrated or described in connection with an exemplary embodiment may be combined with the features of other embodiments. Such modifications and variations are intended to be included within the scope of the present invention. A number of problems with conventional methods and systems are noted herein and the methods and systems disclosed herein may address one or more of these problems. By describing these problems, no admission as to their knowledge in the art is intended. A person having ordinary skill in the art will appreciate that, although certain methods and systems are described herein with respect to embodiments of the present invention, the scope of the present invention is not so limited. Moreover, while this invention has been described in conjunction with a number of embodiments, it is evident that many alternatives, modifications and variations would be or are apparent to those of ordinary skill in the applicable arts. Accordingly, it is intended to embrace all such alternatives, modifications, equivalents and variations that are within the spirit and scope of this invention.

Claims

1. An interface for products (40), such as e-textile products (40), intended to receive a connector part (10), such as a socket (10) or a plug (50), in a detachable and orientable manner, said interface comprising a first flexible part (1) intended to be attached to said product (40), a second rigid part (2) fixed to said first part (1) and comprising orientation means (3,4) allowing said connector part to be fixedly oriented with respect to said first part (1) in at least one position.
2. The interface according to claim 1, in which said orientation means comprise notches (3) or a particular shape (4).
3. The interface according to one of the preceding claims, in which the orientation is in four positions at least.
4. A combination comprising an interface according to one of the preceding claims and a connector part, said connector part comprising complementary

means (11) cooperating with the orientation means (3,4) of the interface (1) to ensure a fixed position of the connector part in the oriented position chosen relatively to the interface.

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5. The combination according to the preceding claim, wherein the complementary means comprise a complementary shape (11) to the orientation means (3,4).

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6. The combination according to claim 4 or 5, said combination comprising locking means (20) for making the connector part integral with the interface.

7. The combination according to the preceding claim, in which the locking means comprise a clip (20).

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8. The combination according to one of claims 4 to 7, in which the connector part (10) comprises circular tracks (13).

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9. A product (40) comprising at least one interface as defined in one of the preceding claims 1 to 3 or a combination as defined in one of claims 4 to 8.

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10. The product according to the preceding claim, wherein said product is a "wearable" product.

11. The product according to one of the preceding claims 9 or 10, wherein said product is a e-textile product.

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12. The product according to one of the preceding claims 9 to 11, wherein said product is a garment.

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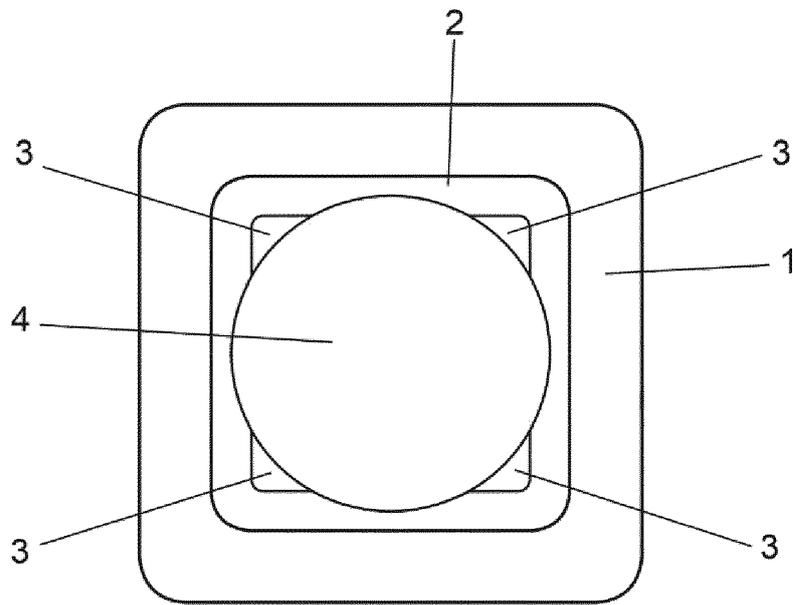


FIGURE 1

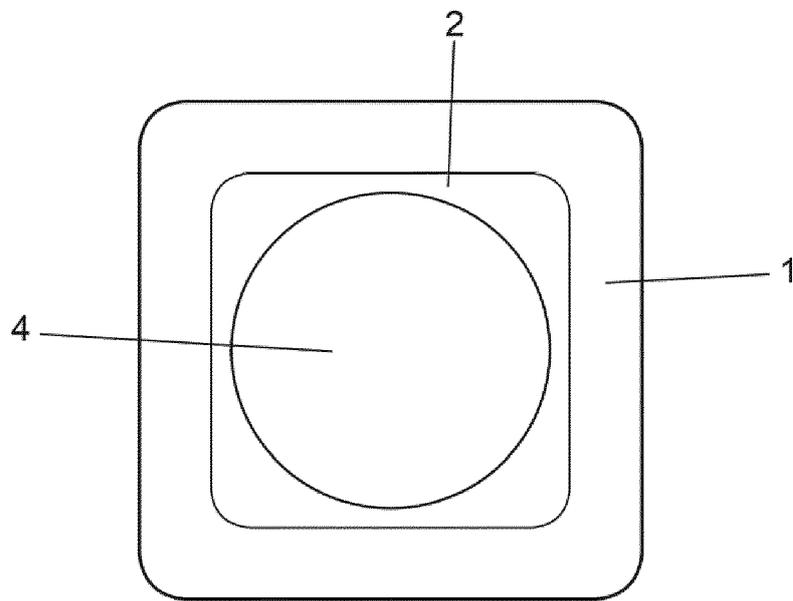


FIGURE 2

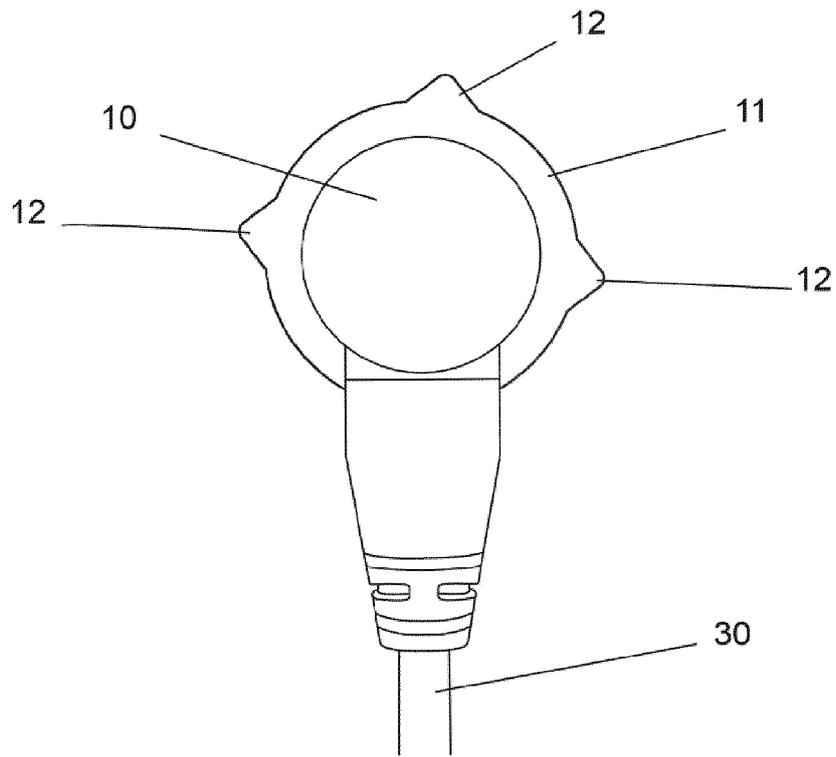


FIGURE 3

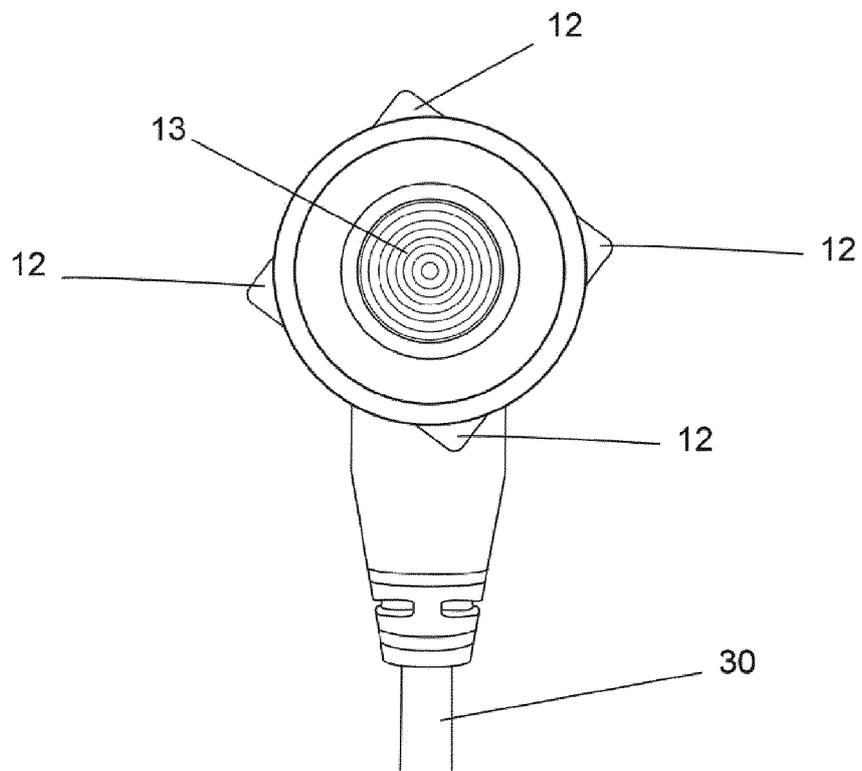


FIGURE 4

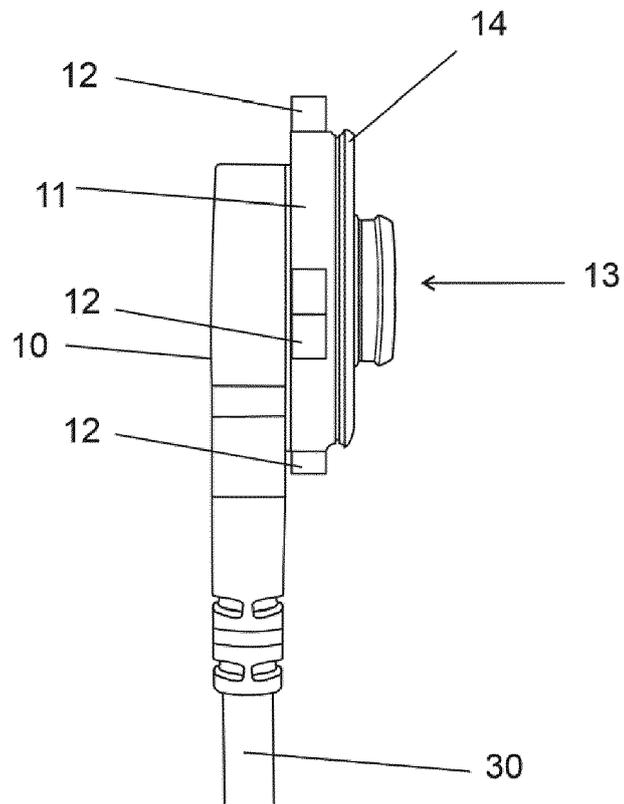


FIGURE 5

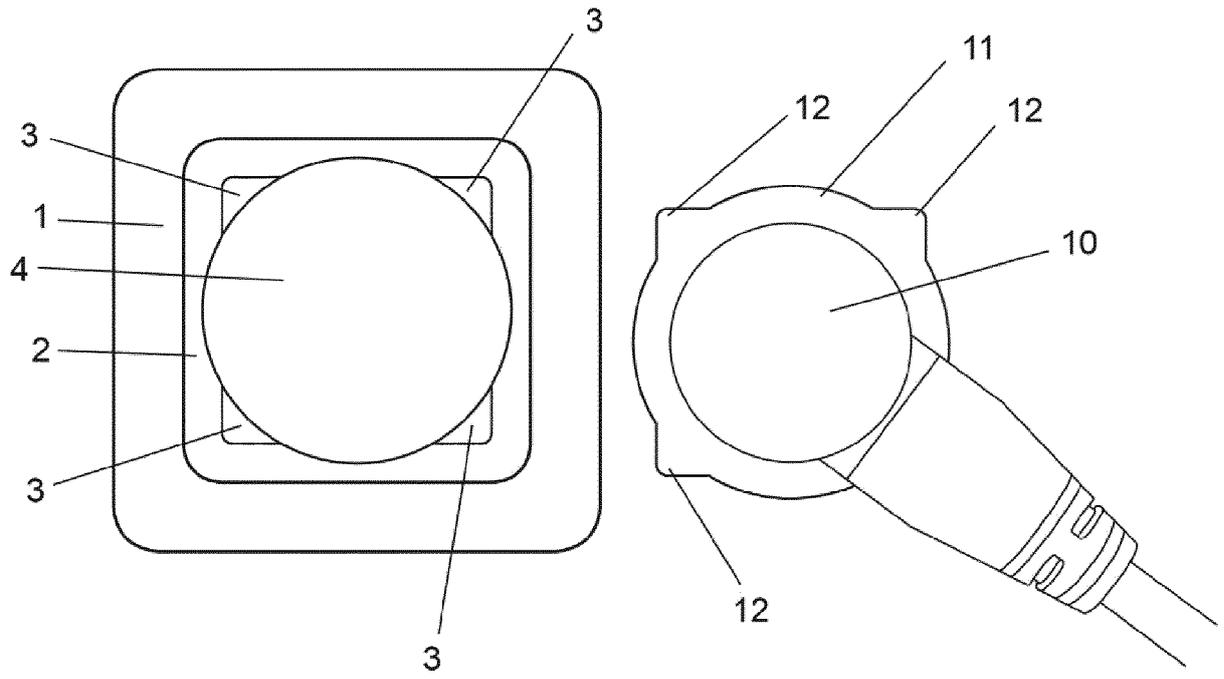


FIGURE 6

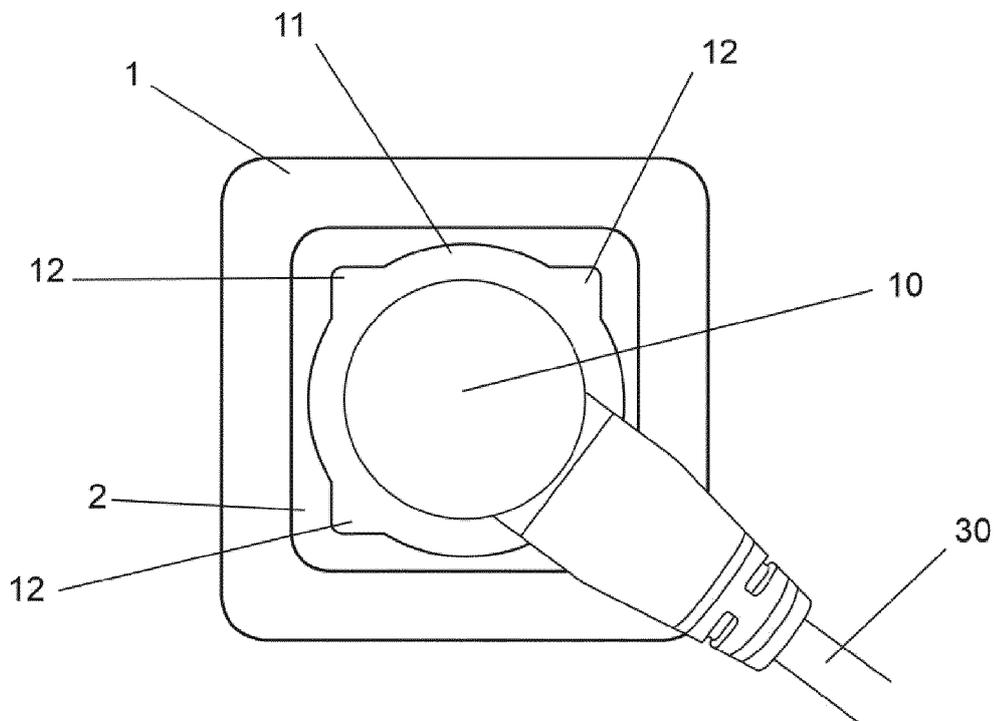


FIGURE 7

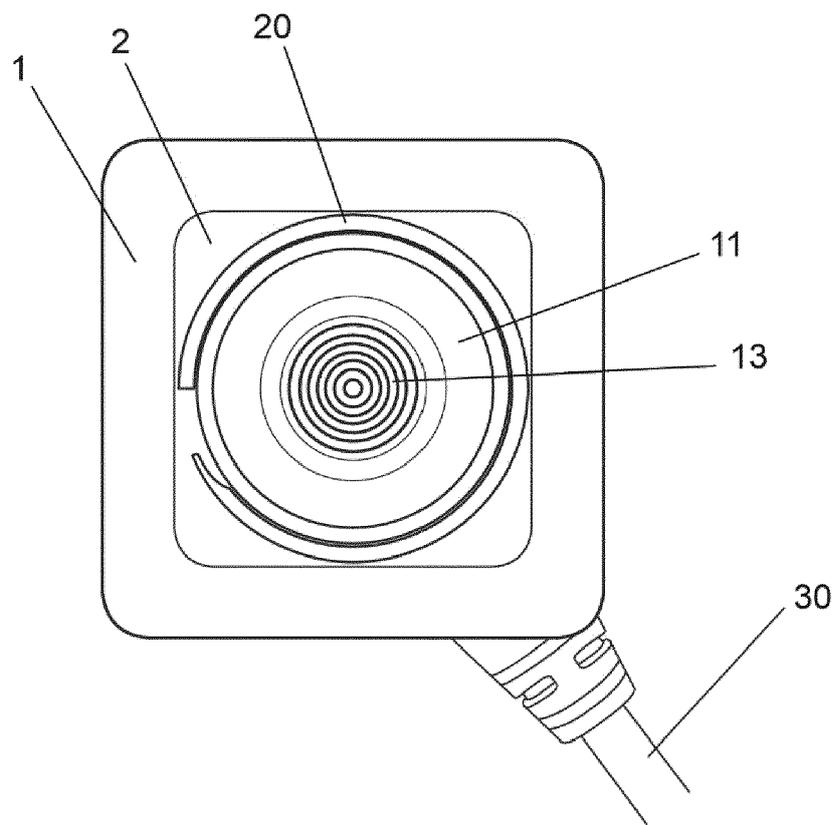


FIGURE 8

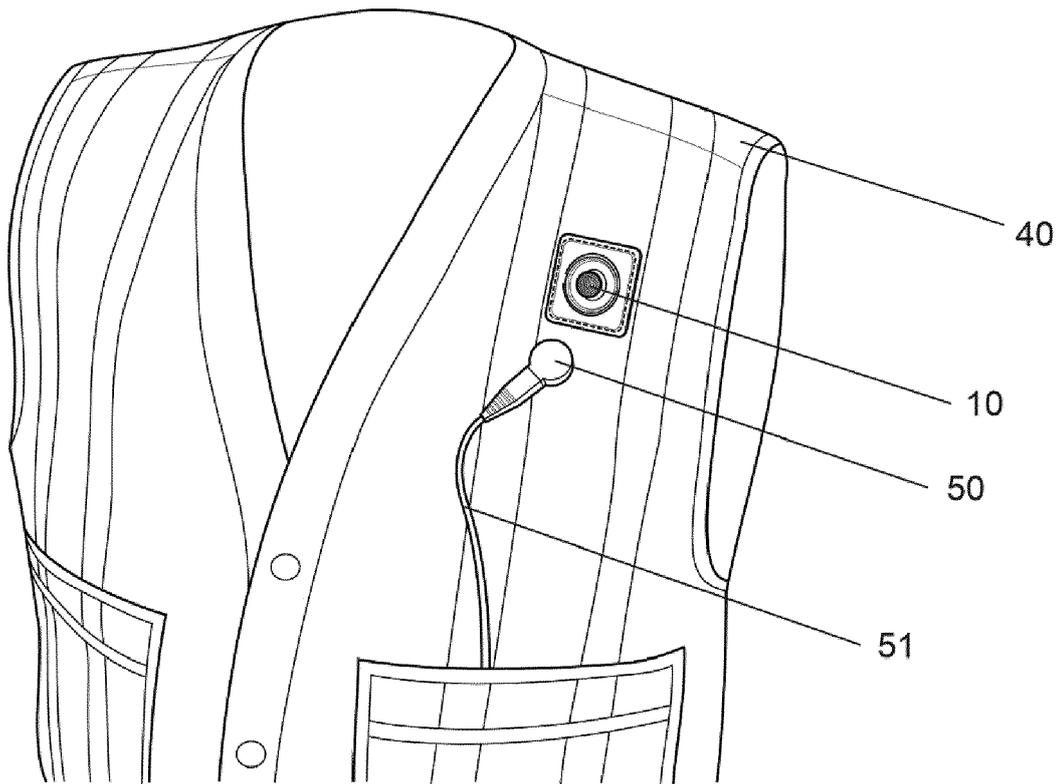


FIGURE 9

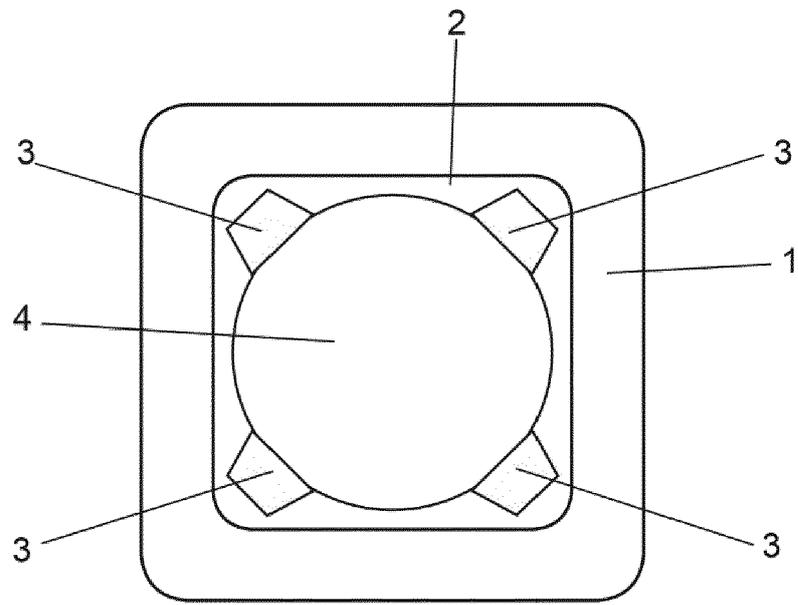


FIGURE 10 A

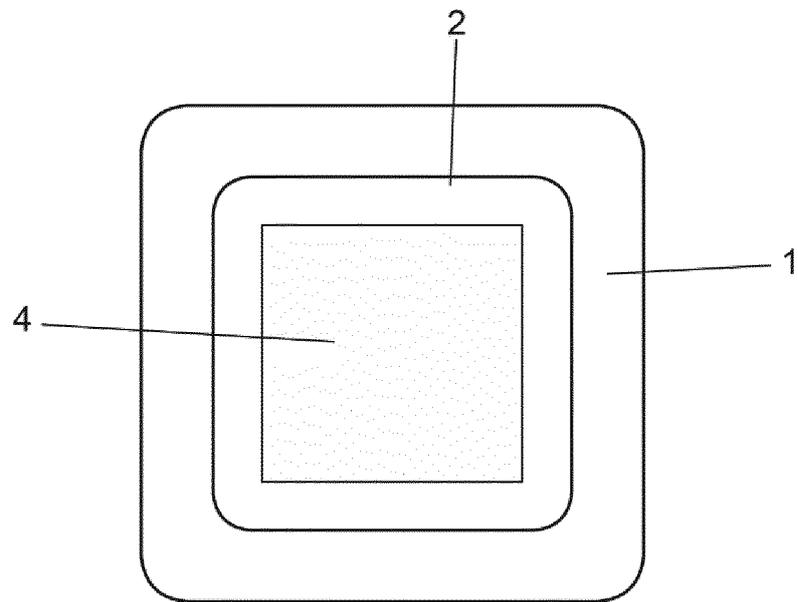


FIGURE 10 B

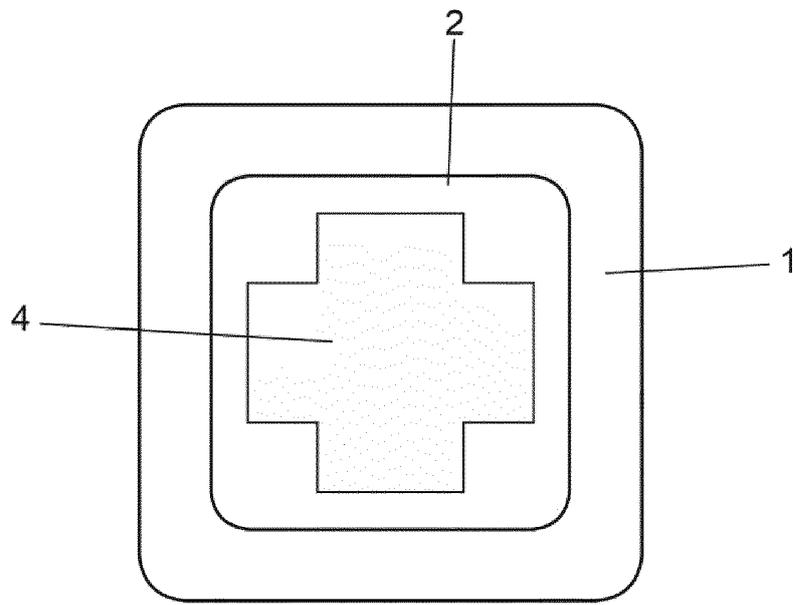


FIGURE 10 C

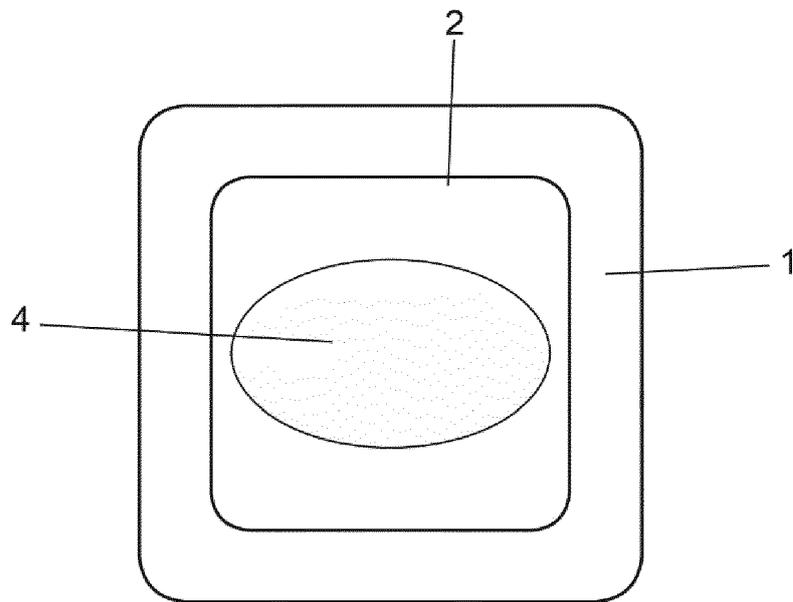


FIGURE 10 D

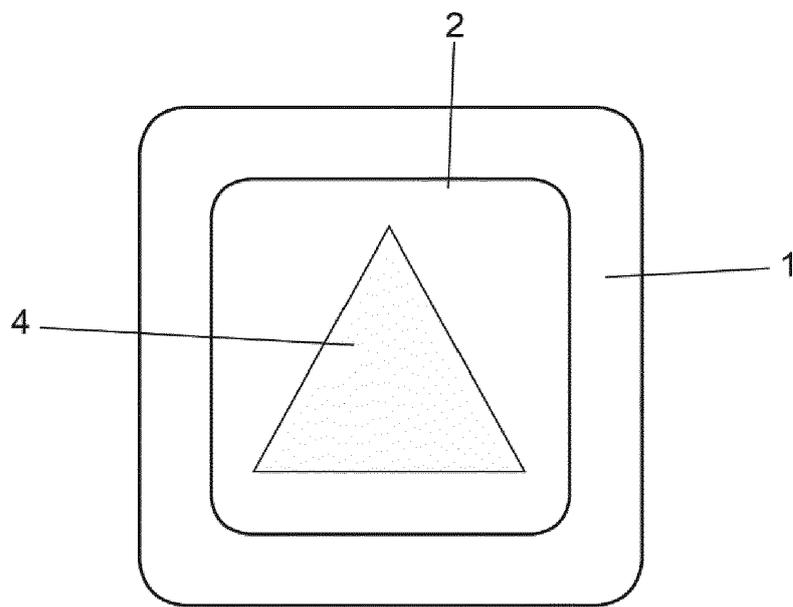


FIGURE 10 E



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Application Number
EP 20 18 1156

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Place of search The Hague		Date of completion of the search 17 November 2020	Examiner Esmiol, Marc-Olivier
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