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(54) **COUPLING DEVICE**

(57) A coupling device for establishing a coupling between a hearing device and an external device, wherein the coupling device comprises a magnetic or magnetis-

able member adapted to be magnetically attached to the hearing device.

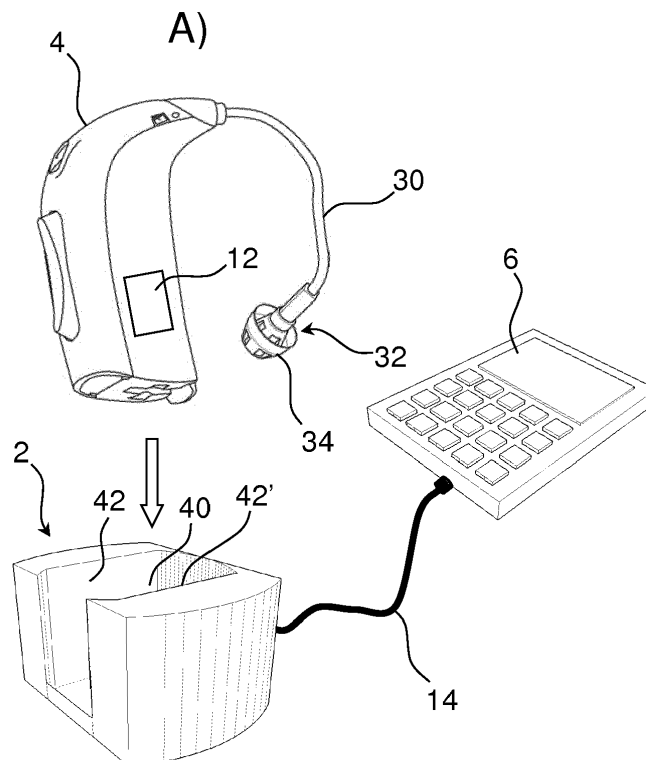


Fig. 3

Description

Field of invention

[0001] The present disclosure relates to a coupling device for establishing a coupling between a hearing device and an external device. More particularly, the present disclosure relates to a coupling device for establishing a coupling between a hearing device and an external device by using magnetic means.

Background

[0002] Hearing devices need to be connected to an external device in several situations. In the fitting situation, a so-called "shoe" is applied to establish the required connection between the hearing device and a special electrical measurement device provided with a probe that needs to be mounted on the hearing device.

[0003] The prior art coupling devices are often provided to establish electrical connection between the hearing device and the external device. These coupling devices are not suitable for connection with small hearing devices or waterproof hearing devices. Accordingly, it would be advantageous to have an alternative to the prior art coupling devices.

Summary of the invention

[0004] Preferred embodiments of the present disclosure can be achieved by a coupling device as defined in claim 1. Other preferred embodiments are defined in the dependent sub claims, explained in the following description and illustrated in the accompanying drawings.

[0005] According to an aspect of the disclosure, the coupling device is a coupling device for establishing a coupling between a hearing device and an external device, wherein the coupling device comprises a magnetic or magnetisable member adapted to be magnetically attached to the hearing device.

[0006] Hereby, the coupling device can be attached to the hearing device in a fast and easy manner. Further, it is possible to establish a wireless connection between the hearing device and the surroundings.

[0007] The magnetic or magnetisable member may have any suitable shape and be made of any suitable material. The magnetic or magnetisable member may be made of a ferromagnetic material, such as iron. The magnetic or magnetisable member may be an electromagnet. According to another aspect of the disclosure, the coupling device comprises a magnetic or magnetisable member adapted to be magnetically attached to a magnetic or magnetisable member of the hearing device.

[0008] Hereby, it is possible to establish a reliable and firm attachment of the coupling device to the hearing device.

[0009] According to yet another aspect of the disclosure, the magnetic or magnetisable member of the cou-

pling device is a permanent magnet.

[0010] Hereby, it is possible to attach the coupling device to a magnetic or magnetisable member of a ferromagnetic material, such as iron. A magnetisable member of a ferromagnetic material, such as iron is easy to manufacture and entails no permanent interference with the electronic parts of the hearing device. The hearing device may be provided with a magnetisable member integrated in the housing e.g. by means of a separate plate member.

[0011] According to a further aspect of the disclosure, the magnetic or magnetisable member of the hearing device is a permanent magnet.

[0012] Hereby, it is possible to attach a magnetic or magnetisable member of a ferromagnetic material, such as iron, to the hearing device.

[0013] According to another aspect of the disclosure, the magnetic or magnetisable member of the coupling device comprises one or more guide portions configured to engage with corresponding guide sections of the hearing device.

[0014] The guide portions can be used to position the coupling device in a specific position e.g. in order to provide optimum condition for establishing a wired or wireless connection between the coupling device and the hearing device.

[0015] According to yet another aspect of the disclosure, the magnetic or magnetisable member of the hearing device comprises one or more guide portions configured to engage with corresponding guide sections of the coupling device.

[0016] Hereby, it is possible to guide the coupling device into a specific predefined position relative to the hearing device.

[0017] The guide portions and the guide sections may be formed as plane structures.

[0018] According to a further aspect of the disclosure, the magnetic or magnetisable member of the coupling device comprises a plane contact surface adapted to engage with a corresponding contact surface of the hearing device.

[0019] Hereby, smooth and efficient displacement of the coupling device relative to the hearing device can be established.

[0020] According to yet another aspect of the disclosure, the plane contact surface of the magnetic or magnetisable member of the coupling device is rectangular.

[0021] A rectangular plane contact surface allows using guide portions and guide sections that are provided along the sides of the rectangular plane contact surface.

[0022] According to another aspect of the disclosure, the plane contact surface of the magnetic or magnetisable member of the coupling device is circular. Hereby, it is possible to establish an attachment of the coupling device which allows the coupling device to be oriented (angled) relative to the hearing device.

[0023] According to yet another aspect of the disclosure, the magnetic or magnetisable member of the coupling device comprises a groove configured to receive a

magnetic or magnetisable member of the hearing device.

[0024] According to an aspect of the disclosure, the magnetic or magnetisable member of the hearing device comprises a groove configured to receive a magnetic or magnetisable member of the coupling device.

[0025] The groove can be used to secure that the coupling device is maintained in a fixed position relative to the hearing device.

[0026] According to a further aspect of the disclosure, the groove comprises a first guide portion and a second guide portion angled relative to each other. Hereby, the first guide portion and the second guide portion can be used to provide displacement of the engaging magnetic or magnetisable member in several directions. Accordingly, the first guide portion and the second guide portion can be used to position the engaging magnetic or magnetisable member in a desired position.

[0027] According to an even further aspect of the disclosure, the coupling device comprises a wireless communication unit configured to communicate wirelessly with the hearing device and/or with the external device.

[0028] Hereby, it is possible to establish wireless communication between the hearing device and the surroundings or an external device. The wireless communication may replace the need for an electrical connection between the coupling device and the hearing device.

[0029] According to a further aspect of the disclosure, the coupling device comprises a wired connection for being electrically connected to the external device.

[0030] The wired connection may be used to provide communication between the hearing device and an external device through the coupling device.

[0031] According to another aspect of the disclosure, the coupling device is configured to be magnetically attached to an external device for measuring individual ear acoustics of a hearing device user through the hearing device.

[0032] Hereby, the connection procedure can be eased and thus be carried out faster.

Brief description of the drawings

[0033] The aspects of the disclosure may be best understood from the following detailed description taken in conjunction with the accompanying figures. The figures are schematic and simplified for clarity, and they only show selected details to improve the understanding of the claims, while other details have been left out. Throughout, the same reference numerals are used for identical or corresponding parts. The individual features of each aspect may each be combined with any or all features of the other aspects. These and other aspects, features and/or technical effects will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

Fig. 1 A shows a schematic view of a coupling device according to an embodiment of the disclosure being

attached to a hearing device;

Fig. 1 B shows a schematic view of the coupling device illustrated in Fig. 1 A attached to the hearing device;

Fig. 2 A shows a schematic perspective view of an external device connected to a hearing device by means of a coupling device according to an embodiment of the disclosure;

Fig. 2 B shows a schematic perspective view of an external device connected to another hearing device by means of a coupling device according to an embodiment of the disclosure;

Fig. 2 C shows a schematic perspective view of an external device connected to a further hearing device by means of a coupling device according to an embodiment of the disclosure;

Fig. 3 A shows a schematic perspective view of a hearing device being inserted into a coupling device according to the disclosure for being connected to an external device;

Fig. 3 B shows a schematic perspective view of a hearing device being attached to a coupling device comprising a cylindrical magnetic member;

Fig. 4 shows a schematic view of a coupling device attached to a hearing device during a fitting situation;

Fig. 5 A shows a cross-sectional view of a first magnetic member and a second corresponding magnetic member being inserted into the first magnetic member and Fig. 5 B shows a cross-sectional side view of the magnetic members shown in Fig. 5 A.

Detailed description of the invention

[0034] The detailed description set forth below in connection with the appended drawings is intended as a description of various configurations. The detailed description includes specific details for the purpose of providing a thorough understanding of various concepts. However, it will be apparent to those skilled in the art that these concepts may be practiced without these specific details. Several aspects of the apparatus are described by various blocks, functional units, modules, components, steps, processes etc. (collectively referred to as "elements"). Depending upon the particular application, design constraints or other reasons, these elements may be implemented using electronic hardware, computer programs, or any combination thereof.

[0035] The electronic hardware may include microprocessors, microcontrollers, digital signal processors (DSPs), field programmable gate arrays (FPGAs), programmable logic devices (PLDs), gated logic, discrete hardware circuits, and other suitable hardware configured to perform the various functionality described throughout this disclosure. Computer programs shall be construed broadly to mean instructions, instruction sets, code, code segments, program code, programs, subprograms, software modules, applications, software applications, software packages, routines, subroutines, ob-

jects, executables, threads of execution, procedures, functions, etc., whether referred to as software, firmware, middleware, microcode, hardware description language, or otherwise.

[0036] A hearing device may include a hearing aid adapted to improve or augment a user's hearing capability by receiving an acoustic signal from a user's surroundings, generating a corresponding audio signal, possibly modifying the audio signal and providing the possibly modified audio signal as an audible signal to at least one of the user's ears. The "hearing device" may further refer to a device adapted to receive an audio signal electronically, possibly modifying the audio signal and providing the possibly modified audio signal as an audible signal to at least one of the user's ears. Such audible signals may be provided in the form of an acoustic signal radiated into the user's outer ear.

[0037] The hearing device is adapted to be worn in any known way. This may include i) arranging a unit of the hearing device behind the ear with a tube leading air-borne acoustic signals into the ear canal or with a receiver/ loudspeaker arranged close to or in the ear canal such as in a behind-the-ear type hearing aid, and/ or ii) arranging the hearing device entirely or partly in the pinna and/ or in the ear canal of the user such as in an in-the-ear type hearing aid or in-the-canal/ completely-in-canal type hearing aid, or iii) arranging a unit of the hearing device attached to a fixture implanted into the skull bone such as in bone-anchored hearing aids or cochlear implants, or iv) arranging a unit of the hearing device as an entirely or partly implanted unit such as in bone-anchored hearing aids or cochlear implant.

[0038] In general, a hearing device includes i) an input unit such as a microphone for receiving an acoustic signal from a user's surroundings and providing a corresponding input audio signal, and/ or ii) a receiving unit for electronically receiving an input audio signal. The hearing device further includes a signal processing unit for processing the input audio signal and an output unit for providing an audible signal to the user in dependence on the processed audio signal.

[0039] The input unit may include multiple input microphones, e.g. for providing direction-dependent audio signal processing. Such a directional microphone system is adapted to enhance a target acoustic source among a multitude of acoustic sources in the user's environment. In one aspect, the directional system is adapted to detect (such as adaptively detect) from which direction a particular part of the microphone signal originates. This may be achieved by using conventionally known methods. The signal processing unit may include an amplifier that is adapted to apply a frequency dependent gain to the input audio signal. The signal processing unit may further be adapted to provide other relevant functionality such as compression, noise reduction, etc. The output unit may include an output transducer such as a loudspeaker/ receiver for providing an air-borne acoustic signal transcutaneously or percutaneously to the skull bone or a

vibrator for providing a structure-borne or liquid-borne acoustic signal. In some hearing devices, the output unit may include one or more output electrodes for providing the electric signals such as in a cochlear implant.

[0040] Referring now in detail to the drawings for the purpose of illustrating preferred embodiments of the disclosure, Fig. 1 A illustrates a schematic view of a coupling device 2 according to an embodiment of the disclosure being attached to a hearing device 4.

[0041] The coupling device 2 comprises a body member 8 and a magnetic or magnetisable member 10 attached thereto. The coupling device 2 comprises a plane structure to which the magnetic or magnetisable member 10 is attached.

[0042] The coupling device 2 is attached to an external device 6 through a cable provided with a first connection member 16 (connected to the coupling device 2) and a second connection member 18 (connected to the external device 6).

[0043] The hearing aid device 4 comprises a body member 20 and a tube 26 connecting a receiver connection member 24 of the hearing device 2 with a connection member 22 inserted in an inlet portion of the hearing device 2. The hearing device 2 comprises a magnetic or magnetisable member 12 configured to engage with the magnetic or magnetisable member 10 of the coupling device 2.

[0044] Fig. 1 B illustrates a schematic view of the coupling device illustrated in Fig. 1 A attached to the hearing device 4;

[0045] The magnetic or magnetisable members 10, 12 may be provided as plate shaped permanent magnets. One of the magnetic or magnetisable members 10, 12 may be a permanent magnet, while the other is made in a ferromagnetic material, such as iron.

[0046] The coupling device 2 may provide a wired or wireless communication link between the hearing device 4 and the external device 6 to allow for exchanging information (e.g. during the fitting situation) between hearing device 2 and the external device 6.

[0047] The external device may include at least one of the following: remote controls, remote microphones, audio gateway devices, mobile phones, public-address systems, car audio systems or music players or a combination thereof. The audio gateway is adapted to receive a multitude of audio signals such as from an entertainment device like a TV or a music player, a telephone apparatus like a mobile telephone or a computer, or a PC. The audio gateway is further adapted to select and/ or combine an appropriate signal out of the received audio signals (or combination of signals) for transmission to the at least one hearing device. The remote control is adapted to control functionality and operation of the at least one hearing devices. The function of the remote control may be implemented in a smartphone or another electronic device, the smartphone/electronic device possibly running an application that controls functionality of the at least one hearing device.

[0048] Fig. 2 A illustrates a schematic perspective view of an external device 6 connected to a hearing device 4 by means of a coupling device 2 according to an embodiment of the disclosure. The coupling device 2 is magnetically attached to the hearing device 4 which is mounted behind the ear 28 of a hearing device user.

[0049] The coupling device 2 is attached to an external device 6 by means of a cable 14. The coupling device 2 may comprise an electronic circuit adapted for establishing wired or wireless communication between the hearing device 4 and the external device 6.

[0050] The hearing device 4 comprises a tube 30 connecting the hearing device housing and a receiver 32 that is inserted into the ear canal.

[0051] Fig. 2 B illustrates a schematic perspective view of an external device 6 connected to another hearing device 4 by means of a coupling device 2 according to an embodiment of the disclosure. The coupling device 2 is attached to a plane portion of the housing of the hearing device 4. The hearing device 4 comprises a tube connected to a receiver 32 fitted with a dome 34.

[0052] The coupling device 2 is attached to an external device 6 by means of a cable 14. The coupling device 2 may comprise an electronic circuit adapted for establishing wired or wireless communication between the hearing device 4 and the external device 6.

[0053] Fig. 2 C illustrates a schematic perspective view of an external device 6 connected to a hearing device 4 having an earmould 36 connected to the housing of the hearing device by means of an ear hook 38.

[0054] The coupling device 2 is attached to the outside surface of the housing of the hearing device 4. The hearing device 4 may comprise a permanent magnet or an iron plate integrated in the housing of the hearing device 4.

[0055] The external device 6 is connected to the hearing device 4 via the coupling device 2 through a cable 14. The coupling device 2 may comprise an electronic circuit adapted for establishing wired or wireless communication between the hearing device 4 and the external device 6.

[0056] Fig. 3 A illustrates a schematic perspective view of a hearing device 4 being inserted into a coupling device 2 according to the disclosure for being connected to an external device 6. The hearing device 4 is a BTE hearing device provided with a magnetic plate 12 attached to the housing of the hearing device 4. A tube connects a receiver 32 provided with a dome 34.

[0057] The coupling device 2 comprises a groove 40 defined by a first side section 42 extending parallel to a second side section 42'. The coupling device 2 comprises a magnetic or magnetisable member attached to or integrated in the inside portion of the side sections 42, 42'.

[0058] By moving the hearing device 4 in the direction indicated by the arrow, it is possible to insert the hearing device 4 into the coupling device 2 and magnetically attach the hearing device 4 to the coupling device 2.

[0059] The coupling device 2 is electrically connected

to the external device 6 by means of an electrical cable 14 which comprises a first connection member 16 and a second connection member 18 provided in the ends of the cable 14.

[0060] Fig. 3 B illustrates a schematic perspective view of a hearing device 4 being attached to the coupling device 2 comprising a cylindrical magnetic member 10. The hearing device 4 comprises a receiver 32 provided with a dome 34. The receiver 32 is connected to the housing of the hearing device 4 by means of a tube 30.

[0061] The coupling device 2 is connected to a computer 6 through an electrical cable 14 provided with a first connection member 16 connected to the coupling device 2 and a second connection member 18 connected to the computer 6.

[0062] The coupling device 2 comprises a box-shaped housing and a cylindrical magnetic member 10 protruding therefrom.

[0063] Fig. 4 illustrates a schematic view of a coupling device 2 attached to a hearing device 4 during a fitting situation. The hearing device 4 is mounted behind the ear 28 of a hearing device user. A receiver 32 has been inserted into the ear canal of the user. A tube 30 connects the receiver 32 with the hearing device 4.

[0064] The coupling device 2 is magnetically attached to the hearing device 4. By using a magnetic attachment, it is possible to provide a fast and reliable attachment of the coupling device 2 to the hearing device 4. Accordingly, the external device 6 can be connected to the hearing device 4.

[0065] The external device 6 is an electrical measurement device 6 provided with a probe 14 that is mounted on the hearing device 4 by means of the coupling device 2. This electrical measurement device 6 is adapted to be used to carry out in-situ audiometry for determining the hearing threshold of the hearing device user by means of internally generated tones from the hearing device 4.

[0066] It is generally accepted that this way of threshold determination is better for fitting hearing devices than using thresholds obtained through conventional means such as through headphones or inserts.

[0067] During the fitting, the hearing impaired person is measured with the receiver of the hearing device 4 (such as earmoulds or domes for BTE) inside the ears. By means of the measured values, it is possible to generate the target gain corresponding to the input-output characteristics by the specific hearing device 4. Fitting software is used to generate the target gain.

[0068] During the fitting, the hearing device 4 is calibrated with the receiver 32 fitted in the ear canal so that the acoustic analog of the electrical voltage generated by the hearing device 4 can be estimated. This calibration is needed because the same electrical voltage results in different acoustic sound pressure levels when it is measured in different sound cavities (in different ear canals).

[0069] Fig. 5 A illustrates a cross-sectional view of a first magnetic member 12 and a second corresponding magnetic member 10 being inserted into the first mag-

netic member 12. The second magnetic member 10 comprises a plane rectangular (square) bottom surface 48 and four inclined guide portions 44, 44' extending from the periphery thereof.

[0070] The first magnetic member 12 has been cut. It can, however, be seen that it comprises a groove 40 formed to receive the second magnetic member 10. Thus, the second magnetic member 10 is shaped to fit into the groove 40. The groove comprises a plane square bottom section 50 configured to bear against the bottom surface 48 of the second magnetic member 10. The groove 40 comprises four guide sections 46, 46', 46" (only three can be seen) extending in extension of the periphery of the bottom section 50. The guide sections 46, 46', 46" are angled relative to each other and configured to guide the second magnetic member 10 into engagement with the groove 40 of the first magnetic member 12.

[0071] The guide sections 46, 46', 46" are configured to displace the second magnetic member 10 along the X-axis or the Y-axis in combination with a displacement along the Z-axis of the first magnetic member 12. The first magnetic member 12 may be provided on a coupling device according to the disclosure or on a hearing device. Similarly, the second magnetic member 10 may be provided on a coupling device according to the disclosure or on a hearing device.

[0072] The first magnetic member 12 and the second magnetic member 10 may be made of a permanent magnetic material or of a ferromagnetic material, such as iron. The first magnetic member 12 and the second magnetic member 10 may alternatively comprise an electromagnet.

[0073] Fig. 5 B illustrates a cross-sectional side view of the magnetic members 10, 12 shown in Fig. 5 A. It can be seen that the groove 40 of the first magnetic member 12 is shaped to receive the second magnetic member 10 in a manner in which the bottom surface 48 of the second magnetic member 10 abuts the bottom section 50 of the first magnetic member 12 and in which the guide sections 46, 46', 46" of the first magnetic member 12 abut the inclined guide portions 44, 44' of the second magnetic member 10.

[0074] The guide sections 46, 46', 46" of the first magnetic member 12 and the corresponding inclined guide portions 44, 44' of the second magnetic member 10 will guide the second magnetic member 10 into the right position in the groove 40 by simultaneously displacing the magnetic member 10 along the Z-axis and along the X-axis or the Y-axis extending perpendicular to the X-axis and the Z-axis.

[0075] When nouns are used in the singular form, they are also intended to include the corresponding plural forms (i.e. to have the meaning "at least one"), unless expressly stated otherwise. It will be further understood that the terms "includes," "comprises," "including," and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations,

elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof. It will also be understood that when an element is referred to as being "connected" or "coupled" to another element, it can be directly connected or coupled to the other element, but an intervening element may also be present, unless expressly stated otherwise. Furthermore, "connected" or "coupled" as used herein may include wirelessly connected or coupled. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items. The steps of any disclosed method are not limited to the exact order stated herein, unless expressly stated otherwise.

[0076] It should be appreciated that reference throughout this specification to "one embodiment" or "an embodiment" or "an aspect" or features included as "may" means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the disclosure. Furthermore, the particular features, structures or characteristics may be combined as suitable in one or more embodiments of the disclosure. The previous description is provided to enable any person skilled in the art to practice the various aspects described herein. Various modifications to these aspects will be readily apparent to those skilled in the art, and the generic principles defined herein may be applied to other aspects.

[0077] The claims are not intended to be limited to the aspects shown herein, but are to be accorded the full scope consistent with the language of the claims, wherein reference to an element in the singular is not intended to mean "one and only one" unless specifically so stated, but rather "one or more." Unless specifically stated otherwise, the term "some" refers to one or more.

[0078] Accordingly, the scope should be judged in terms of the claims that follow.

List of reference numerals

[0079]

| | |
|--------|---------------------------------|
| 2 | Coupling device |
| 4 | Hearing device |
| 6 | External device |
| 8 | Body member |
| 10, 12 | Magnetic or magnetisable member |
| 14 | Cable |
| 16, 18 | Connection member |
| 20 | Body member |
| 22, 24 | Connection member |
| 26 | Tube |
| 28 | Ear |
| 30 | Tube |
| 32 | Receiver |
| 34 | Dome |
| 36 | Earmould |
| 38 | Ear hook |

| | |
|--------------|----------------|
| 40 | Groove |
| 42, 42' | Side section |
| 44, 44' | Guide portion |
| 46, 46', 46" | Guide section |
| 48 | Bottom surface |
| 50 | Bottom section |
| X, Y, Z | Axis |

Claims

1. A coupling device for establishing a coupling between a hearing device and an external device, wherein the coupling device comprises a magnetic or magnetisable member adapted to be magnetically attached to the hearing device. 15
2. A coupling device according to claim 1, wherein the coupling device comprises a magnetic or magnetisable member adapted to be magnetically attached to a magnetic or magnetisable member of the hearing device. 20
3. A coupling device according to claim 1 or claim 2, wherein the magnetic or magnetisable member of the coupling device is a permanent magnet. 25
4. A coupling device according to one of the preceding claims, wherein the magnetic or magnetisable member of the hearing device is a permanent magnet. 30
5. A coupling device according to one of the preceding claims, wherein the magnetic or magnetisable member of the coupling device comprises one or more guide portions configured to engage with corresponding guide sections of the hearing device. 35
6. A coupling device according to one of the preceding claims 1-4, wherein the magnetic or magnetisable member of the hearing device comprises one or more guide portions configured to engage with corresponding guide sections of the coupling device. 40
7. A coupling device according to one of the preceding claims, wherein the magnetic or magnetisable member of the coupling device comprises a plane contact surface adapted to engage with a corresponding contact surface of the hearing device. 45
8. A coupling device according to one of the preceding claims, wherein the plane contact surface of the magnetic or magnetisable member of the coupling device is rectangular. 50
9. A coupling device according to one of the preceding claims 1-7, wherein the plane contact surface of the magnetic or magnetisable member of the coupling device is circular. 55
10. A coupling device according to one of the preceding claims, wherein the magnetic or magnetisable member of the coupling device comprises a groove configured to receive a magnetic or magnetisable member of the hearing device. 5
11. A coupling device according to one of the preceding claims, wherein the magnetic or magnetisable member of the hearing device comprises a groove configured to receive a magnetic or magnetisable member of the coupling device. 10
12. A coupling device according to claim 10 or claim 11, wherein the groove comprises a first guide portion and a second guide portion angled relative to each other. 15
13. A coupling device according to one of the preceding claims, wherein the coupling device comprises a wireless communication unit configured to communicate wirelessly with the hearing device and/or with the external device. 20
14. A coupling device according to one of the preceding claims, wherein the coupling device comprises a wired connection for being electrically connected to the external device. 25
15. A coupling device according to one of the preceding claims, wherein the coupling device is configured to be magnetically attached to an external device for measuring individual ear acoustics of a hearing device user through the hearing device. 30

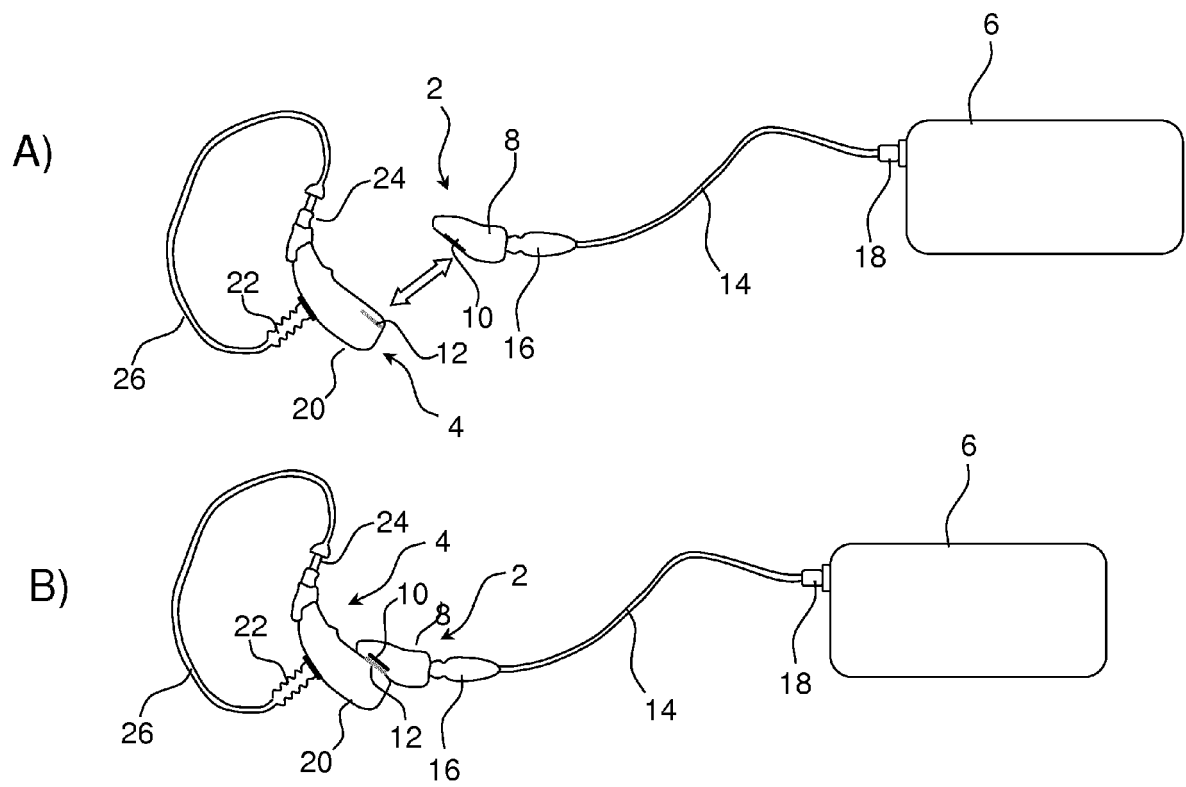


Fig. 1

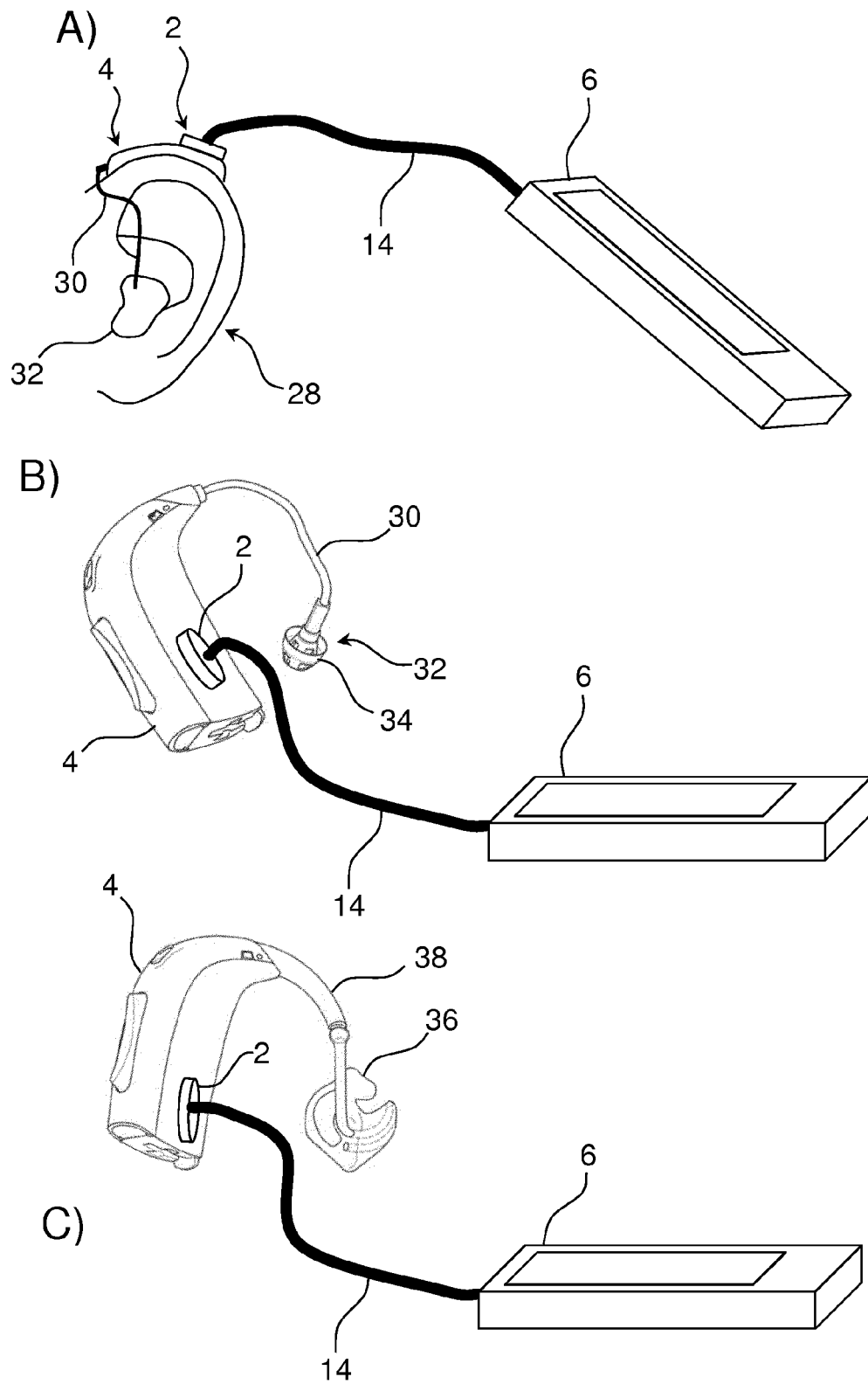


Fig. 2

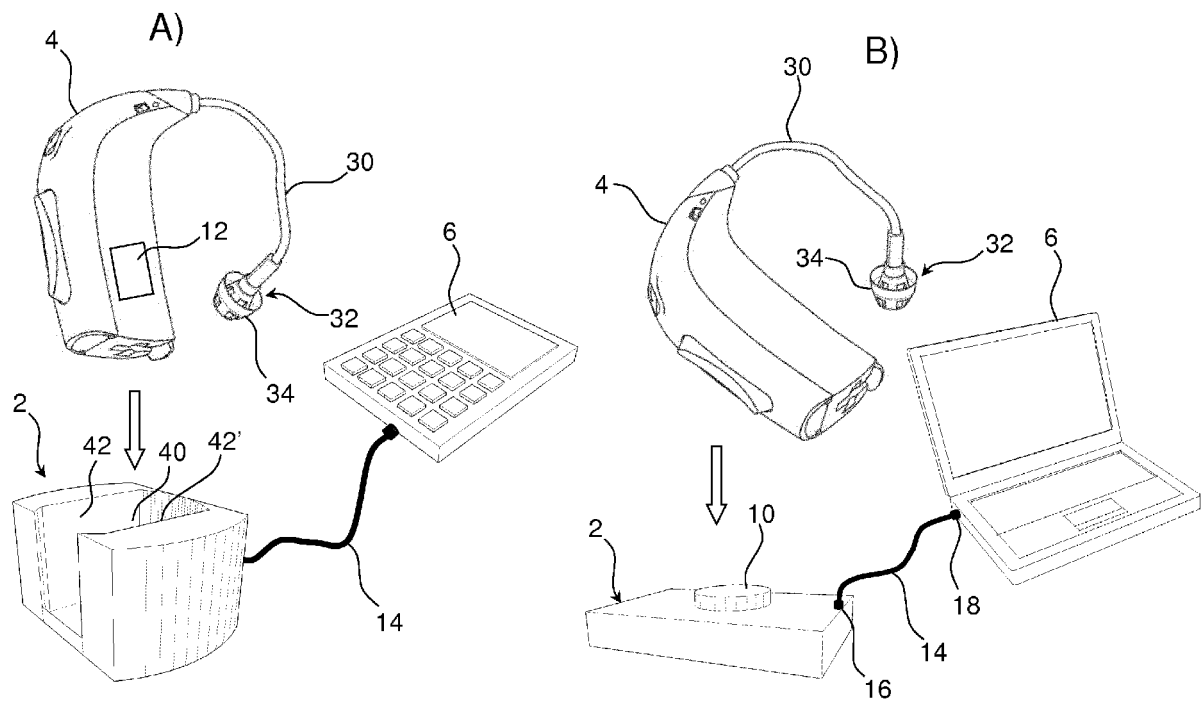


Fig. 3

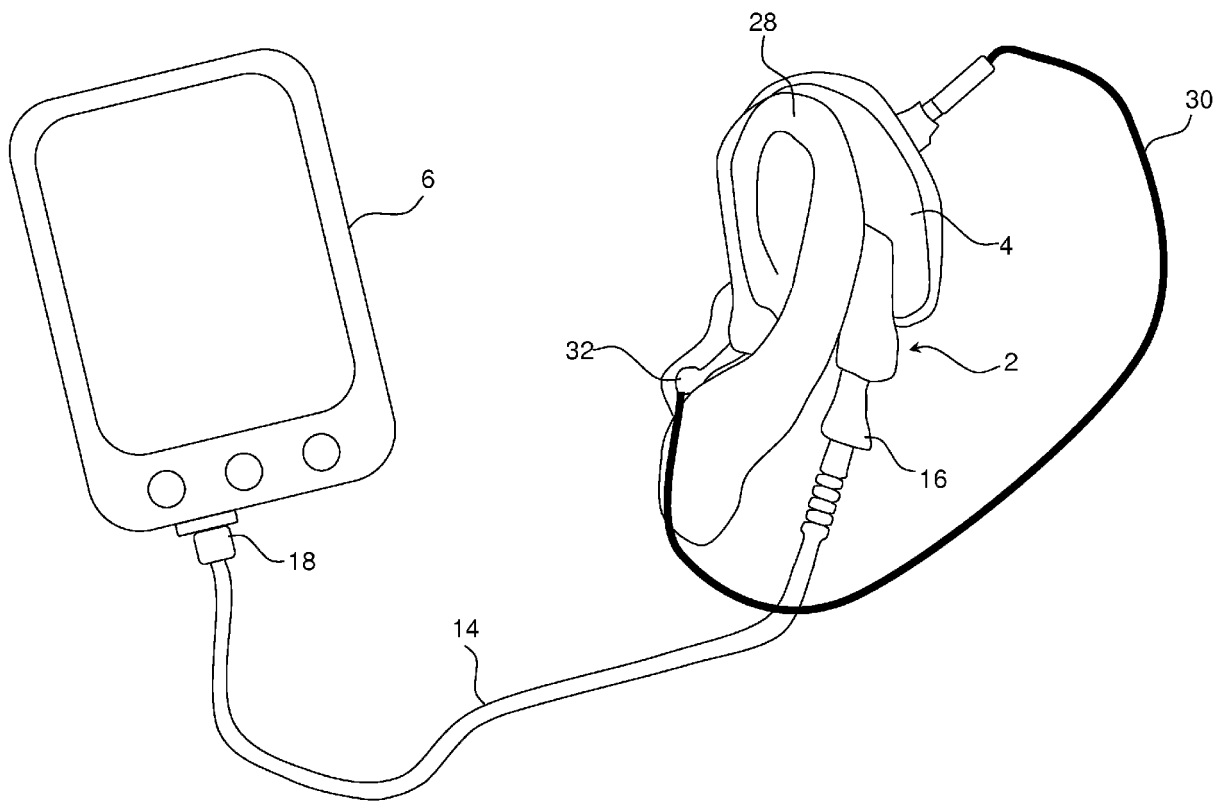


Fig. 4

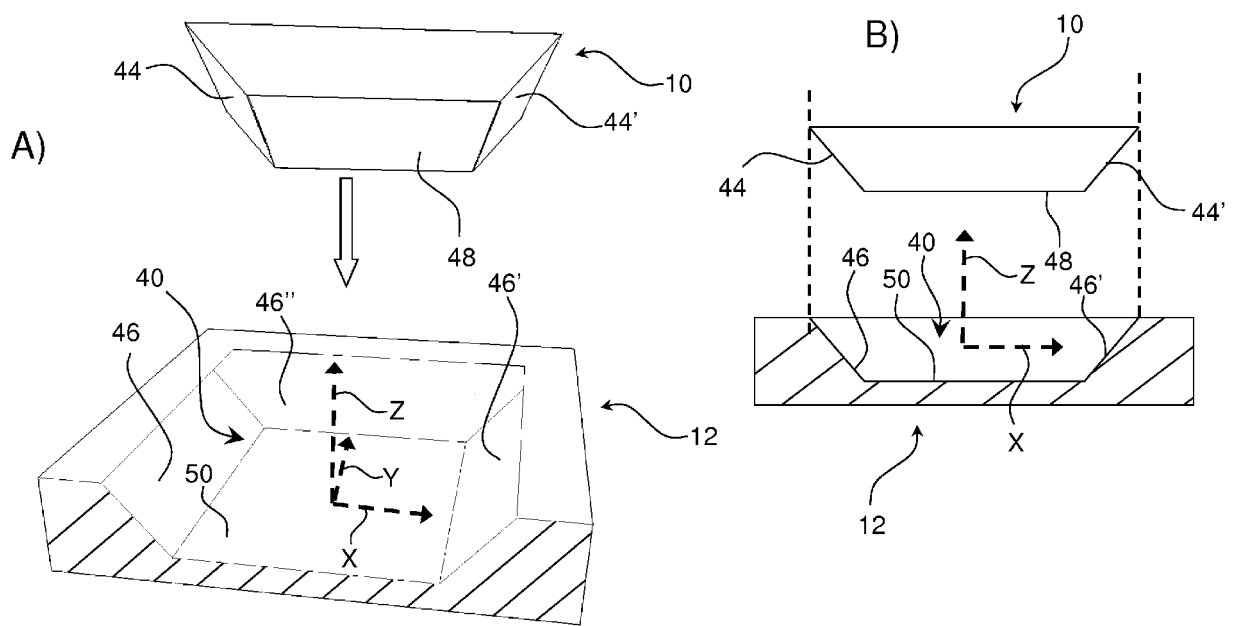


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 15 17 4336

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| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|--|--|--|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (IPC) |
| X | US 2002/131614 A1 (JAKOB ANDREAS [CH] ET AL) 19 September 2002 (2002-09-19) * abstract * * paragraph [0028] * * paragraph [0056] - paragraph [0058] * * paragraph [0061] * * paragraph [0078] - paragraph [0079] * * figures 1-3,9 * | 1-15 | INV. H04R25/00 |
| X | WO 97/46050 A1 (MULTITECH PRODUCTS PTE LTD [SG]; TONG YIT CHOW [SG]; CHANG JOSEPH SYLV) 4 December 1997 (1997-12-04) * abstract * * figures 2a,2b,3,4 * | 1-15 | |
| A | EP 2 355 552 A1 (OTICON AS [DK]) 10 August 2011 (2011-08-10) * paragraph [0006] * * paragraph [0035] * * figures 4,4A * | 8,9,13 | |
| A | US 2006/280324 A1 (BECK FRANK [DE] ET AL) 14 December 2006 (2006-12-14) * abstract * * paragraph [0018] * * paragraph [0023] * * figure 2 * | 13 | TECHNICAL FIELDS SEARCHED (IPC) H04R |
| A | EP 2 706 760 A1 (OTICON AS [DK]) 12 March 2014 (2014-03-12) * abstract * | 15 | |
| The present search report has been drawn up for all claims | | | |
| Place of search Munich | | Date of completion of the search 10 December 2015 | Examiner Fülöp, István |
| 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
ON EUROPEAN PATENT APPLICATION NO.**

EP 15 17 4336

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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10-12-2015

| Patent document cited in search report | Publication date | Patent family member(s) | Publication date |
|---|---------------------|--|--|
| US 2002131614 A1 | 19-09-2002 | NONE | |
| WO 9746050 A1 | 04-12-1997 | US 6157728 A WO 9746050 A1 | 05-12-2000 04-12-1997 |
| EP 2355552 A1 | 10-08-2011 | AU 2011200362 A1 CN 102196351 A DK 2355552 T3 EP 2355552 A1 US 2011206225 A1 | 18-08-2011 21-09-2011 18-02-2013 10-08-2011 25-08-2011 |
| US 2006280324 A1 | 14-12-2006 | DE 102005020322 A1 EP 1720377 A2 US 2006280324 A1 | 13-07-2006 08-11-2006 14-12-2006 |
| EP 2706760 A1 | 12-03-2014 | EP 2706760 A1 EP 2706761 A2 US 2014072157 A1 | 12-03-2014 12-03-2014 13-03-2014 |