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(54) **HEARING AID WITH FLEXIBLE INSERTION MEMBER**

(57) A hearing aid comprising a housing configured to be arranged behind the pinna of a user, an earpiece, and a tube or wire, which in one end is connected to said housing and in a second end is connected to said earpiece is disclosed. The hearing aid further comprises an insertion member, the insertion member being configured to be connected to said earpiece of the hearing aid, the insertion member being configured to ease insertion

of the hearing aid into the ear canal of a hearing aid user, said insertion member comprising a contact portion, allowing the earpiece of the hearing aid to be forced into the ear canal of the user upon pressing the contact portion. The insertion member comprises a front end and a rear end and at least one flexible portion arranged between the front end and the rear end allowing the insertion member to be bent.

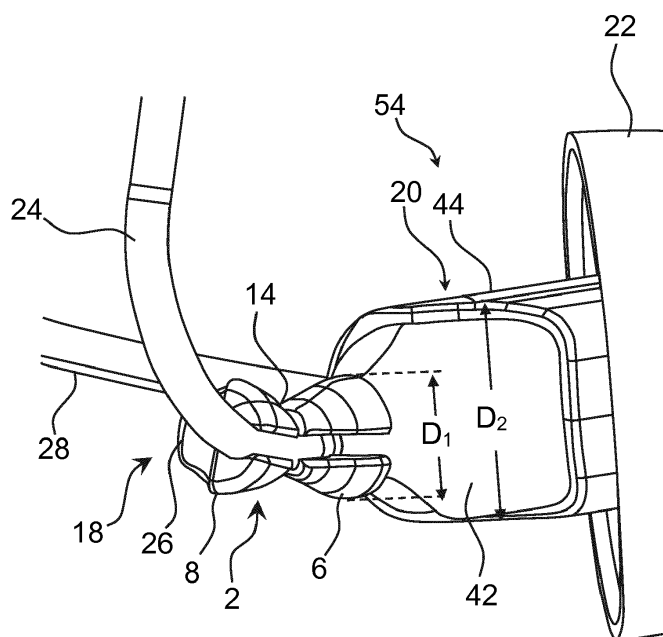


Fig. 1B

## Description

### FIELD

[0001] The present disclosure relates to a hearing aid comprising a housing configured to be arranged behind the pinna of a user and configured with an insertion member allowing easy insertion of the earpiece in the ear canal of a user. The disclosure more particularly relates to a hearing aid comprising an earpiece, and a tube or wire, where the tube or wire in one end is connected to the housing and in a second end is connected to the earpiece. Furthermore, the disclosure relates to a kit of parts comprising a tool and an insertion member, wherein the tool is used to attach the insertion member to the tube of wire of a hearing aid.

### BACKGROUND

[0002] Many hearing aid users experience problems during insertion of their earpiece into the ear canal, since it is challenging to insert the earpiece deep enough into the ear canal. In practise, the problem is, that the earpiece needs to be inserted into a deep position in the ear canal. It is very difficult for the user to arrange the earpiece into this position by using the fingers, because the fingers are not thin enough to be in the ear canal together with the speaker wire or tube.

[0003] To get the earpiece into the right position in the ear canal, many users press on the tube/wire that just flexes instead of pressing the earpiece deeper into the ear canal. Often, the earpiece comprises a speaker which if not inserted correctly into the ear canal, will cause an unintended error in the needed amplification for a given hearing loss. It may cause a lower feedback margin and the retention of the earpiece in the ear canal may be insufficient causing the earpiece to fall out of the ear canal.

[0004] The tighter the seal between the earpiece and the ear canal is, the harder will it often be for the user to insert the earpiece in to the canal. This is often the case with domes for hearing aid earpieces, which are intended to be inserted deep into the ear canal of a user. Here the seal between the dome and the ear canal should be good and therefore a high friction is to be overcome before the earpiece is correctly positioned.

[0005] Accordingly, there is a need for a hearing aid, by which the problems and shortcomings noted above can be overcome. The present disclosure provides at least an alternative to the prior art.

### SUMMARY

[0006] According to an aspect of the disclosure, the hearing aid comprises a housing configured to be arranged behind the pinna of a user, an earpiece, and a tube or wire. The tube or wire is in one end connected to the housing and in a second end connected to the ear-

piece. The hearing aid further comprises an insertion member, the insertion member being configured to connect with said tube or wire and to contact the earpiece of the hearing aid, wherein the insertion member is configured to ease insertion of the hearing aid into the ear canal of a hearing aid user, and where the insertion member comprises a contact portion, allowing a user to push on the insertion member forcing the earpiece of the hearing aid into the ear canal of the user. The insertion member furthermore comprises a front end and a rear end and at least one flexible portion arranged between the front end and the rear end.

[0007] With the above described construction of a hearing aid having an insertion member an easy insertion of the earpiece into the ear canal of a hearing aid user may be achieved. The insertion member enables the hearing aid user and/or a dispenser in "forcing" the earpiece into the ear by simply pushing a rear end of the insertion member. As such the insertion member, being connected to the wire or tube of the hearing aid allows a stiffening of parts of the wire while maintaining the flexible properties of the wire or tube at parts thereof, so as to allow a "push" to the receiver while maintaining the bendable properties of the wire or tube needed when forcing the earpiece into the bended ear canal. Hereby, it is possible for a hearing aid user to insert the earpiece deep enough into the ear canal in an easy and flexible manner.

[0008] Moreover, due to the flexible portion between the front end and the rear end, the wire or tube connected to the earpiece, can be bend during insertion of the earpiece allowing the earpiece to follow the internal contours of the ear canal. Accordingly, it is possible to place the earpiece in a correct position in the ear canal allowing optimized amplification and reduced feedback.

[0009] The hearing aid may be any kind of hearing aid comprising a housing configured to be arranged behind the pinna of a user. The earpiece may be any earpiece configured to be arranged into the ear canal, including any type of dome. In RITE-style hearing aids (Receiver in the ear), the earpiece typically includes a speaker arranged in the proximal end thereof, wherein the insertion member is intended to be arranged in proximity to a part of the speaker unit at a wire or tube connected to the earpiece and/or at least to a part of the speaker.

[0010] In more detail, generally a tube or wire, is in a first end connected to the housing arranged behind the pinna of the ear, and in the opposite end connected to the earpiece.

[0011] The insertion member is adapted to be mechanically connected to the earpiece of the hearing aid in a manner, in which the insertion member abuts a portion of the earpiece, e.g. the speaker. Accordingly, the earpiece may be a separate element, forming part of a hearing aid kit having a tool for attaching the insertion member to the hearing aid. By forming the insertion member as a separate part that can be attached to wire, a tube or a speaker unit of the hearing aid, it is possible to replace only the insertion member in case damages to parts of

the hearing aid should occur.

**[0012]** That is, the insertion member may comprise attachment structures configured to attach the insertion member to the wire or tube of the earpiece. The wire or tube is preferably connected to a speaker unit of the hearing aid.

**[0013]** The insertion member is configured to ease insertion of the hearing aid into the ear canal of a hearing aid user by providing an "extension" of the proximal end of the earpiece (and e.g. the speaker). The "extension" given by the insertion member enables a slight stiffening of the tube or wire at two positions, i.e. at a portion of the rear end and at a portion of the front end of the ear piece, wherein an intermediate part arranged in between the front and rear end, the insertion member is configured with a flexible portion allowing the earpiece to slightly bend along with the wire or tube. Accordingly, the "extension" allows an easy grip on the tube or wire by use of the insertion member and a controlled insertion of the earpiece by controlling the wire to tube through the insertion member.

**[0014]** In more detail, the insertion member comprises a contact portion configured and shaped to allow the earpiece of the hearing aid to be pushed into the ear canal of the user by pressing the contact portion. The contact may have any suitable size and geometry.

**[0015]** As previously described, the insertion member comprises a front end and a rear end, and it may be an advantage that the contact portion is arranged at the rear end of the insertion member. Hereby, it is possible to apply a finger to press on the insertion member and hereby push the earpiece into the ear canal.

**[0016]** Furthermore, at least one flexible portion of the insertion member may be arranged between the front end and the rear end allowing the insertion member to be bent. Hereby, the flexible portion makes it possible to insert the earpiece of the hearing aid deeply into the ear canal, since the flexible portion maintains a flexibility of the wire or tube at a portion thereof enabling the ear piece with the possibility of aligning with and following the contours of the ear canal when inserting the earpiece into the ear canal.

**[0017]** According to an embodiment, the insertion member is shaped as an elongated body comprising one or more attachment structures (e.g. configured as clamp-on structures) configured to be clamped on the wire or tube, wherein at least one flexible portion is provided between a first end and the opposite end of the insertion member. Accordingly, the attachment structures of the insertion member may comprise a receiving structure configured to receive and connect with the wire or tube.

**[0018]** According to a further embodiment, at least one of the attachment structures of the insertion member comprises a receiving structure configured to receive and maintain a wire or a tube.

**[0019]** In order to ease insertion of the earpiece into the ear canal the insertion member is attached to a structure of the hearing aid or to be integrated into the hearing

aid. It may be advantageous to attach the insertion member to a wire or a tube because it allows for attaching the insertion member in an optimum position. Attachment of the insertion member to a wire or a tube is, however, challenging.

**[0020]** Attachment of the insertion member to a wire or a tube can be carried out by providing the insertion member with a receiving structure configured to receive and maintain a wire or a tube.

**[0021]** Accordingly, in an embodiment one or more attachment structures of the insertion member is configured as one or more openings constituting an elongated slit of the insertion member, which slit is configured to receive the wire or tube.

**[0022]** Attachment of a tube or a wire to the insertion member can be a challenge. Attachment of a tube or a wire to the insertion member can be carried out by using an elongated slit to which the wire or tube can be inserted into the receiving structure.

**[0023]** According to an embodiment, the receiving structure is provided with protruding structures configured to prevent the insertion member from being moved along the length of the wire or tube. The protruding structures provide an increased friction between the tube or wire and the insertion member. Hereby, the insertion member can be maintained at the intended position of the tube or wire. Accordingly, the protruding structures prevent the insertion member from being moved along the tube or wire.

**[0024]** According to an embodiment, the protruding structures constitute a barbed portion. The barbed portion is an effective way of providing a desired friction between the tube or wire and the insertion member.

**[0025]** In an embodiment, the protruding structures may comprise several barbed portions.

**[0026]** In an embodiment, the attachment structures of the insertion member may be configured as a click-on-structure configured to be clicked on to and hereby be attached to a wire or a tube or one or more structures of a speaker unit. Hereby, it is possible to provide an easy and user-friendly attachment of the insertion member to a wire or a tube or one or more structures of a speaker unit.

**[0027]** In an embodiment, the flexible portion is arranged centrally in the insertion member. Hereby, it is possible to provide an insertion member that will bend in the central region of the insertion member. Accordingly, it is possible to bend the insertion member, in a manner, in which both the distal and proximal portion of the insertion member is provided relative close to the region of bending. Furthermore, it is possible to arrange the insertion member in a bent configuration, in which the radius of curvature is small.

**[0028]** By the term "centrally" is meant at or close to the middle (e.g. midpoint or centerline) of the insertion member. Centrally will be at or near the middle of the insertion member, such as the midpoint between the distal end and proximal end of the insertion member. In one

preferred embodiment according to the disclosure, the flexible portion is arranged in a position that has the same or approximately the same distance from the distal end and the proximal end of the insertion member.

**[0029]** For the insertion member to have flexile properties at a portion thereof, the insertion member may in an embodiment be configured such that a middle (or center) portion there is configured with a smaller diameter than the portions arranged adjacent to middle and centrally arranged flexible portion.

**[0030]** The flexible portion of the insertion member not only maintains the flexibility of the tube or wire at a part of the tube or wire, but also prohibits a front or rear part of the insertion member to loosen from the tube or wire. Such loosening would unintentionally make the insertion member protrude radially from the wire or tube which would make it impossible to place the earpiece into the ear canal. Thus, providing a flexible portion that has a smaller diameter than the portions arranged adjacent to the flexible portion, the reduction in material at the flexible portion makes it is possible to avoid that the insertion member protrudes radially from the earpiece (or a wire or tube connected to the earpiece/speaker unit).

**[0031]** For the user of the hearing aid to gain a sufficient grip on the earpiece, the the insertion member may in an embodiment comprise a protrusion extending from the rear end, wherein the protrusion is configured to receive a nail of a finger of a hearing aid user. It can be difficult to hold on to the insertion member due to its small size. By providing the insertion member with a protrusion (a nail grip) arranged to receive a nail of a finger, it is possible to hold on to the insertion member and hereby carry out a controlled insertion of the earpiece into the ear canal.

**[0032]** As will become apparent throughout the disclosure, the insertion member protrudes axially from the speaker unit of the hearing aid and extends in extension of the speaker unit of the hearing aid. Hereby, the insertion member can transfer the force applied towards it to the speaker unit and further to the earpiece. Accordingly, the force exerted to the insertion member will be cause the earpiece to be moved into the ear canal. By axially should be understood that the insertion member extends parallel with a longitudinal direction of the speaker unit.

**[0033]** In more detail, the insertion member may in an embodiment enclose said tube or wire in an area that abuts an end of the speaker unit. Hereby, it is possible to arrange the insertion member adjacent to the speaker unit, to make the insertion member bear against the speaker unit. This may be done in a simple manner by providing the insertion member with an elongated opening configured to receive said tube or wire.

**[0034]** In line with the above described configuration of the insertion member. the insertion member comprises a first body portion and a second body portion attached by an intermediate portion having a smaller diameter than the first body portion and the second body portion. Hereby, it is possible to provide an insertion member capable

of bending due to an enlarged flexibility at the central intermediate portion because of its smaller diameter.

**[0035]** In more detail, the first body portion and the second body portion comprise a basically C-shaped form. Hereby, it is possible to attach a wire or a tube into the opening of the basically C-shaped body portion. Accordingly, the insertion member is suitable of being snapped into engagement with the wire or tube.

**[0036]** According to another aspect of the disclosure, a kit of parts comprising a tool and an insertion member suitable for use with a hearing aid is disclosed. The tool is configured for attaching the previously described insertion member to a tube or wire of a hearing aid, wherein the insertion member comprises an elongated body having a first body portion and a second body portion, which first and second body portions are connected through an intermediate substantially flexible body portion. The first and second body portions of the insertion member comprises a receiving structure configured to receive a tube or wire of the hearing aid. In accordance herewith, the tool comprises a first arm having a receiving portion configured to receive the insertion member and a wire or tube of the hearing aid therein. In addition, a second arm is configured as a pressing structure, which when acted upon provides a force to the wire or tube. That is, the when pushing the second arm towards the first arm, the pressing structures of the second arm forces the wire or tube of the hearing aid into the receiving structures of the insertion member.

**[0037]** This tool makes it possible to attach a wire or a tube to the insertion member. This may, in particular, be an advantage for hearing aid user having impaired finger function, or at least an efficient method for a dispenser to attach the insertion member to the wire or tube.

**[0038]** In an embodiment, the receiving portion of the first arm of the tool is configured as a first groove having substantially the shape of the first body portion and the second body portion of the insertion member, thereby allowing an easy and one-fit of the insertion member into the receiving portion of the first arm. Furthermore, the first arm comprises side portions, which are configured as two protrusions, each having a second groove structure configured to receive the wire or tube of a hearing aid, wherein the pressing structure of the second arm is configured with a first and second arm configured to engage into the second groove structure of the first arm. This allows the wire or tube to be forced into the receiving structure of the insertion member upon a user action on the second arm.

## BRIEF DESCRIPTION OF DRAWINGS

**[0039]** Embodiments 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 just show details to improve the understanding of the claims, while other details are 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 effect will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

- Fig. 1A shows a schematic, perspective side view of an insertion member of a hearing aid according to the disclosure;
- Fig. 1B shows the insertion member shown in Fig. 1A attached to a wire of a hearing aid according to the disclosure;
- Fig. 2A shows a schematic, perspective side view of an insertion member of a hearing aid according to the disclosure attached to a wire of the hearing aid;
- Fig. 2B shows a schematic, perspective end view of an insertion member of a hearing aid according to the disclosure;
- Fig. 3 shows a schematic, perspective top view of an insertion tool according to the disclosure;
- Fig. 4A shows a schematic, side view of a hearing aid according to the disclosure having an integrated insertion member;
- Fig. 4B shows a schematic, side view of another hearing aid according to the disclosure having an integrated insertion member;
- Fig. 4C shows a schematic, side view of a further hearing aid according to the disclosure having an integrated insertion member;
- Fig. 4D shows a schematic, side view of an even further hearing aid according to the disclosure having an integrated insertion member;
- Fig. 4E shows a schematic, side view of another hearing aid according to the disclosure having a detachably attached insertion member;
- Fig. 4F shows a schematic, side view of a further hearing aid according to the disclosure having a detachably attached insertion member;
- Fig. 5A shows a schematic view of a housing of a hearing aid according to the disclosure being arranged behind the pinna of a user;
- Fig. 5B shows a schematic view of the earpiece of the hearing aid shown in Fig. 5A being pressed into the ear canal of the user and
- Fig. 5C shows a schematic view of the hearing aid shown in Fig. 5B when the earpiece has been arranged deep into the ear canal of the user.

## DETAILED DESCRIPTION

**[0040]** 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 embodiments of the apparatus and kit of parts, together with the methods for assembly related thereto, are described in the following.

**[0041]** A hearing device may include a hearing aid that is adapted to improve or augment the hearing capability of a user 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 such as an earphone or a headset adapted to receive an audio signal electronically, possibly modifying the audio signal and providing the possibly modified audio signals 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.

**[0042]** 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 airborne 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.

**[0043]** A "hearing system" refers to a system comprising one or two hearing devices, and a "binaural hearing system" refers to a system comprising two hearing devices where the devices are adapted to cooperatively provide audible signals to both of the user's ears. The hearing system or binaural hearing system may further include auxiliary device(s) that communicates with at least one hearing device, the auxiliary device affecting the operation of the hearing devices and/or benefitting from the functioning of the hearing devices. A wired or wireless communication link between the at least one hearing device and the auxiliary device is established that allows for exchanging information (e.g. control and status signals, possibly audio signals) between the at least one hearing device and the auxiliary device. Such auxiliary devices may include at least one of 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, a PC. The audio gateway is further adapted to select and/or combine an appropriate one 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 other electronic device, the SmartPhone/ electronic device possibly running an application that controls functionality of the at least one hearing device.

**[0044]** 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.

**[0045]** The input unit may include multiple input microphones, e.g. for providing direction-dependent audio signal processing. Such 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 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 (speaker) for providing an air-borne acoustic signal.

**[0046]** Now referring to Fig. 1A, which illustrates a schematic, perspective side view of an insertion member 2 of a hearing aid according to the disclosure, and Fig. 1B, which illustrates the insertion member 2 shown in Fig. 1A attached to a wire or tube 24 of a hearing aid according to the disclosure.

**[0047]** As illustrated in Fig. 1B, the hearing aid comprises a housing (refer to Figures 5A to 5C) configured to be arranged behind the pinna of a user. The housing is in one end connected to a wire 24 (also referred to as a tube) and in a second end connected to an earpiece 54. The wire 24 connects with an insertion member 2 in the second end connected to the earpiece 54. As will become apparent the insertion member 2 is connected to the wire 24 in order to enable an easy insertion of the hearing aid into the ear canal of a hearing aid user.

**[0048]** In more detail, and as illustrated in the figures, the insertion member 2 comprises a contact portion 26 allowing a user to push on the insertion member 2 forcing the earpiece of the hearing aid into the ear canal of the user. Accordingly, a front end 16 is configured to abut a surface of the earpiece and a rear end 18 is configured with a contact portion 26, which allows a user to get a grip on the insertion member. In between the front end 16 and the rear end 18, the earpiece comprises a flexible portion 14, which allows the insertion member to bent in accordance with a bend to the wire 24.

**[0049]** In more detail, the insertion member comprises a first body portion 6, a second body portion 8, where the flexible portion 14 provided is provided there between. The flexible portion 14 is constructed by reducing the material thickness of the flexible portion compared to the adjacent first body portion 6 and second body portion 8. In this way the flexible portion enables the insertion mem-

ber 2 to bend along with the wire 24 without loosening its grip with the wire 24 along the length of the insertion member 2.

**[0050]** As illustrated in Fig. 1B, the front end 16 is configured to bear against the speaker unit 20 inserted into the earpiece 54 of the hearing aid. A groove-shaped nail grip is provided at the contact portion 26 arranged in the rear end 18. The contact portion is this configured as a nail grip 26, which is formed as a protrusion extending from the rear end 18. The nail grip 26 is configured to receive a nail of a finger of a hearing aid user. Accordingly, the user can use a finger to press upon the insertion member 2, and hereby force the earpiece 54 into the ear canal.

**[0051]** Illustrated in more detail in Fig. 1A, the insertion member comprises a first opening 4 provided in the first body portion 6 and a second opening 4' is provided in the second body portion 8. The openings 4, 4' are shaped as elongated slits extending in extension of each other. They are, however, separated by a centrally arranged indentation provided next to the flexible portion 14. The indentation should thus be construed as a smaller amount of material in the insertion member allowing a flexibility to bending of the insertion member. A receiving structure 10 is provided in the first body portion 6 and in the second body portion 8. The receiving structure 10 together with the openings 4, 4' are formed and configured to receive the wire 24 of the hearing aid, such that the insertion member can be attached to the wire, as illustrated in Fig. 1B.

**[0052]** In Fig. 1B, it can be seen, that the hearing aid comprises an ear grip 28 configured to be arranged in the outer ear (as shown in Fig. 5C) for allowing an easy removal of the earpiece 54 from the ear canal by pulling the ear grip 28. The ear piece 54 comprises a dome 22 into which a speaker unit 20 having a casing 44 has been arranged. A speaker 42 is arranged in the casing 44. It should be noted that this ear grip is an independent part of the hearing aid, which does not connect with the insertion member. Accordingly, the ear grip does not necessarily form a part of the hearing aid, but can be chosen to be applied to the hearing aid.

**[0053]** For the insertion member 2, to abut a part of the speaker unit or at least a part of an earpiece sufficiently, the insertion member is designed such that the outer counters of the surface of the front end substantially follow an outer counter of the speaker unit or a part of the earpiece as illustrated in Fig. 1B. Here it is seen that the diameter  $D_1$  of the front end 16 of the insertion member 2 is smaller than the diameter  $D_2$  of the casing 44 and that the outer surface contours of the front end 16 of the insertion member 2 substantially follows the outer contours of a surface of the speaker unit.

**[0054]** Furthermore, Fig. 1B illustrates how the rear end 18 of the insertion member 2 extends from the intermediate flexible portion 14, so as to protrude therefrom, and where the contact portion 26 is formed as a nail grip configured to receive a nail from a finger applied to press

upon the insertion member 2.

[0055] Fig. 2A illustrates a schematic, perspective side view of an insertion member 2 of a hearing aid according to the disclosure attached to a wire 24 of the hearing aid. The insertion member 2 and the hearing aid corresponds to the one shown in Fig. 1B. It can be seen, that the flexible portion 14 of the insertion member 2 is bent and follows the bending of the wire 24 to which the insertion member 2 is attached. The first body portion 6 of the insertion member 2 abuts the speaker.

[0056] Referring now to Fig. 2A a schematic, perspective end view of the insertion member 2 of a hearing aid according to the disclosure is illustrated. In comparison to Figure 1B, the insertion member 2 attached to the wire 24 is illustrated from a "back side" of the insertion member 2. From Fig. 2A it is seen how the flexible portion 14 allows a small piece of the wire 24 to be exposed to the surrounding, such that the insertion member 2 merely supports the wire 24 at a part of the wire structure.

[0057] The construction and form of the insertion member 2 is illustrated in more detail in Fig. 2B. Here it can be seen that the insertion member 2 on an internal surface 60 thereof, is provided with protruding structures 12 shaped as several barbed structures. The protruding structures 12 are configured to prevent the insertion member 2 to be moved along the length of the wire or tube. Accordingly, the protruding structures 12 formed as barbed structures provides a friction between the wire 24 and the insertion member 22 which prohibits the insertion member 2 to move along the length of the wire 24.

[0058] Referring now to Fig. 3 a tool configured to be used for attaching the insertion member 2 to the wire or tube of a hearing aid is illustrated. The tool forms part of a kit of parts comprising the above described insertion member 2 and the tool 30, which is used to attach the insertion member to a tube or wire of the hearing aid.

[0059] The tool 30 comprises a first arm 34 having a receiving portion (formed as a canal portion) 38 configured to receive the insertion member 2 and a wire or tube of a hearing aid therein. A second arm 32 is provided in connection with the first arm 34, where the second arm 32 is configured as a pressing structure 40, 40' providing a force to the wire or tube 24 upon a user of the hearing aid pushing the second arm 32 towards the first arm 34. In this way, the wire or tube 24 may be forced into the receiving structure 38 of the insertion member 2. It should be noted that the first arm 32 and second arm 34, could be construed as a first upper jaw 32 and a second lower jaw 34 rotatable attached to each other by means of a joint structure 36. The tool 30 makes it possible to attach a wire or a tube to the insertion member for hearing aid user having impaired finger function.

[0060] As illustrated in Fig. 3, the tool comprises in more detail a receiving portion 38 of the first arm 34, wherein the receiving portion is configured as a first groove 39 having substantially the shape of the first body portion 6 and the second body portion 8 of the insertion member 2. Furthermore, the first arm 34 comprises side

portions 61, 62, which are configured as two protrusion extending from a surface of the receiving structure towards the second arm 32, and comprises a second groove structure 63, 64 configured to receive the wire or tube.

[0061] Referring now in more detail to the second arm 32, the second arm 32 comprises first and second arms 40, 40' configured to engage into the groove structures 63, 64 of the first arm 34 allowing the wire or tube to be forced into the receiving structures 10 of the insertion member 2.

[0062] Different embodiments of the hearing aid insertion member 2 is illustrated in Figures 4A to 4F, and will be explained in more detail, with reference to the differentiating features in the following.

[0063] As illustrated in Fig. 4A the insertion member may be configured to form an integrated part of the wire or tube 24. In this embodiment, the insertion member 2 similarly as previously described, protrudes from the rear end of the speaker unit 20. Accordingly, the earpiece 54 can be inserted into the ear canal by pressing the insertion member 2 that will transfer the force exerted to the insertion member, to the earpiece 54 comprising the dome 22. A wire 24 protrudes from the rear end of the speaker unit 20.

[0064] Fig. 4B illustrates a schematic, side view of another hearing aid according to the disclosure having an integrated insertion member 2. The hearing aid basically corresponds to the one shown in Fig. 4A, however, the insertion member is slightly thinner than the one shown in Fig. 4A.

[0065] Fig. 4C illustrates a schematic, side view of a further hearing aid according to the disclosure having an integrated insertion member 2. The hearing aid has an earpiece 54 provided with an open dome 22, into which a speaker unit 20 is attached. The insertion member 2 protrudes from the rear side of the speaker unit 20 and is provided with a receiving portion into which a wire 24 is attached. It can be seen that the insertion member 2 has a centrally arranged flexible portion that allows the insertion member 2 to be bent.

[0066] Fig. 4D illustrates a schematic, side view of an even further hearing aid according to the disclosure having an integrated insertion member 2. The hearing aid basically corresponds to the one shown in Fig. 4D, however, an ear grip 28 is attached to the earpiece 54.

[0067] Fig. 4E illustrates a schematic, side view of another hearing aid according to the disclosure having a detachably attached insertion member 2. The hearing aid comprises an earpiece 54 having an open dome 22 and a speaker unit 20 arranged therein. An insertion member 2 has been detachably attached to a wire 24 protruding from the rear end of the speaker unit 20. The insertion member 2 comprises two centrally arranged flexible portion allowing the insertion member 2 to be bent between the configuration indicated by the solid line and the configuration indicated by the dotted line.

[0068] Fig. 4F illustrates a schematic, side view of a

further hearing aid according to the disclosure having a detachably attached insertion member 2. The insertion member 2 corresponds to the one shown in Fig. 4C, however, the insertion member 2 is detachably attached to the wire 24 of the hearing aid.

**[0069]** Fig. 5A illustrates a schematic view of a housing 52 of a behind-the-ear type hearing aid 56 according to the disclosure being arranged behind the pinna of a user. The user holds the housing 52 of the hearing aid 56 by the fingers 50. The hearing aid 56 comprises a speaker unit 20 and a dome 22 attached thereto. An ear grip 28 is attached to the speaker unit casing and an insertion member 2 is detachably attached to the wire 24.

**[0070]** Fig. 5B illustrates a schematic view of the earpiece 54 of the hearing aid 56 shown in Fig. 5A being pressed into the ear canal 48 of the user. It can be seen, that the index finger 50 is used to press upon the insertion member 2 in order to force the earpiece 54 into the ear canal 48.

**[0071]** Fig. 5C illustrates a schematic view of the hearing aid 56 shown in Fig. 5B when the earpiece 54 has been arranged deep into the ear canal 48 of the user. The wire 24 has been arranged behind the ear and the ear grip 28 is fixed to concha 46. It can be seen, that the insertion member 2 has been bent in order to allow the wire 24 to be bent. Accordingly, it is important to apply an insertion member 2 that can be bent. The insertion member 2 according to the disclosure comprises a flexible portion enabling the insertion member 2 to be bent.

**[0072]** As used, the singular forms "a," "an," and "the" are intended to include the plural forms as well (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.

**[0073]** 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 embod-

iments 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.

**[0074]** The claims are not intended to be limited to the aspects shown herein, but is 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.

**[0075]** Accordingly, the scope should be judged in terms of the claims that follow.

## Claims

1. A hearing aid comprising:

- a housing configured to be arranged behind the pinna of a user,
- an earpiece, and
- a tube or wire, which in one end is connected to said housing and in a second end is connected to said earpiece,

wherein the hearing aid further comprises an insertion member, the insertion member being configured to connect with said tube or wire, and to contact said earpiece of the hearing aid, wherein the insertion member is configured to ease insertion of the hearing aid into the ear canal of a hearing aid user, and wherein said insertion member comprise a contact portion, allowing a user to push on the insertion member forcing the earpiece of the hearing aid into the ear canal of the user, wherein the insertion member comprises a front end and a rear end and at least one flexible portion arranged between the front end and the rear end.

2. A hearing aid according to claim 1, wherein the insertion member is a separate part comprising attachment structures configured to attach the insertion member to said wire, tube or a speaker unit of the hearing aid.

3. A hearing aid according to claim 1 or claim 2, wherein at least one of said attachment structures of said insertion member comprises a receiving structure configured to receive and connect with said wire or said tube.

4. A hearing aid according to claim 3, wherein at least one of said one or more attachment structures of the insertion member is configured as one or more openings constituting an elongated slit to which said wire

- or tube can be inserted into the receiving structure.
5. A hearing aid according to claim 3 or claim 4, wherein the receiving structure is provided with protruding structures configured to prevent the wire or tube to be moved along the length of the wire or tube. 5
  6. A hearing aid according to one of the claims 3-5, wherein the attachment structures of the insertion member are configured as a click-on-structure configured to be clicked on to and hereby be attached to said wire or tube or one or more structures of said speaker unit. 10
  7. A hearing aid according to claim 1 or 2, wherein the insertion member is an integrated part of the speaker unit. 15
  8. A hearing aid according to one of the preceding claims, wherein the flexible portion is arranged centrally in the insertion member, wherein said flexible portion is configured as a cut-out in said material of said insertion member. 20
  9. A hearing aid according to one of the preceding claims, wherein the insertion member comprises a protrusion extending from the rear end, said protrusion being configured to receive a nail of a finger of a hearing aid user. 25
  10. A hearing aid according to one of the preceding claims 2-9, wherein the insertion member is arranged on said tube or wire in an area of said tube or wire that abuts an end of the speaker unit. 30
  11. A hearing aid according to one of the preceding claims, wherein the insertion member comprises a first body portion and a second body portion attached by an intermediate portion having a smaller diameter than the first body portion and the second body portion. 35 40
  12. A hearing aid according to claim 11, wherein the first body portion and the second body portion comprise a substantially C-shaped body portion. 45
  13. A kit of parts comprising an insertion member and a tool configured for attaching an insertion member to a tube or wire of a hearing aid according to claims 1 to 12, said insertion member comprising an elongated body having first body portion and a second body portion, said first and second body portions being connected through an intermediate substantially flexible body portion, wherein said first and second body portions comprises a receiving structure configured to receive a tube or wire of a hearing

aid,  
 wherein said tool comprises  
 a first arm having a receiving portion configured to receive said insertion member and a wire or tube of a hearing aid therein;  
 and a second arm configured as a pressing structure configured to provide a force to said wire or tube upon pushing the second arm towards the first arm such that said wire or tube of said hearing aid is forced into said receiving structure of said insertion member.

14. Kit of parts according to claim 13, wherein said receiving portion of said first arm is configured as a first groove having substantially the shape of said first body portion and said second body portion of said insertion member, and wherein side portions of said first arm is configured as two protrusions, each having a second groove structure configured to receive said wire or tube, where said pressing structure of said second arm is configured with a first and second arm configured to engage into said second groove structure of said first arm allowing said wire or tube to be forced into said receiving structure of said insertion member.

15. Kit of parts according to any one of claim 13 and 14, wherein said first and second arms are attached to each other by means of a joint structure.

Fig. 1A

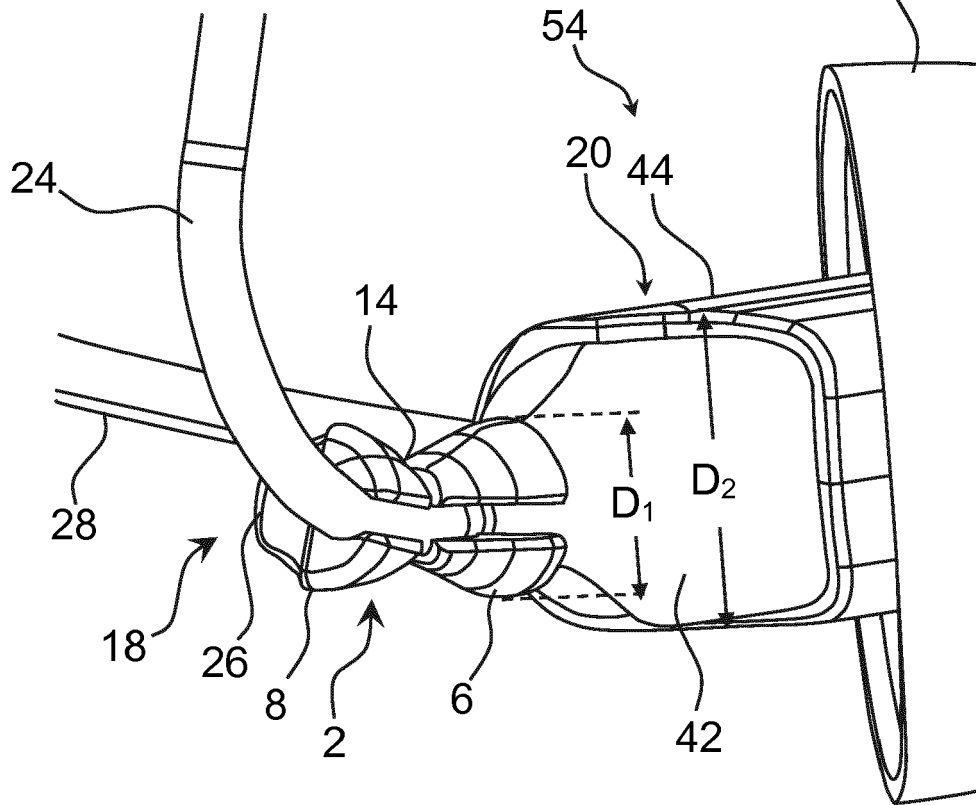
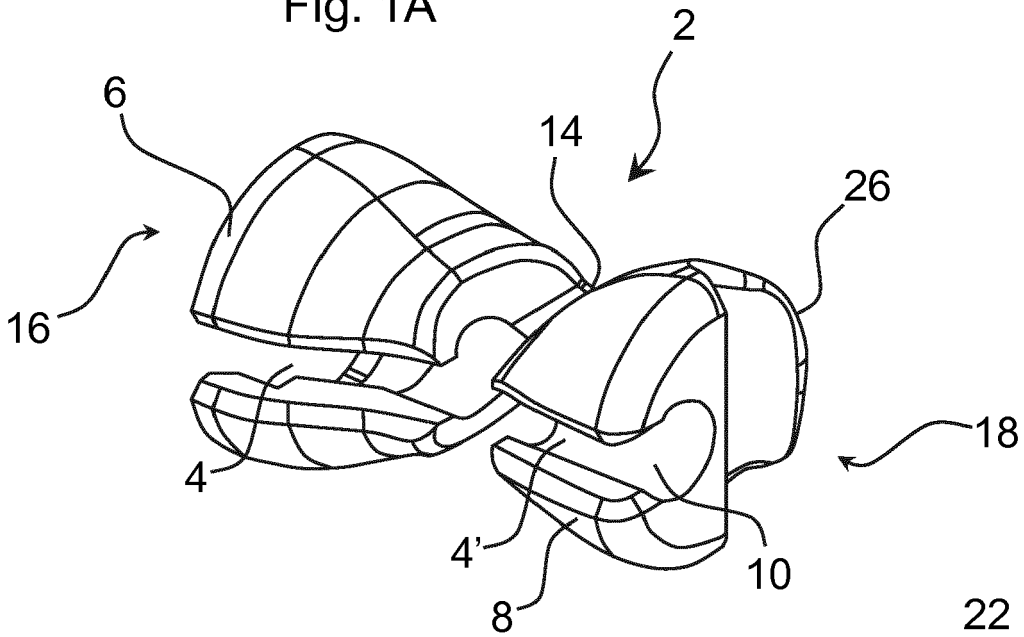
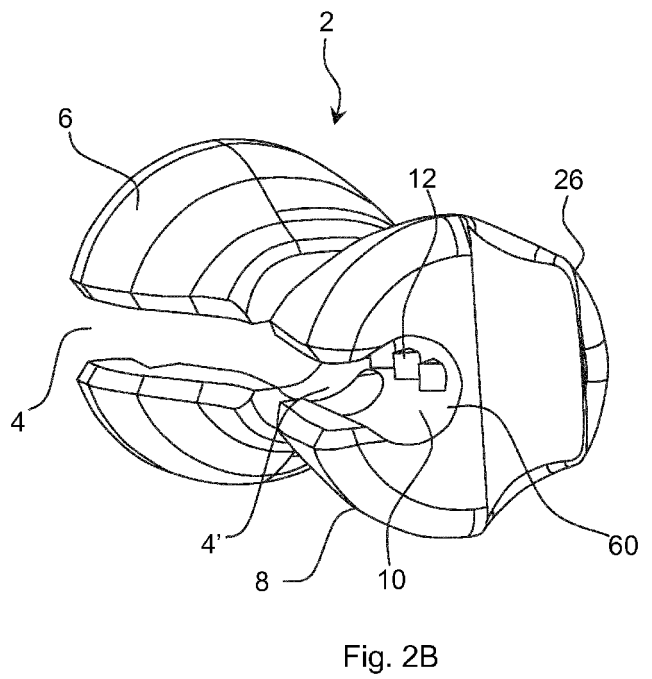
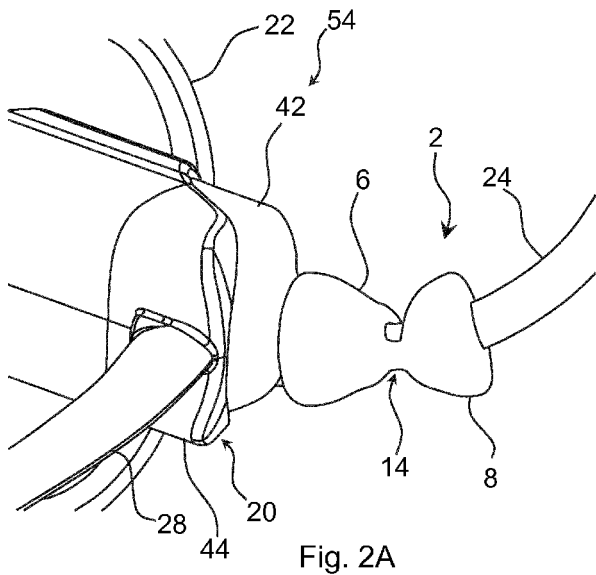


Fig. 1B



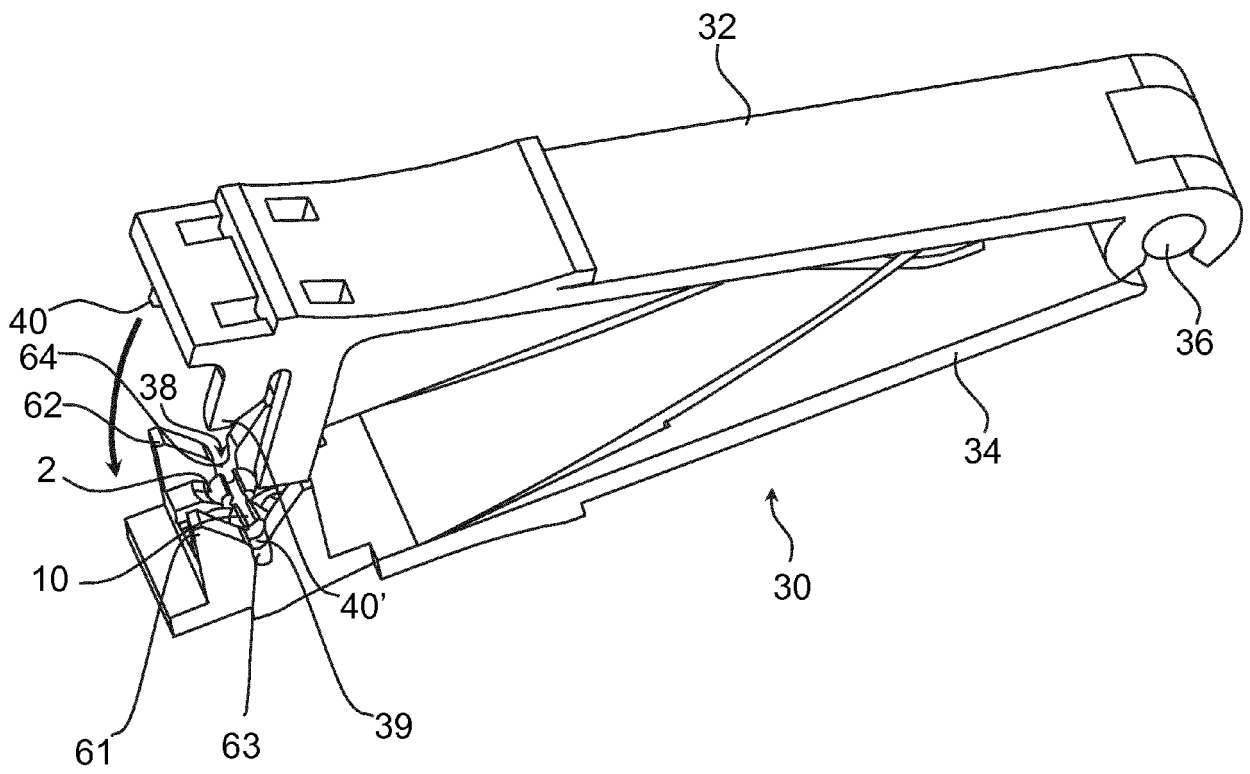
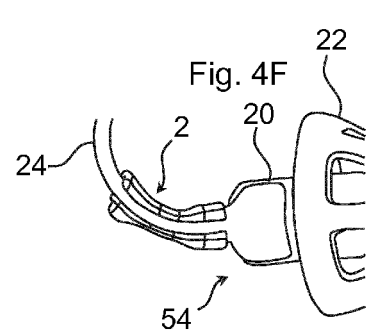
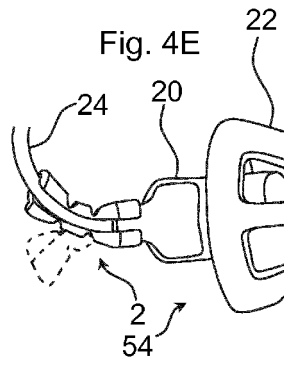
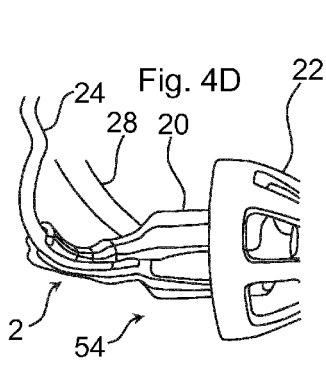
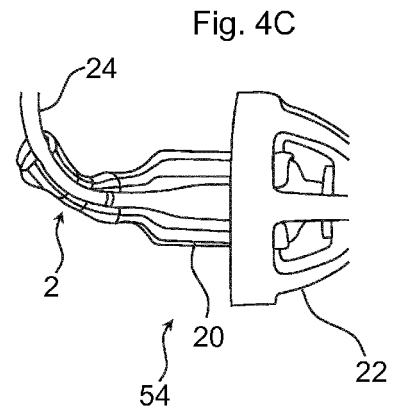
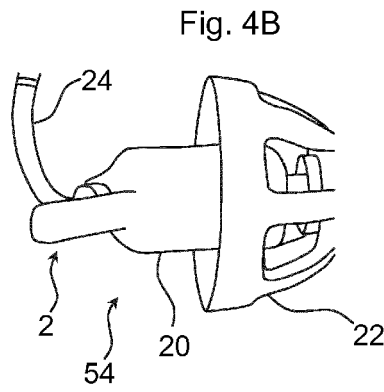
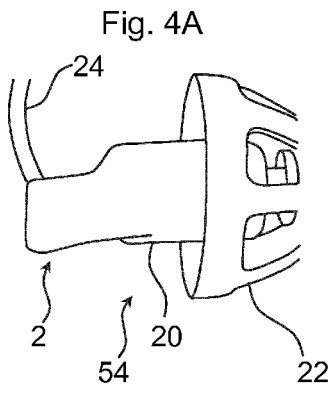


Fig. 3



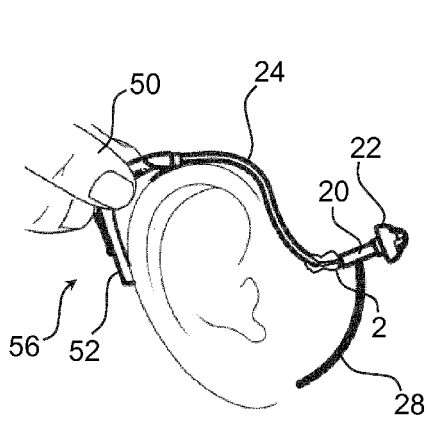


Fig. 5A

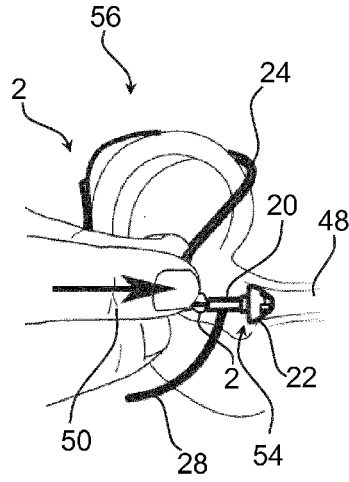


Fig. 5B

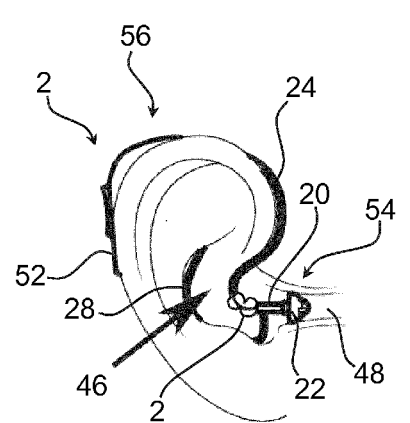


Fig. 5C



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Place of search <b>Munich</b>		Date of completion of the search <b>23 January 2018</b>	Examiner <b>Peirs, Karel</b>
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