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(54) **HEARING AID TUBE ASSEMBLY**

(57) A hearing aid tube assembly (2) comprising a tube (6) provided with a connector (8) in a first end of the tube (6) and a receiver (4) provided in the opposite second end, said connector (8) being configured to be connected to a behind-the-ear or receiver-in-the-ear type hearing aid (32), wherein the tube (6) is configured to be permanently elongated and be shaped to fit the geometry of the ear (34) of a hearing aid user, wherein the tube (6) is configured to be brought into a form stable configuration by applying heating and/or light (28).

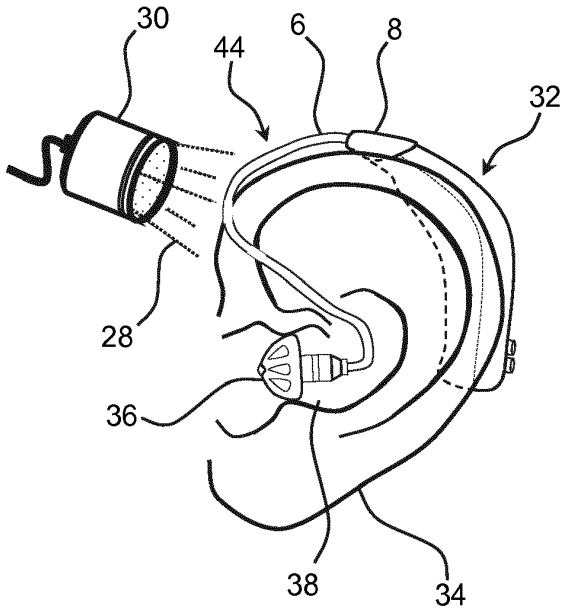

Fig. 2C

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Description

FIELD

[0001] The present disclosure relates to a hearing aid tube assembly comprising a tube provided with a connector in a first end of the tube and a receiver provided in the opposite second end, wherein the connector is configured to be connected to a behind-the-ear or receiver-in-the-ear type hearing aid. More particularly, the disclosure relates to a hearing aid tube assembly having a tube is configured to fit the concha shape of a hearing aid user.

BACKGROUND

[0002] Receiver-in-the-ear (RITE) hearing aids as well as behind-the-ear (BTE) hearing aids are very popular and therefore widely used. RITE hearing aids and many BTE hearing aids comprise a receiver that is electrically connected to a connector by means of a number of wires provided in a tube extending between the receiver and the connector.

[0003] Due to biological vibration among hearing aid user, the hearing aid tube assemblies are available in various lengths. Besides, different geometries are required for the left-side and right-side tubes of the hearing aid tube assemblies, respectively. The tubes are preshaped to fit the length and geometry of the ear of a hearing aid user.

[0004] The tubes are designed to have a generic shape that fits most people. Some hearing aid dispensers rework the tubes by applying heating by means of hair dryers, lighters and other heat sources to customize the tube to the hearing aid users ear. Prior art tubes available require to be heated up to 150°C to become malleable.

[0005] Therefore, it would be desirable to be able to reduce the number of hearing aid tube assemblies required. It would also be desirable to have a hearing aid tube assembly that is easier than the prior art hearing aid tube assemblies to shape and customize (make the tube fit the concha shape of a hearing aid user).

[0006] Accordingly, it is an object of the disclosure to provide a hearing aid tube assembly tube that makes it possible to reduce the number of tubes required in order to minimize the variants on stock.

[0007] It is also an object of the disclosure to provide a hearing aid tube assembly that is easier than the prior art hearing aid tube assemblies to shape and customize.

SUMMARY

[0008] According to an aspect of the disclosure, the hearing tube assembly is a hearing tube assembly comprising a tube provided with a connector in a first end of the tube and a receiver provided in the opposite second end, said connector being configured to be connected to a BTE or RITE type hearing aid, wherein the tube is configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user, wherein the tube is configured to be brought into a form stable configuration by applying heating and/or light.

[0009] Hereby, it is possible to provide a hearing aid tube assembly that reduces the number of required variants. The prior art hearing aid tube assemblies come in various geometries (one for the left ear and one for the right ear) and sizes. Since the hearing aid tube assembly can be shaped in different ways, it is possibly to use one single hearing aid tube assembly to cover several prior art hearing aid tube assembly variants.

[0010] The connector may have any suitable shape and size as long as it can be electrically connected to a BTE or RITE type hearing aid. The electrical connection to the hearing aid may be established by using electrical connection structures (e.g. corrsponding pins and socket holes). In one embodiment, the connector is provided with pins protruding from a body portion of the connection. In another embodiment, the connector is provided with socket holes configured to receive corresponding pins protruding from the body portion of the hearing aid.

[0011] The receiver may have any size and geometry. The tube may have any suitable size and geometry. It may be an advantage that the tube has a homogeneous cross section. In a preferred embodiment, the tube has a circular or oval cross section in order to ease the comfort for the hearing aid user wearing it.

[0012] The tube is configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user. The elongation may be established by pulling the tube by the hands. Accordingly, it is preferred that the tube is constructed in a material and having a cross sectional area that allows it to be formed by suing the hands. The tube is configured to be brought into a form stable configuration by applying heating and/or light. In a preferred embodiment, the tube is configured to be brought from a non-cured configuration into a cured configuration by using heat and/or light.

[0013] In one embodiment the required heat does not necessarily need to be high (it may e.g. be as low as room temperature, such as 15-25 °C). Normally, the curing process will, however, be speeded up if a higher temperature (above 25°C) is applied.

[0014] According to yet another aspect, the tube comprises a first portion and a second portion that is stiffer than the first portion.

[0015] Hereby, the soft portion allows the tube to be bent easier in this region. Likewise, the stiff portion makes the tube suitable for clamping to the ear.

[0016] According to a further aspect, the first portion is a central portion and the second is a distal portion that is stiffer than the central portion. This may be an advantage, because the central portion of the tube typically needs to be bent, whereas the tube typically needs to be stiffer at its distal portion in order to make it clamp at the ear.

[0017] According to an even further aspect, the distal

portion is the distal portion, in which the connector is provided.

[0018] Hereby, is possible to achieve a tube that has sufficient stiffness at the region, at which the tube needs to clamp at the ear. The tube may at the same time bent (due to the lower stiffness) at its central portion so that the tube can be formed to fit the shape of the concha of the ear.

[0019] According to another aspect, the tube comprises a first section and a second section separated by a separation wall, wherein the first section comprises a first substance and the second section comprises a second substance that begins to harden when mixed with the first substance. The term "section" should be understood as a compartment or a lumen, in which a component (e.g. a liquid or gel) can be contained.

[0020] Hereby, the hardening process (also referred to as curing process) is easy controllable and can be initiated by bending the tube hereby breaking the separation wall.

[0021] The tube may preferably comprise several sections. By the term "section" is meant a compartment or lumen, in which a component can be contained.

[0022] According to a further aspect, the separation wall is configured to break when the tube is bent. Hereby, the curing process can easily be initiated. By the term "is bent" is meant "bent to a predefined radius of curvature".

[0023] According to an even further aspect, the separation wall is configured to break when the tube is bent in a manner in which the radius of curvature of the bent portion of the tube is less than 2 cm. Hereby, it is possible to handle the tube without breaking the separation wall (e.g. during storage and transport). At the same time, it is possible to break the separation wall simply by bending the tube in the prescribed manner.

[0024] According to a further aspect, the separation wall is configured to break when the tube is bent in a manner in which the radius of curvature of the bent portion of the tube is less than 1 cm. Hereby, it is possible to handle the tube without breaking the separation wall and at the same time break the separation wall by bending the tube to a larger extent.

[0025] According to another aspect, one or more metal wires are provided in the tube and extend along at least a portion of the tube. Hereby, the one or more metal wires can be used as a conductor or as a reinforcement structure.

[0026] According to a further aspect, the one or more metal wires extend along the entire length of the tube. Hereby, the one or more metal wires can be used as a conductor or as a reinforcement structure

[0027] According to an even further aspect, the one or more metal wires are provided in a cable. Hereby, it is possible to electrically isolate the one or more metal wires from surrounding structures. This may be beneficial if the tube comprises both one or more metal wires used as conductors and a metal reinforcement structure.

[0028] According to another aspect, the cable is centrally arranged in the tube. Hereby, it is possible to keep the cable in the largest possible distance from the periphery of the tube in order to reduce or even eliminate the risk of damaging the tube wall with the cable.

[0029] According to a further aspect, the cable is arranged close to the periphery of the tube than the center of the tube. Hereby, it is possible to achieve a large-volume section arranged adjacent to the section, in which the cable is arranged.

[0030] According to an even further aspect, the one or more metal wires are Litze wires. Hereby, it is possible to reduce the skin effect and proximity effect losses in the one or more metal wires.

[0031] According to another aspect, at least a portion of the one or more metal wires constitute a wire and fiber assembly configured to be arranged in:

- a first configuration, in which first configuration the wire and fiber assembly is compacted and
- a second configuration, in which second configuration the wire and fiber assembly is elongated compared to the first configuration, wherein the tube comprises a permanently extendable structure surrounding one or more metal wires.

[0032] Hereby, it is possible to achieve an easy way to provide an extendable tube.

[0033] According to a further aspect, the tube comprises a minor portion separated from a major portion of the tube, wherein the one or more metal wires are arranged in the minor portion and wherein the major portion comprises a shapeable material, said shapeable material is configured to hardened by using heat and/or light.

[0034] Hereby, it is possible to ease the forming process, since the tube has a large-volume section comprising a shapeable material that can be formed.

[0035] According to an even further aspect, the tube comprises a light sensitive substance. Hereby, it is possible to initiate and carry out the curing process (hardening process) by using light.

[0036] According to an even further aspect, the light sensitive substance is a ultraviolet (UV) sensitive substance. Hereby, it is possible to initiate and carry out the curing process (hardening process) by using UV light.

[0037] According to another aspect, the tube is at least partly made of a material that can be formed and reformed multiple times. Hereby, the tube can be reformed.

[0038] It may be beneficial that the tube is at least partly made of a polymorph material. The polymorph material may be selected from class of polymers known as caprolactones.

[0039] According to a further, the material has a melting point below 90°C.

[0040] According to another aspect, the material has a melting point in the range 50-85°C, preferably 55-75°C, such as 60-70°C. Hereby, it is easy to heat the tube of the hearing aid tube assembly in order to make it shapeable.

[0041] The method according to the disclosure is a method for making a hearing aid tube assembly comprising a tube provided with a connector in a first end of the tube and a receiver provided in the opposite second end, said connector being configured to be connected to a BTE or RITE type hearing aid, wherein the method comprises the step of providing a tube being configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user, wherein the tube is configured to me brought into a form stable configuration by applying heating and/or light.

[0042] Hereby, it is possible to provide a method for making a hearing aid tube assembly that reduces the number of required variants. Wherein the prior art hearing aid tube assemblies come in various geometries (one for the left ear and one for the right ear) and sizes, the method enables production of a single hearing aid tube assembly that can be shaped in different ways. Hereby, it is possibly to use one single hearing aid tube assembly to cover several prior art hearing aid tube assembly variants.

[0043] According to another aspect, the method comprises the following steps:

- connecting the connector to the hearing aid;
- arranging the receiver in the ear canal of a hearing aid user;
- arranging and shaping the tube to fit the geometry of the ear;
- applying heat and/or light to harden the tube.

[0044] Hereby, it is possible to customize a single hearing aid tube assembly to various hearing aid user.

BRIEF DESCRIPTION OF DRAWINGS

[0045] 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 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 tube assembly according to an embodiment of the disclosure;

Fig. 1B shows a cross-sectional view of a tube of a tube assembly according to an embodiment of the disclosure;

Fig. 2A shows a cross-sectional view of a tube of a tube assembly according to an embodiment of the disclosure;

Fig. 2B shows a cross-sectional view of a tube of a tube assembly according to another embodiment of the disclosure;

Fig. 2C shows a tube assembly according to an embodiment of the disclosure being formed to fit the concha shape of a hearing aid user;

Fig. 2D shows the tube assembly shown in Fig. 2C being hardened by means of light;

Fig. 3A shows a view of a tube assembly according to an embodiment of the disclosure in a first compressed configuration and

Fig. 3B shows a view of the tube assembly shown in Fig. 3A in an elongated configuration.

DETAILED DESCRIPTION

[0046] 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 practised without these specific details.

[0047] 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, or an acoustic signal transferred as mechanical vibrations to the user's inner ears through bone structure of the user's head and/or through parts of middle ear of the user or electric signals transferred directly or indirectly to cochlear nerve and/or to auditory cortex of the user.

[0048] 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, 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.

[0049] 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.

[0050] 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 for providing an air-borne acoustic signal transcutaneously.

[0051] Now referring to Fig. 1A, which illustrates a tube assembly 2 according to an embodiment of the disclosure. The tube assembly 2 comprises a tube 6, a receiver 4 and a connector 8. The tube 6 is connected to the connector 8 in a first end of the tube 6 and to the receiver 4 in the opposite second end. Accordingly, the tube 6 extends between the receiver 4 and the connector 8.

[0052] The receiver 12 is provided with an attachment structure in the distal end 12. The attachment structure is configured to receive an ear piece (e.g. a dome as shown in Fig. 2C).

[0053] The connector 8 is configured to be connected to a BTE or RITE type hearing aid (see Fig. 2C and Fig. 2D). The connector 8 comprises a connector body and pins 10 extending along the longitudinal axis of the connector body. The pins 10 protrude from the distal end of the connector body and are configured to be inserted into a BTE or RITE type hearing aid.

[0054] In Fig. 1A the tube 6 is straight (neutral configuration) and is configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user. Moreover, the tube 6 is configured to be brought into a form stable configuration (be hardened) by applying heating and/or light.

[0055] Fig. 1B illustrates a cross-sectional view of a tube 6 of a tube assembly according to an embodiment of the disclosure. The tube 6 comprises a first section I and a second section II separated by a separation wall 16 and surrounded by a tube wall 14. The tube 6, moreover, comprises a centrally arranged cable 20 comprising a plurality of Litze wires 18.

[0056] The tube 6 can have two or more sections each shaped as a lumen (a cavity extending along the length of the tube 6). In one embodiment, one section I, II comprises a compressed wire that can be elongated by pulling the tube 6. This wire may be made in metal or another suitable material. The wire will to a considerable extent determine the shape of the tube 6. By bending the wire, the tube 6 can be shaped.

[0057] In a preferred embodiment the wire is a folded metal wire.

[0058] The tube wall 14 may be made in any suitable material. In one embodiment the tube wall 14 is, at least partly, made in a polymorph material. It may be an advantage that the polymorph material has a melting point at approximately 60-65°C such as 62°C, since this allows the hearing aid dispenser to modify the tube 6 with less invasive tools compared to the prior art tubes.

[0059] Tests have revealed that when the tube wall 14 is made in a polymorph material, the tube 6 will gradually take the shape of the ear and not revert back to the preshape after demounting.

[0060] In one embodiment, the first section I comprises a first component, whereas the second section II comprises a second component. The separation wall 16 is preferably made sufficiently fragile to break the separation wall 16 by bending the tube 6 so that the first component and the second component can be mixed in order to initiate a hardening process. Hereafter the hearing aid dispenser can placed the tube 6 on the end-user's ear while the tube 6 hardens. When the tube 6 has hardened, the tube 6 will keep the shape given by the ear.

[0061] In one embodiment, one section I, II can be filled with light sensitive glue and closed in both ends. The light sensitive glue may be sensitive to ultraviolet (UV) light. Hereby, the hearing aid dispenser will be able to shape the tube 6, and apply sunlight or a UV-lamp to harden the tube 6. When the glue is hardened, the tube 6 will permanently maintain its shape.

[0062] Fig. 2A illustrates a cross-sectional view of a tube 6 of a tube assembly according to an embodiment of the disclosure. The tube 6 comprises a cable 20 provided with a centrally arranged metal wire 22 constituting a reinforcement structure extending along the length of the cable 20. The metal wire 22 is surrounded by a plurality of Litze wires 18 extending along the length of the cable 20.

[0063] Fig. 2B illustrates a cross-sectional view of a tube 6 of a tube assembly according to another embodiment of the disclosure. The tube 6 comprises a portion 25, in which a shapeable material 24 is provided. The tube 6 comprises another portion 26, in which a plurality of Litze wires 18 are provided. The shapeable material 24 may be a material that is sensitive to heat and/or light. Hereby, it is possible to shape the tube 6 and harden the tube 6 by using light and/or heat in order to maintain the geometry.

[0064] Fig. 2C illustrates a tube assembly according to an embodiment of the disclosure being formed to fit the shape of ear 34 of a hearing aid user. The tube assembly comprises a tube 6 extending between a connector 8 and a receiver 4. The connector 8 is provided in the first end of the tube 6, whereas the receiver 4 is provided in the opposite end of the tube 6. A dome 36 is attached to the distal end of the receiver 4. The dome 36 is inserted into the ear canal 38.

[0065] A lamp 30 emits light 28 towards the distal portion 44 of the tube 6. Hereby, it is possible to harden the tube 6. The hearing aid dispenser can form (change the

length and geometry) the tube 6 to make it fit the geometry of the ear 34 and afterwards harden the tube 6 by mean of the lamp 30.

[0066] Fig. 2D illustrates the tube assembly shown in Fig. 2C being hardened by means of light 28 from a lamp 30 in a configuration in which the tube assembly is removed from the ear of the hearing aid user. It can be seen that the tube 6 is connected to a connector 8 that is attached to the housing of a hearing aid 32 configured to be arranged behind the ear of the hearing aid user. A receiver 4 is provided in the opposite end of the tube 6. The receiver 4 comprises an attachment structure provided at the distal end 12 of the receiver 4. The attachment structure is configured to be engagingly received by a corresponding structure of a dome (as shown in Fig. 2C).

[0067] In one embodiment, the tube 6 has a distal portion 44 that is stiffer than the central portion 42 of the tube 6, in which the tube 6 is bent to have an arched portion having a required radius of curvature R.

[0068] The stiff portion of the tube 6 allows the tube 6 to be sufficiently stiff to clamp to the ear. The central portion 42, however, needs to softer in order to decouple vibrations from the ear canal to the microphone in the body portion of the hearing aid 32.

[0069] In one embodiment, the central portion 42 is made in a polyurethane plastic such as thermoplastic polyurethane (TPU), e.g. TPU having a hardness in the range shore 25-35, such as approximately shore 30. Hereby, it is possible to reduce the risk of feedback and to make the tube 6 fit better to the ear.

[0070] Fig. 3A illustrates a view of a tube assembly according to an embodiment of the disclosure in a first compressed configuration, whereas Fig. 3B illustrates a view of the tube assembly shown in Fig. 3A in an elongated configuration.

[0071] The tube assembly comprises a tube 6 extending between a connector 8 and a receiver 4. The connector 8 is provided with pins 10 for establishing electric contact to a body portion of a hearing aid (see Fig. 2C and Fig. 2D). The receiver 4 comprises an attachment structure (for attachment of an ear piece such as a dome) provided in the distal end 12.

[0072] The tube 6 surrounds a wire and fiber assemble 40. The wire and fiber assemble 40 comprises one or more electrical wires providing electrical connection between the connector 8 and the receiver 4.

[0073] In Fig. 3A the wire and fiber assemble 40 is provided in a compressed configuration. In Fig. 3B, however, the wire and fiber assemble 40 has been elongated and the length of the tube 6 is increased. This can be done because the tube 6 is made in an extendable material. In a preferred embodiment the tube 6 is made in a material that allows the tube 6 to be elongated and hereafter be hardened by using heat and/or light. Hereby, it is possible to shape the tube 6 in order to customize it to the ear of a hearing aid user. Since the tube 6 may be elongated and formed in various ways, it is possible to reduce the number of tubes on stock.

[0074] In a preferred embodiment, the wires in the wire and fiber assemble 40 are protected by fibers. These fibers may be made in aramid. In another embodiment, the fibers may comprise or be made in carbon or glass. By compacting both the fiber(s) and the wire(s) in to a short tube 6 like illustrated in Fig. 3A, the tube 6 can be pulled to beyond the elastic deformation to permanently elongate the tube 6. At maximum elongation before damaging tube 6, the fiber should be stretched, restricting further elongation. Hereby, the fiber protects the tube 6 from being damaged due to elongation.

[0075] In an alternative embodiment, only a single section of the tube 6 is elongated by pulling the tube 6. Hereby, the remaining section will be shorter and pulled thin and long, leaving short and thick section.

[0076] 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 is not limited to the exact order stated herein, unless expressly stated otherwise.

[0077] 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.

[0078] 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 "somme" refers to one or more.

[0079] Accordingly, the scope should be judged in terms of the claims that follow.

List of reference numerals

[0080]

2	Tube assembly
4	Receiver
6	Tube
8	Connector
10	Pin
12	Distal end
14	Tube wall
16	Separation wall
18	Litze wire
20	Cable
22	Metal wire
24	Shapeable material
25	Portion
26	Portion
28	Ultraviolet light
30	Lamp
32	Hearing aid
34	Ear
36	Dome
38	Ear canal
40	Wire and fiber assembly
42	Central portion
44	Distal portion
I	Section
II	Section
R	Radius of curvature

Claims

1. A hearing aid tube assembly comprising a tube provided with a connector in a first end of the tube and a receiver provided in the opposite second end, said connector being configured to be connected to a behind-the-ear or receiver-in-the-ear type hearing aid, wherein the tube is configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user, **wherein** the tube is configured to be brought into a form stable configuration by applying heating and/or light.

2. A hearing aid tube assembly according to claim 1, wherein tube comprises a first portion and a second portion that is stiffer than the first portion.

3. A hearing aid tube assembly according to claim 2, wherein the first portion is a central portion and the second is a distal portionthat is stiffer than the central portion.

4. A hearing aid tube assembly according to claim 3, wherein the distal portion is the distal portion, in which the connector is provided.

5. A hearing aid tube assembly according to one of the preceding claims, wherein the tube comprises a first section and a second section separated by a separation wall, wherein the first section comprises a first substance and the second section comprises a second substance that begins to harden when mixed with the first substance.

6. A hearing aid tube assembly according to one of the preceding claims, wherein one or more metal wires are provided in the tube and extend along at least a portion of the tube.

7. A hearing aid tube assembly according to claim 6, wherein the one or more metal wires extend along the entire length of the tube.

8. A hearing aid tube assembly according to claim 6, wherein the one or more metal wires extend along the entire length of the tube.

9. A hearing aid tube assembly according to claim 8, wherein at least a portion of the one or more metal wires constitute a wire and fiber assembly configured to be arranged in:

- a first configuration, in which first configuration the wire and fiber assembly is compacted and
- a second configuration, in which second configuration the wire and fiber assembly is elongated compared to the first configuration,

Wherein the tube comprises a permanently extendable structure surrounding one or more metal wires.

10. A hearing aid tube assembly according to claim 8, wherein the tube comprises a minor portion separated from a major portion of the tube, wherein the one or more metal wires are arranged in the minor portion and wherein the major portion comprises a shapeable material, said shapeable material is configured to hardened by using heat and/or light.

11. A hearing aid tube assembly according to one of the preceding claims, wherein the tube comprises a light sensitive substance.

12. A hearing aid tube assembly according to one of the preceding claims, wherein the tube is at least partly made of a (polymorph) material that can be formed and reformed multiple times.

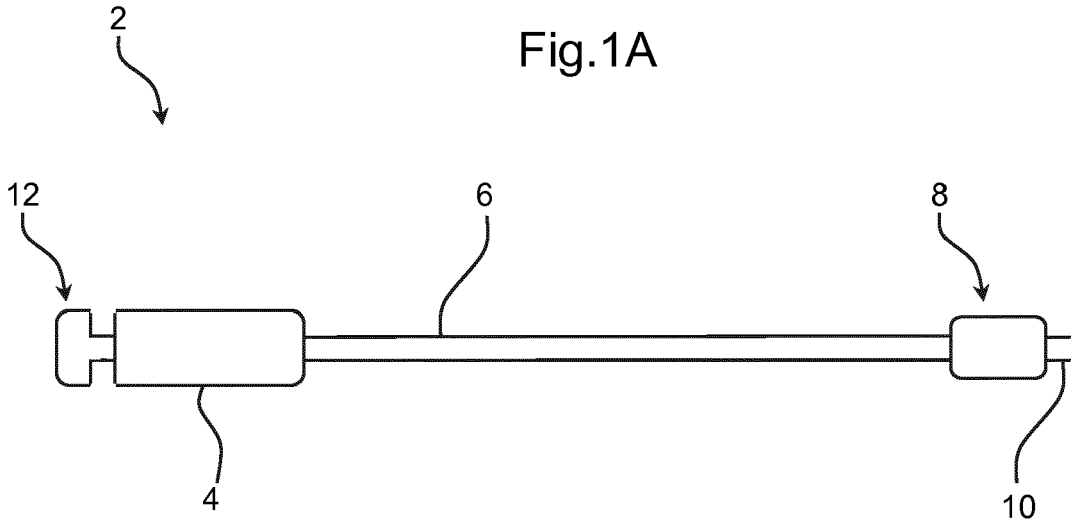
13. A hearing aid tube assembly according to claim 12, wherein the material has a melting point below 90°C.

14. A method for making a hearing aid tube assembly comprising a tube provided with a connector in a first end of the tube and a receiver provided in the opposite second end, said connector being configured to be connected to a behind-the-ear or receiver-in-the-ear type hearing aid, wherein the method comprises the step of providing a tube being configured to be permanently elongated and be shaped to fit the geometry of the ear of a hearing aid user, wherein the tube is configured to me brought into a form stable configuration by applying heating and/or light.

15. A method according to claim 14, wherein the method comprises the following steps:

- connecting the connector to the hearing aid;
- arranging the receiver in the ear canal of a hearing aid user;
- arranging and shaping the tube to fit the geometry of the ear;
- applying heat and/or light to harden the tube.

Fig.1A



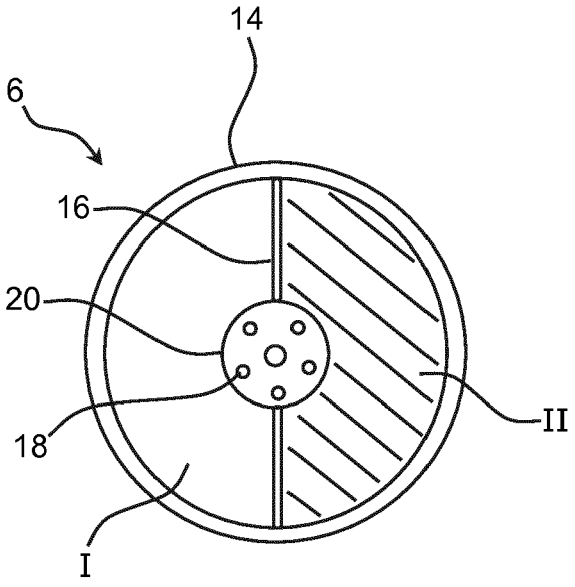


Fig.1B

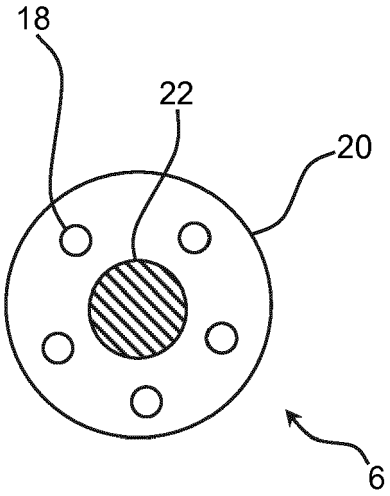


Fig. 2A

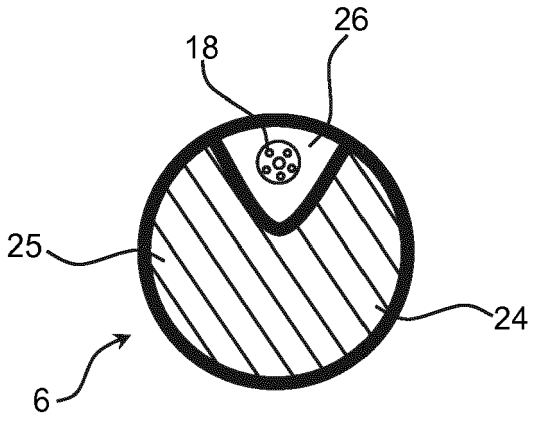


Fig. 2B

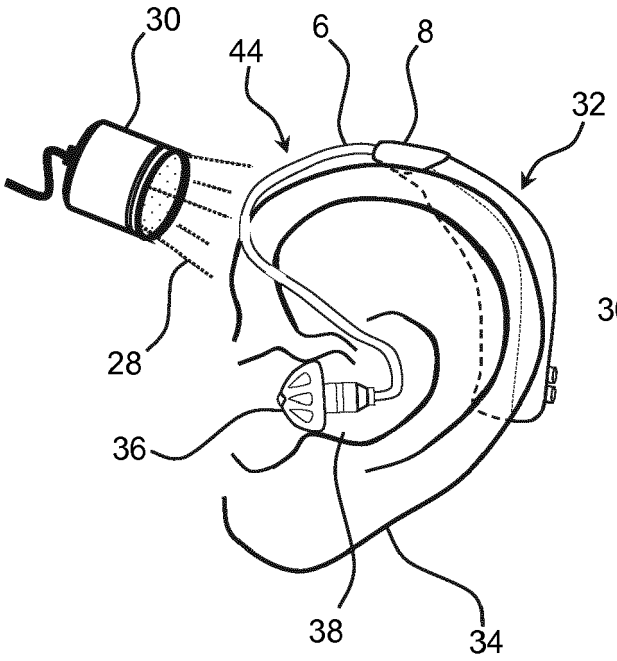


Fig. 2C

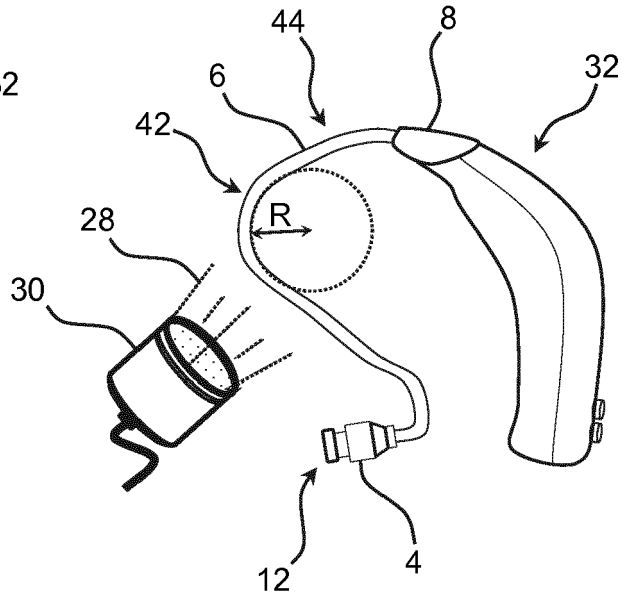


Fig. 2D

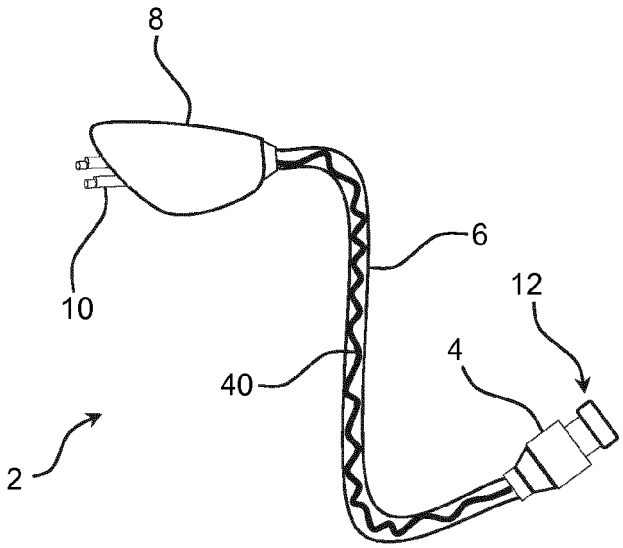


Fig. 3A

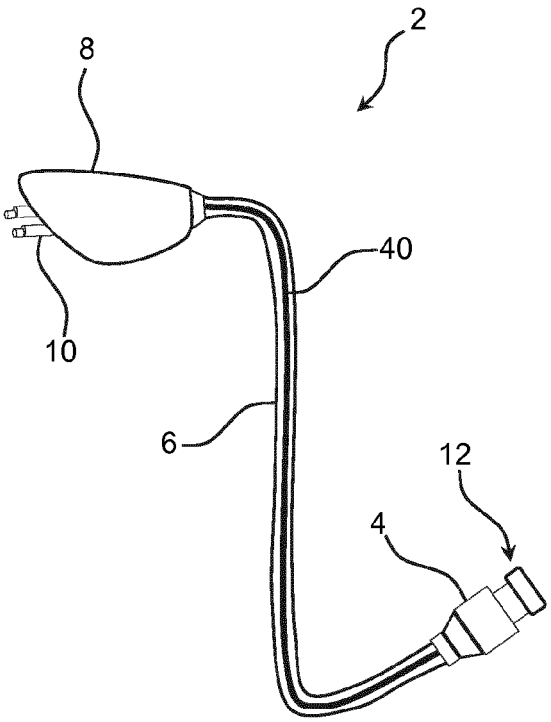


Fig. 3B

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EUROPEAN SEARCH REPORT

Application Number
EP 18 15 3906

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	13 June 2018	Mendoza Lopez, Jorge

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