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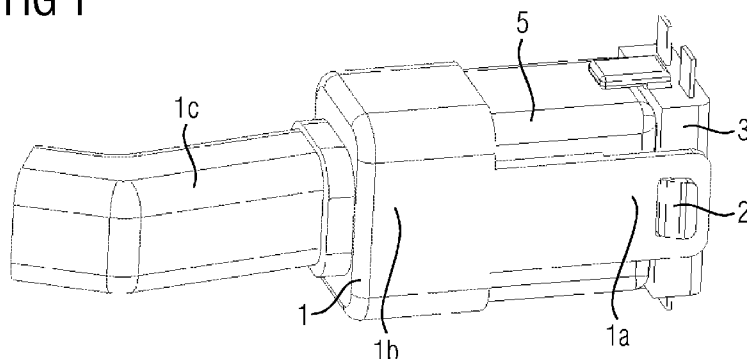
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(54) Title: COMBINED RECEIVER SUSPENSION AND RECEIVER CONNECTOR FASTENER

FIG 1



(57) Abstract: The invention is related to a receiver assembly for a hearing aid. The receiver assembly comprises a combined receiver suspension/ receiver connector fastener (1), a receiver (5) and a receiver connector (3). The receiver suspension/receiver connector fastener (1) or the receiver connector (3) provides a recess (2, 7) to receive the receiver (5) within. The receiver suspension/receiver connector fastener (1) and the receiver connector (3) each provide fastening means (2, 7) configured to mutually engage such that the receiver suspension/receiver connector fastener (1) and the receiver connector (3) are fixed in a predefined relative position to each other. When receiver suspension/receiver connector fastener (1) and the receiver connector (3) are fixed to each other in the predefined relative position, the receiver (5) positioned in the recess is fixed in the recess by the receiver suspension/receiver connector fastener (1) and the receiver connector (3).



COMBINED RECEIVER SUSPENSION AND RECEIVER CONNECTOR FASTENER

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The invention is related to a receiver assembly for a hearing aid and a receiver suspension/receiver connector fastener.

The receiver assembly comprises a receiver suspen-
10 sion/receiver connector fastener and a receiver connector.
The receiver suspension/receiver connector fastener is configured to receive a receiver.

A typical hearing aid provides a microphone for converting
15 sound into electrical signals, electronics for filtering and
amplifying the signals, and a transducer or receiver for converting the electrical signals back to sound. These components are arranged in a housing which protects the components against detrimental effects from the environment, but the as-
20 sembly of the components is complex and costly.

It is thus an object of the present invention to simplify the assembly of a hearing aid and reduce the cost.

25 This object is achieved in accordance with the invention by a receiver suspension/receiver connector fastener according to claim 1 and a receiver assembly for a hearing aid according to claim 7.

30 A receiver suspension/receiver connector fastener according to the invention provides fastening means configured to detachably mutually engage complementary fastening means of a receiver connector such that the receiver suspension/receiver connector fastener and the receiver connector are fixed in a
35 predefined relative position to each other. The receiver sus-

pension/receiver connector fastener provides also a recess configured to receive a receiver.

The receiver assembly for a hearing aid furthermore comprises
5 a receiver connector providing fastening means configured to detachably mutually engage the fastening means of the receiver suspension/receiver connector fastener, such that the receiver suspension/receiver connector fastener and the receiver connector are fixed in a predefined relative position
10 to each other, wherein a receiver positioned in the recess is fixed in its position by the receiver suspension/receiver connector fastener and the receiver connector.

A receiver assembly according to the invention may advantageously be assembled without usage of other assembly materials (i.e. glue, solder, wires). Assembling is simplified and the time to assemble the receiver assembly is reduced. The detachable fixing means enable dismounting of the receiver and improve the serviceability. The receiver is suspended by
20 the receiver suspension/receiver connector fastener and is fixed between the receiver suspension/receiver connector fastener and the receiver connector. The fastening means keep the receiver suspension/receiver connector fastener and the receiver connector in a fixed relative position to each other
25 thus preventing the receiver from moving or dropping off. The receiver assembly according to the invention protects the receiver from dropping off the assembly when the receiver assembly is subjected mechanical shocks, thereby improving the reliability.

30

Exemplary embodiments of the present invention are described in more detail below with reference to 9 figures, in which:

35 Fig. 1 shows a perspective side view of a receiver assembly;

Fig. 2 shows a perspective top view of a partial cross section of the receiver assembly;

Fig. 3 shows a top view of a cross section of the receiver assembly;

Fig. 4 shows a perspective view from the bottom of the combined receiver suspension and receiver connector fastener;

Fig. 5 shows a perspective view of separate portions of an embodiment of the receiver connector fastener;

Fig. 6 shows a side view of a cross section of another embodiment of the receiver assembly;

Fig. 7 shows a side view of a cross section of another embodiment of the receiver assembly;

Fig. 8 shows a side view of a cross section of another embodiment of the receiver connector fastener; and

Fig. 9 shows a side view of a cross section of a receiver assembly according to the prior art.

Fig. 1 shows a receiver assembly, which is composed of three major parts. These are a receiver suspension/receiver connector fastener 1, a receiver 5 and a receiver connector 3.

The combined receiver suspension /receiver connector fastener 1 serves as a receiver connector fastener 1a, receiver suspension 1b and a sound tube 1c. This is molded as one part and is made out of rubber (Viton or Fluorosilicone). It is also possible to provide a suspension /receiver connector

fastener according to the invention made from other elastic or flexible material, e.g. from plastics. This approach will make ultrasonic welding, laser welding, spot welding, shrink tube application and gluing more feasible.

5

At the receiver connector fastener 1a portion occupies approximately half of the receiver length. The portions 1a or legs 1a extend from receiver suspension /receiver connector fastener 1 in a direction in which a receiver connector 3 is to be connected. The legs 1a extend essentially parallel such that they provide a recess in between to receive the receiver 5 therein. The portion 1a is designed to have a rounded edge rectangular hole 7 at the tip, as can be seen in Fig. 2, which mates with the hook up rib 2. Other shapes of the hole 7 and complementary hook up ribs 2 are possible, such as circular, ellipsoid, rectangular, triangular.

The front end part 6 provides a slightly thicker rubber to introduce some level of interference to press and avoid gaps.

The hook up rib 2 sprouts from the receiver connector 3. The hook up rib is designed to lock and hold in place the receiver suspension /receiver connector fastener 1.

25

Apart from hook up ribs 2, another way to latch the receiver suspension/receiver connector fastener 1 is to sprout two plastic shafts on each side with a dome/spherical shape object 9, which can be seen in Fig. 3 on its tip. The holes in the receiver suspension/receiver connector fastener 1 need to have a smaller diameter than the dome/spherical object 9 in order to maintain a good latch.

30

From the design, it only covers two sides of the receiver but it must be known that this is not limited to two and can cover all sides as well.

- 5 The receiver suspension part occupies approximately half of the receiver length and is configured to wrap the receiver 5.

The sound tube 1c part of the receiver suspension/receiver connector fastener 1 assembly is configured to interfaces the
10 screw on connection thereby completing the sound channel of the BTE (behind the ear) hearing aid.

The receiver suspension/receiver connector fastener 1 may have embodiments in different sizes to fit a wide range of
15 receiver 5 sizes.

The combined receiver suspension/receiver connector fastener 1 is configured to press the receiver connector 3 together thereby introducing x compression to the polymeric contact 4
20 which is sandwiched between these parts. This is done to maintain good electrical connection.

Fig. 5 shows the portions 1a or legs 1a according to another embodiment of the invention. The portions 1a may be manufactured separately and may be imposed over the receiver suspension 1b and a sound tube 1c parts of the receiver suspension/receiver connector fastener 1. The portions 1a may be implemented as a dedicated rubber belt 8, wherein this part is not molded together with the receiver suspension 1b and
25 the sound tube 1c. The rubber belt may have the same latching features as in 2, 7 of the combined receiver suspension/receiver connector fastener 1.
30

The receiver suspension/receiver connector fastener 1 and the rubber belt 8 can also be fastened using a special form of adhesive (glue) instead of latching features as in 2 and 7.

The adhesive material can be applied e.g. at the side surface
5 10 of the receiver connector 3 in Fig. 7.

Fig. 6 shows an embodiment of the receiver assembly according to the invention, wherein the fastening means comprise screws or pins 11, which fix the portions 1a of the receiver suspen-
10 sion/receiver connector fastener 1 to the receiver connector 3 detachably.

Fig. 7 shows another embodiment of the receiver assembly according to the invention. The portions or legs 1a provide
15 hooks 10 at the distal end, which engage with a recess of the receiver connector 3 or reach behind a corner of a base of the receiver connector and engage with the base itself.

In Fig. 8, another embodiment of the receiver assembly is
20 shown. The hook up ribs 2 do not sprout from the receiver connector 3. Instead of this, a frame rib hook 13 sprouts to latch the receiver suspension/receiver connector fastener to the assembly. Instead at the receiver connector 3, the rib will come from the frame or any rigid surface of the hearing
25 aid assembly.

The design can also use separate rubber part 12 where its shape is molded in a way to push the receiver towards the receiver connector, as shown in Fig. 9. It utilizes interference fit with any rigid surface or part of the hearing aid
30 assembly to create the force.

Patent claims

1. Receiver suspension/receiver connector fastener (1) for a
5 hearing aid, wherein the receiver suspension/receiver connector fastener (1) provides fastening means configured to detachably mutually engage complementary fastening means of a hearing aid such that the receiver suspension/receiver connector fastener (1) and a receiver connector (3) of a hearing
10 aid are fixed in a predefined relative position to each other, wherein the receiver suspension/receiver connector fastener (1) provides a recess configured to receive a receiver (5).
- 15 2. Receiver suspension/receiver connector fastener (1) according claim 1, wherein the recess is configured such that when the receiver (5) is positioned in the recess, the receiver (5) is fixed in its position by the receiver suspension/receiver connector fastener (1) and the receiver connector (3).
- 20 3. Receiver suspension/receiver connector fastener (1) according to one of the preceding claims, wherein the fastening means comprise portions (1a) extending from the receiver suspension/receiver connector fastener (1) and providing the recess between the portions (1a).
- 25 4. Receiver suspension/receiver connector fastener (1) according to claim 3, wherein the portions (1a) provide openings (7) at distal ends of the portions (1a) configured to engage with hook up ribs (2) extending radial from the receiver connector (3).
- 30 5. Receiver suspension/receiver connector fastener (1) according to claim 3, wherein the portions (1a) provides recesses at distal ends of the portions (1a) configured to engage tightly with spherical extensions extending radial from the receiver connector (3).

6. Receiver suspension/receiver connector fastener (1) according to one of the preceding claims, wherein the receiver suspension/receiver connector fastener (1) comprises a sound tube (1c) extending from the receiver suspension/receiver connector fastener (1).

7. Receiver assembly for a hearing aid, the receiver assembly comprising: a receiver suspension/receiver connector fastener (1) according to one of the preceding claims and a receiver connector (3), wherein the receiver connector (3) provides fastening means configured to detachably mutually engage the fastening means of the receiver suspension/receiver connector fastener (1), such that the receiver suspension/receiver connector fastener (1) and the receiver connector (3) are fixed in a predefined relative position to each other, wherein a receiver (5) positioned in the recess is fixed in its position by the receiver suspension/receiver connector fastener (1) and the receiver connector (3).

8. Receiver assembly according to claim 7, wherein the receiver connector provides hook up ribs (2) extending radial from the receiver connector (3).

9. Receiver assembly according to claim 7, wherein the receiver connector provides spherical extensions extending radial from the receiver connector (3).

10. Receiver assembly according to one of claims 7 to 9, wherein the receiver connector (3) provides electric contacts (4) configured to contact electric contacts of the receiver (5) when the receiver assembly is assembled.

FIG 1

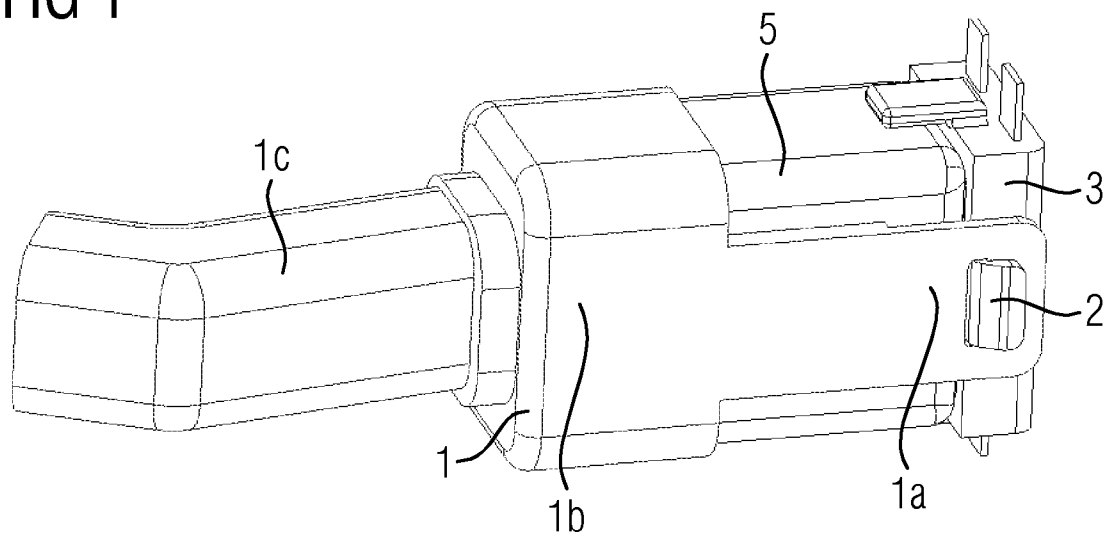


FIG 2

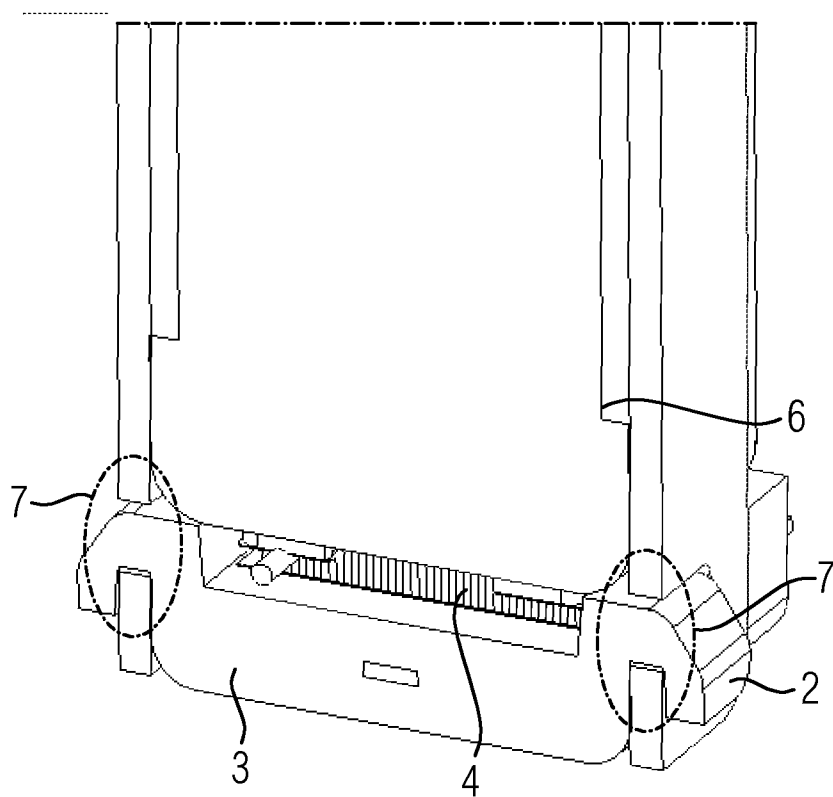


FIG 3

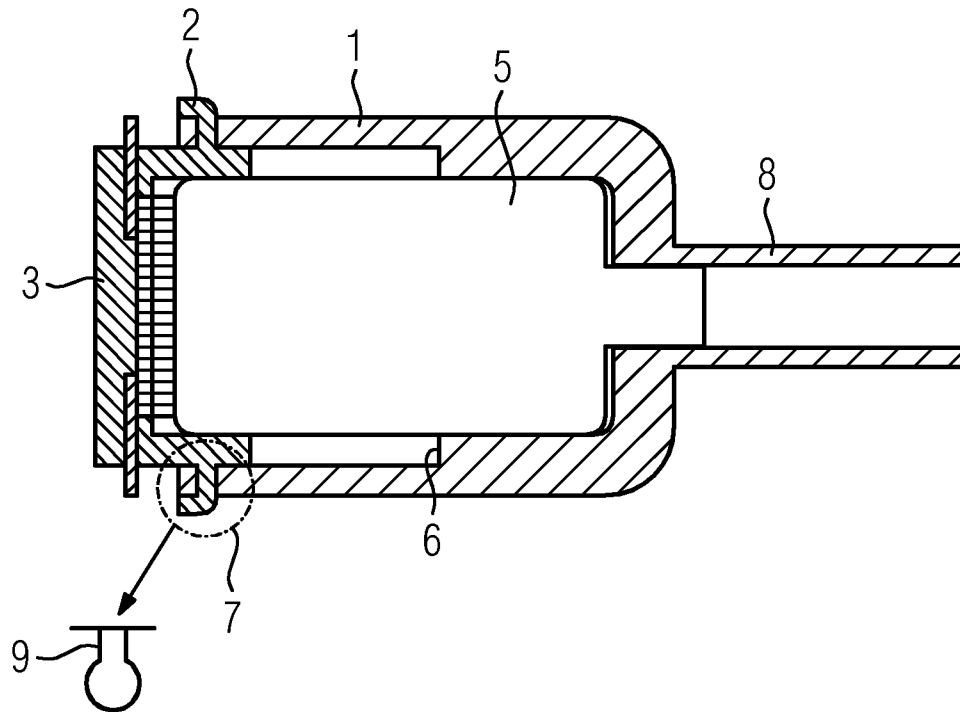


FIG 4

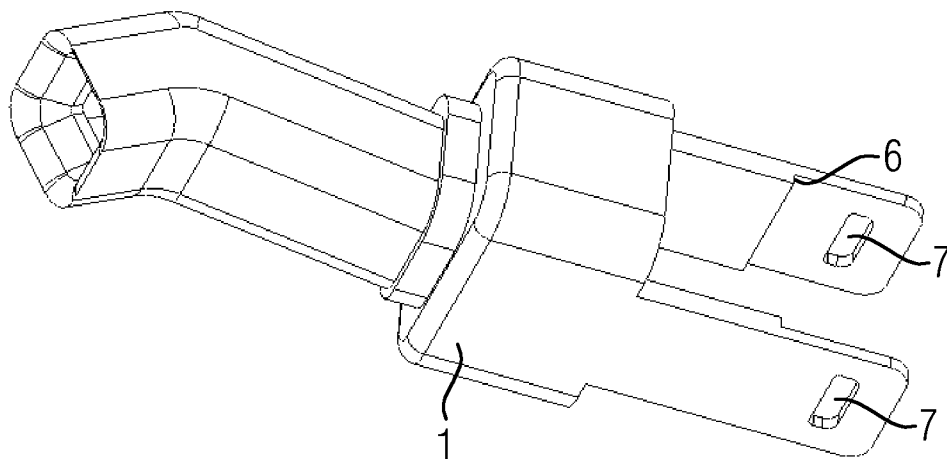


FIG 5

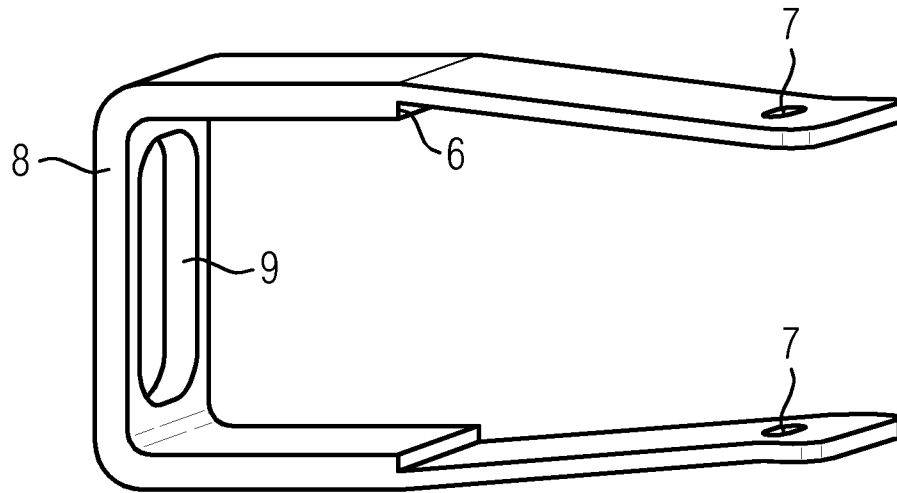


FIG 6

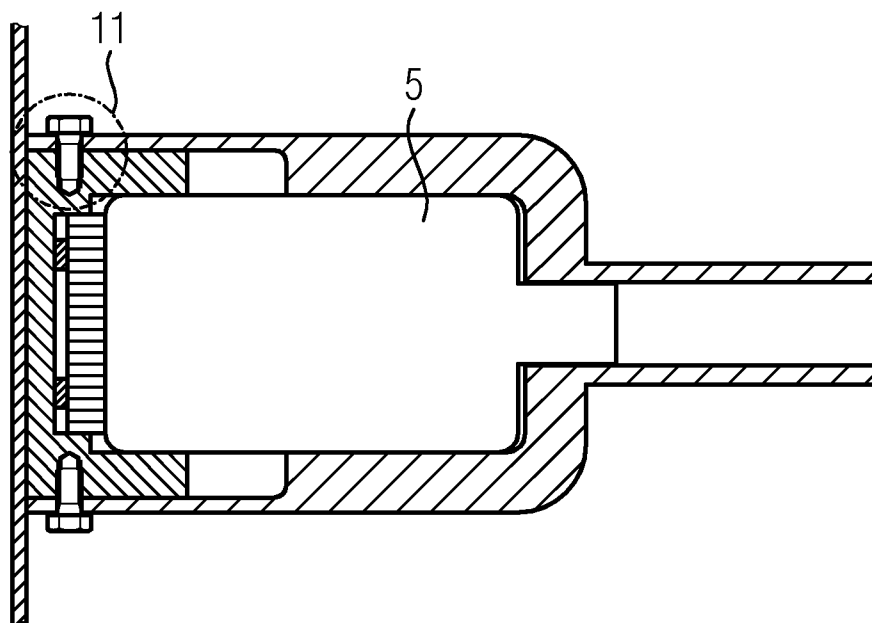


FIG 7

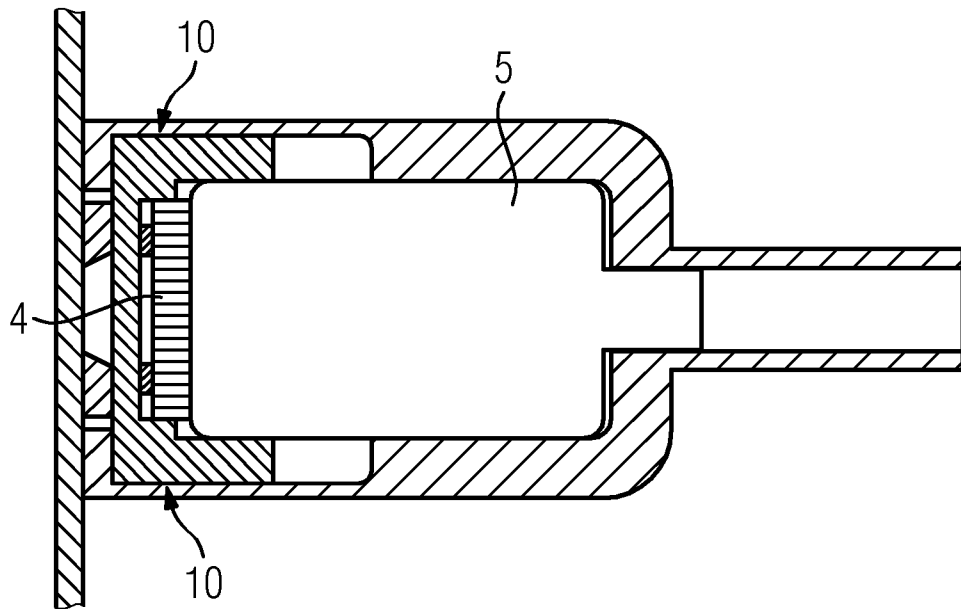


FIG 8

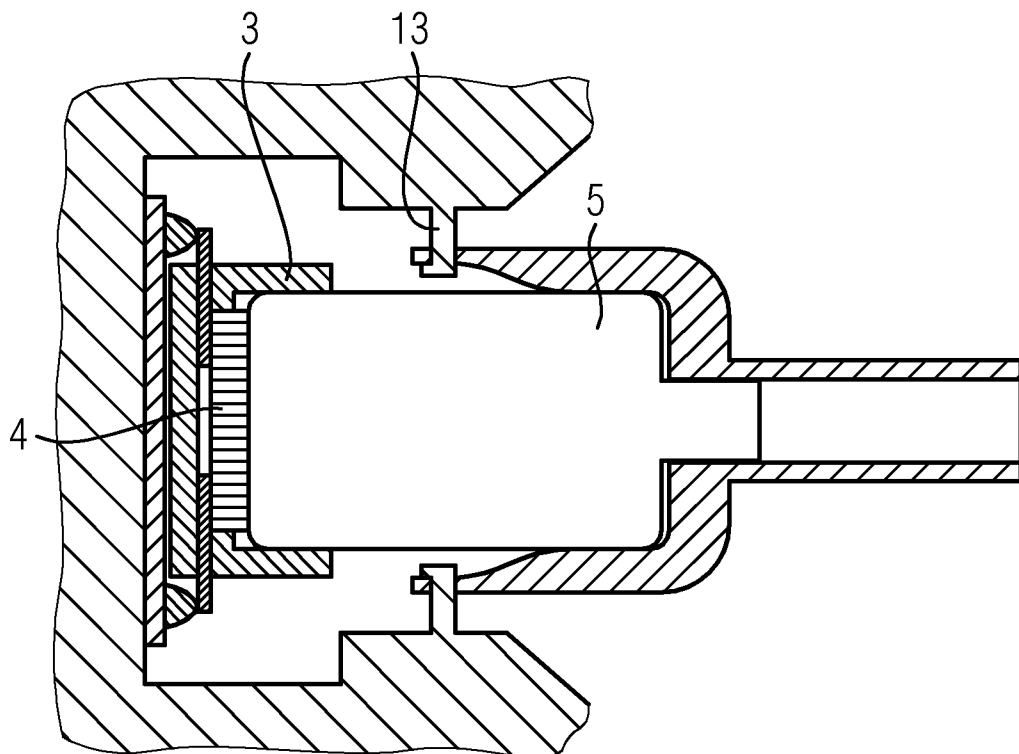
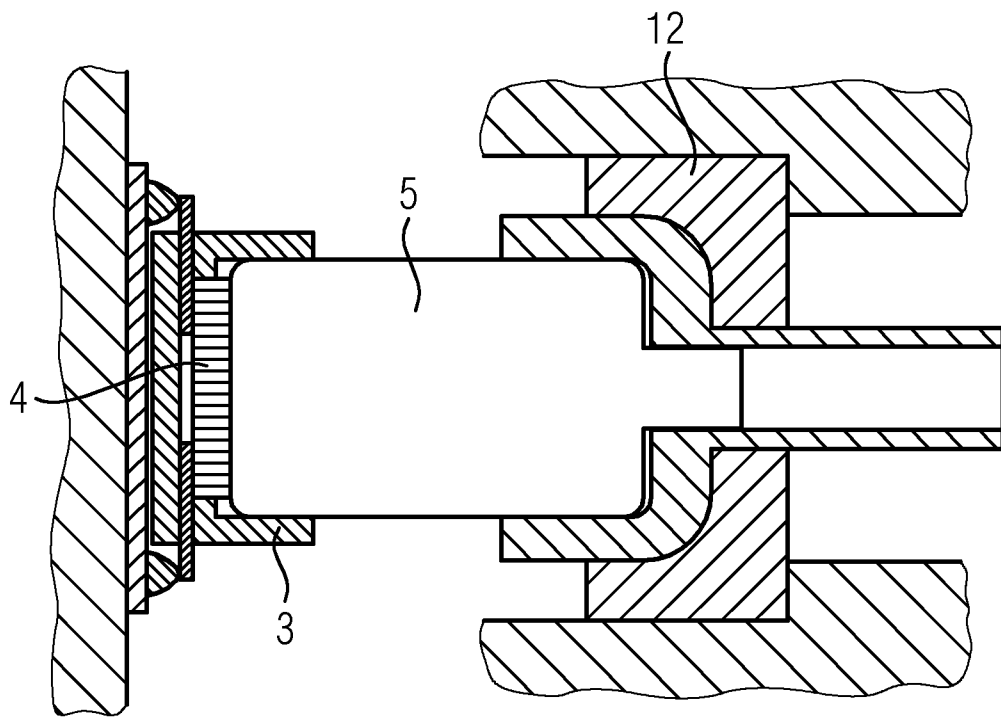


FIG 9



INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/054802

A. CLASSIFICATION OF SUBJECT MATTER
INV. H04R25/00
ADD.

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)
H04R

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)

EP0-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	US 2009/304216 A1 (HANSEN CASPER HOJSTED [DK]) 10 December 2009 (2009-12-10) paragraphs [0040] - [0046]; figures 2,3,7 -----	1-10
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X	US 2010/195853 A1 (JOSCHIKA THOMAS [DK]) 5 August 2010 (2010-08-05) the whole document ----- -/--	1-10

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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Date of the actual completion of the international search

19 September 2013

Date of mailing of the international search report

26/09/2013

Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2013/054802

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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