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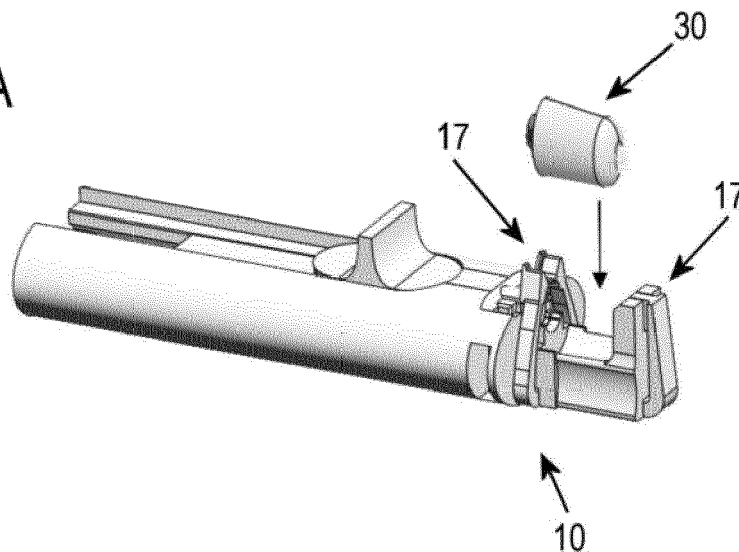
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(54) **TOOL FOR CHANGING CONSUMABLES OF A HEARING AID**

(57) A tool for changing consumables of a hearing aid is disclosed. The hearing aid has a modular design including a disposable first module and a reusable second module. The tool comprises a base and a carrier unit. The base has an engaging mechanism, a separating mechanism and a base receptacle. The engaging mechanism is configured to be engaged to and released from the second module. The movable separating mechanism is coupled to the engaging mechanism and is configured to separate the first and the second module from each other and to join the first and the second module together.

The base receptacle is configured to accommodate the separated second module. The carrier unit is detachably attachable to the base. The carrier unit has a carrier receptacle and a fixing mechanism. The carrier receptacle is configured to accommodate the hearing aid. The fixing mechanism is configured to releasably fix the first module in the carrier receptacle. In an attached state of the carrier unit, the base receptacle and the carrier receptacle are intercommunicated by a path being configured to allow the second module to move between the carrier receptacle and the base receptacle.

FIG. 1A



Description

FIELD

[0001] The present disclosure relates to a tool for changing consumables of a hearing aid, and to a hearing device. More particularly, the disclosure relates to a tool for changing consumables of a hearing aid, wherein the hearing aid has a modular design including a disposable first module and a reusable second module, and to a hearing device comprising the tool and the hearing aid.

BACKGROUND

[0002] A hearing aid, which is intended for being completely worn in the external acoustic meatus ((external ear canal) is very small. Small hearing aids are In-the-Canal (ITC)/ Completely-in-Canal (CIC) type hearing aids, and particularly Deep-in-Canal hearing aids. The latter are completely inserted in the innermost part of the external ear canal (the bony part of the ear canal) where the skin is very thin and the canal opening is surrounded by osseous tissue (bone tissue) instead of cartilaginous tissue. Deep-in-Canal hearing aids have the smallest dimensions of all mentioned types of hearing aids.

[0003] In order to improve the usability, the hearing aid is designed in a way that it is built from two modules. One (the first) module must be replaced by the end user (user) on a regular basis, in order to make the complete hearing aid work. This module comprises a battery, a dome, a microphone filter and a receiver/ loudspeaker/ speaker filter (from now on also called the battery module). The battery is one example of a consumable of the hearing device. The other (the second) module is reused. This module comprises a microphone, an amplifier, a receiver/ loudspeaker/ speaker and a NL coil (from now on also called the hearing aid module). In a small hearing aid, the modules are even smaller and thus more difficult to handle.

[0004] Due to the very small dimensions of the hearing aid, and particularly its modules, changing the battery is cumbersome. For users with limited psychomotor skills, a proper change might be even impossible. Thus, these users have to rely on external support, which limits their quality of life.

[0005] Even for users with normal psychomotor skills there is a risk of damaging or losing parts of the hearing aid when changing the battery of a small hearing aid.

[0006] Therefore, there is a need to provide a solution that allows for easily and securely changing a battery of a small hearing aid.

SUMMARY

[0007] According to an aspect, a tool for changing consumables of a hearing aid is provided. The hearing aid has a modular design including a disposable first module and a reusable second module. The tool comprises a

base and a carrier unit. The base has an engaging mechanism, a separating mechanism and a base receptacle. The engaging mechanism is configured to be engaged to and released from the second module. The movable separating mechanism is coupled to the engaging mechanism and is configured to separate the first and the second module from each other and to join the first and the second module together. The base receptacle is configured to accommodate the separated second module. The carrier unit is detachably attachable to the base. The carrier unit has a carrier receptacle and a fixing mechanism. The carrier receptacle is configured to accommodate the hearing aid. The fixing mechanism is configured to releasably fix the first module in the carrier receptacle. In an attached state of the carrier unit, the base receptacle and the carrier receptacle are intercommunicated by a path being configured to allow the second module to move between the carrier receptacle and the base receptacle.

[0008] This allows for easily and securely changing a battery of a small hearing aid.

[0009] According to another aspect, a hearing device is provided. The hearing device, comprises the tool according to any of the aspects presented herein, and the hearing aid.

[0010] In other words, the hearing device is a system of at least the tool and the hearing aid.

[0011] Preferably, a tool according to any of the aspects presented herein is provided, which further comprises a locking mechanism being configured to prevent detachment of the carrier unit from the base.

[0012] This allows for releasably fixing the carrier unit to the base so that the tool integrally includes the base and the carrier unit. Thus, losing the carrier unit or the base is prevented. Further, unintentional detachment of the carrier unit from the base during handling of the tool by the user is avoided.

[0013] Preferably, a tool according to any of the aspects presented herein is provided, wherein the separating mechanism is configured to release the locking mechanism while moving to separate the first and the second module from each other.

[0014] This allows for easy handling of the tool. Particularly, the separation of the two modules and the separation of the carrier unit from the base can be done simultaneously by operating only the separating mechanism, i.e., by only one move. This further allows for preventing separation of the carrier unit from the base before the two modules are separated from each other. In other words, the carrier unit is not unlocked from the base until the second module is separated from the first module.

[0015] Preferably, a tool according to any of the aspects presented herein is provided, wherein the separating mechanism is configured to lock the locking mechanism while moving to join the first and the second module together.

[0016] This allows for easy handling of the tool. Particularly, the joining of the two modules and the locking

of the carrier unit to the base can be done simultaneously by operating only the separating mechanism, i.e., by only one move. This further allows for ensuring that the carrier unit is coupled and locked to the base before the two modules are joined together. In other words, the second module is not coupled to the first module until the carrier unit is fixed to the base.

[0017] Preferably, a tool according to any of the aspects presented herein is provided, wherein a separating direction of the first and the second module and a detaching direction of the carrier unit from the base differ from each other preferably in that the directions are opposite or perpendicular to each other.

[0018] This allows for separating the detachment of the carrier unit from the base and the detachment of the two modules from each other. Particularly, this ensures that the two modules are not unintentionally separated from each other when removing the carrier unit from the base. On the other hand, it ensures that the carrier unit is not unintentionally detached from the base when separating the two modules. This is because forces in two different directions have to be exerted in order to separate the carrier unit from the base and to separate the two modules from each other. The separating direction and the detaching direction are not limited to linear directions. In other words, the movement, which is necessary to perform the separation of the two modules can be a rotation or a combination of a linear movement and a rotating movement. Similarly, the movement, which is necessary to perform the separation of the carrier unit from the base can be a rotation or a combination of a linear movement and a rotating movement. The type of movements in the separating direction and the detaching direction can be different from each other.

[0019] Preferably, a tool according to any of the aspects presented herein is provided, wherein one of the base and the carrier unit comprises a guide hole and the other of the base and the carrier unit comprises a protrusion being configured to engage the guide hole.

[0020] This allows for easily providing the locking mechanism having a simple structure. Depending on the orientation of the guide hole, which is preferably a groove, the detaching direction of the carrier unit from the base can be easily determined.

[0021] Preferably, a tool according to any of the aspects presented herein is provided, wherein the separating mechanism is a slide mechanism being configured to slide in the longitudinal direction of the base.

[0022] This allows for easily providing the separating mechanism having a simple structure. The sliding direction corresponds to the separating direction of the first and second module.

[0023] Preferably, a tool according to any of the aspects presented herein is provided, wherein the separating mechanism is a rotating mechanism.

[0024] This allows for easily providing the separating mechanism having a simple structure. The rotating direction corresponds to the separating direction of the first

and second module.

[0025] Preferably, a tool according to any of the aspects presented herein is provided, wherein the fixing mechanism comprises an elastically deformable clamp and/or catch.

[0026] This allows for easily providing the fixing mechanism having a simple structure. The hearing aid, and particularly its first module can be easily fixed in and released from the carrier unit by exerting a compressive and a tensile force, respectively, using only one hand.

[0027] Preferably, a hearing device according to any of the aspects presented herein is provided, wherein the hearing aid is a completely-in-the-ear type hearing aid, preferably a deep-in-the-ear type hearing aid.

[0028] This allows for obtaining invisibility of the hearing aid. It further allows for better comfort when wearing the hearing aid as compared to a hearing aid, which is not (completely) inserted into the ear canal. Additionally, it allows for wearing the hearing aid during activities, such as sports, which other types of hearing aids do not permit.

[0029] Preferably, a hearing device according to any of the aspects presented herein is provided, wherein the disposable first module of the hearing aid comprises the consumable, preferably being a battery, a shell, a microphone filter, a receiver filter, and a fixing portion. The reusable second module of the hearing aid comprises a microphone, an amplifier, a speaker, an NL coil, and an engaging portion. The engaging mechanism of the tool is configured to releasably engage the engaging portion of the hearing aid. The fixing mechanism of the tool is configured to releasably fix the fixing portion of the hearing aid.

[0030] This allows for providing a hearing aid having a simply structured disposable module, which is preferably constituted by cheap (mechanical) components. On the other hand, the module, which is preferably constituted by expensive (electronic) components, can be reused. The lifespan of the reusable module can be (unlimitedly) prolonged by replacing the defective or consumed disposable module with a fresh disposable module. The modular structure of the hearing aid allows for easy and fast exchange of the consumables of the hearing aid. Due to the modular structure, the user can execute the exchange without being dependent on external support. The engaging mechanism of the tool and the engaging portion of the hearing aid can be magnetic and/or mechanical components. A magnetic coupling between the tool and the hearing aid allows for simply coupling the tool and the hearing aid without the necessity of bringing the engaging mechanism of the tool exactly in position relative to the corresponding engaging portion of the hearing aid. In other words, it is sufficient to bring the engaging mechanism of the tool only roughly in the vicinity of the engaging portion of the hearing aid so that the magnetic attractive force between the couplings ensures the proper connection. This allows for a simple structure of the tool. A mechanical coupling between the tool and the hearing aid provides a constant functionality

over time. Moreover, it generally allows for exerting a higher tensile force in case of separating the first and the second module. Additionally, a mechanical coupling does not impair other magnetic devices, such as magnetic strips of cards, e.g., when being worn in the same bag or pocket of the user. The mechanical coupling is particularly suitable for rotating the hearing aid.

[0031] Preferably, a hearing device according to any of the aspects presented herein is provided, wherein the second module has smaller external dimensions than the first module. The path, by which the base receptacle and the carrier receptacle are intercommunicated, is a passage having inner dimensions being larger than the external dimensions of the second module and smaller than the external dimensions of the first module.

[0032] This allows for inserting the second module into the first module. This further allows for easily separating the modules by employing a simple structure of the tool. In particular, the outer periphery of the passage serves as a stop of the (linear or rotational) movement of the larger first module, while the smaller second module can pass through the passage.

[0033] Preferably, a hearing device according to any of the aspects presented herein is provided, wherein the hearing aid comprises a coupling being configured to releasably couple the first module and the second module.

[0034] This allows for ensuring that the modules are not unintentionally disconnected from each other. The coupling can be a magnetic and/or a mechanical coupling. The magnetic and the mechanical coupling allow for the same effects as described above in conjunction with the magnetic and the mechanical couplings. The mechanical coupling can comprise, e.g., a bayonet joint or a biased snap-fit element.

[0035] Preferably, a hearing device according to any of the aspects presented herein is provided, wherein the second module is less mechanically flexible than the first module.

[0036] This allows for improving the separation and joining operations of the modules.

BRIEF DESCRIPTION OF DRAWINGS

[0037] 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 effects will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

Figure 1A illustrates a hearing device comprising a

tool and a hearing aid according to an embodiment of the disclosure, wherein the hearing aid is inserted into a carrier unit of the tool;

Figure 1B illustrates the hearing device according to the embodiment of the disclosure shown in Figure 1A, wherein the hearing aid is inserted into a carrier unit of the tool and fixed therein;

Figure 1C illustrates the hearing device according to the embodiment of the disclosure shown in Figures 1A and 1B, wherein the second module is engaged to the engaging mechanism of the tool and the separating mechanism of the tool has been moved to separate the second module from the first module; Figure 1D illustrates the hearing device according to the embodiment of the disclosure shown in Figures 1A to 1C, wherein the carrier unit has been unlocked from the base of the tool and is separated from the base while the second module remains in the base receptacle and the first module remains in the carrier receptacle;

Figure 2A illustrates the hearing device according to the embodiment of the disclosure shown in Figures 1A to 1D, wherein the carrier unit is joined to the base again, while carrying a new first module;

Figure 2B illustrates the hearing device according to the embodiment of the disclosure shown in Figures 1A to 1D and 2A, wherein the carrier unit is joined and locked to the base again, and the engaging mechanism is moved to a position, in which the second module is inserted into the new first module;

Figure 2C illustrates the hearing device according to the embodiment of the disclosure shown in Figures 1A to 1D, Figure 2A and Figure 2B, wherein the hearing aid is removed from the carrier unit of the tool; and Figure 3 illustrates the modular structure of the hearing aid according to an embodiment of the disclosure.

DETAILED DESCRIPTION

[0038] 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.

[0039] A hearing device according to the disclosure includes a hearing aid having a modular structure and a tool for changing consumables of the hearing aid. 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. Such audible signals may be provided in the form of an acoustic signal radiated into the user's outer

ear.

[0040] The hearing aid is adapted to be worn in any known way. This may In-the-Canal (ITC)/ Completely-in-Canal (CIC) type hearing aids.

[0041] In general, a hearing aid 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 aid 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.

[0042] 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 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 speaker/ loudspeaker/ receiver for providing an air-borne acoustic signal.

[0043] The disclosure relates to a tool for changing the consumables on a hearing aid with a modular design. The purpose of this disclosure is to make a tool which enables easy replacement of the disposable module. To make the battery module change as easy as possible a dedicated tool for this purpose has been developed.

[0044] Now referring to Figures 1A to 1D, which illustrate the removal of the disposable module 31 from the reusable module 32 of the hearing aid 30. Figures 1A to 1D and 2A to 2C also show the structure of the tool 10. The tool 10 has a base 11 and a carrier unit 15, which is detachably attached to the base 11. The base 11 according to the present embodiment is an elongated body having a base receptacle 13, which is a groove extending in the longitudinal direction of the base 11. In the groove, a separating mechanism 12 is accommodated and is slidable in the longitudinal direction of the base 11. The sliding direction of the separating mechanism 12 constitutes the separating direction X of the disposable and the reusable module 31, 32. The separating direction X is parallel to the extension/ longitudinal direction of the base 11 in the present embodiment.

[0045] The base 11 further has an engaging mechanism (not shown), which can releasably engage the reusable module 32 of the hearing aid 30. The engaging mechanism is coupled to the separating mechanism 12. The separating mechanism 12 disconnects the reusable module 32 from the disposable module 31 when being

moved in the separating direction X while the reusable module 32 is attached to the engaging mechanism. On the other hand, the separating mechanism 12 connects the reusable module 32 and the disposable module 31 when being moved in the direction opposite to the separating direction X (negative X direction) while the reusable module 32 is attached to or at least pushed by the engaging mechanism. The separating mechanism 12 has a protrusion to which the user can exert a force for moving the separating mechanism 12.

[0046] The base 11 further has at least one groove 20 being part of a locking mechanism 19 by which the carrier unit 15 and the base 11 can be detachably attached to each other. The groove is formed on an end face of the base 11, and particularly on the end face in the negative X direction. The carrier unit has a corresponding protrusion (not shown), which comes into engagement with the groove 20.

[0047] The base 11 further has a through hole 18 (which could also be a groove), which constitutes a path or passage 23 for the reusable module 32. The reusable module 32 passes through the hole 18 when it is moved in the (negative) X direction to be separated from or inserted into the disposable module 31. The hole 18 and the base receptacle 13 guide the movement of the reusable module 32. The hole 18 is large enough for the reusable module 32 to pass, but smaller than the disposable module. Thus, even without the clamps 21 in the carrier unit 15, the disposable module would abut the (end face of the) base 11 so that the reusable module 32 still could be drawn from the disposable module 31.

[0048] The carrier unit 15 has a carrier receptacle 16 for accommodating the hearing aid 30 and a fixing mechanism 17. The fixing mechanism 17 comprises clamps 21 and a catch 22.

[0049] Figure 1A shows how the entire hearing aid 30 is placed in the battery change tool 10. It is here guided into the carrier receptacle 16 of the carrier unit 15, which correctly connects the hearing aid 30 with the tool 10. The small magnetic and/or mechanical engaging mechanism (not shown) ensures that only the reusable module 32 is connected to the tool 10 and the fixing mechanism 17 ensures that the battery module 31 is connected to the carrier unit 15 (this is done by the arms of the clamps 21 on the side and the catch 22 in front of the carrier unit 15).

[0050] Figure 1B shows a state, in which the entire hearing aid 30 is correctly placed in the tool, specifically in the carrier receptacle 16 of the carrier unit 15. The hearing aid is fixed by the fixing mechanism 17.

[0051] Figure 1C shows how the trigger (the separating mechanism 12) on the tool 10 is pulled backwards, i.e., in the separating direction X. This ensures that the hearing aid module 32 is pulled out of the hearing aid 30 and is safely stored in the tool 10, so the user does not risk losing the expensive hearing aid module 32, as this module is very small.

[0052] Figure 1D shows how the carrier unit 15 includ-

ing the battery module 31 is pulled upwards, i.e., in a detaching direction Y and discarded. The detaching direction Y is perpendicular to the separating direction X in the present embodiment. The detaching direction lies within a plane which is constituted by the contact plane of the base 11, specifically its end face, and the carrier unit 15.

[0053] Now referring to Figures 2A to 2C, which illustrate the insertion of the reusable module 32 into the new disposable module 31 of the hearing aid 30.

[0054] Figure 2A shows how a new battery module 31 including carrier unit 15 is taken and placed in the tool 10. The carrier unit is moved along a direction, which is opposite to the detaching direction, i.e., along a negative Y direction. The protrusion(s) in the carrier unit 15 is/are inserted into the groove(s) 20.

[0055] Figure 2B shows how the trigger (the separating mechanism 12) on the tool 10 is once again pulled forward, i.e., in the negative X direction, and the hearing aid module 32 is placed in the battery module 31. This also secures the carrier unit 15 to the base 11 of the battery change tool 10.

[0056] Figure 2C shows how the user can remove the hearing aid 30 from the carrier unit 15, when the hearing aid module 32 is securely placed in the battery module 31. When the trigger (the separating mechanism 12) is moved forward it is not possible to remove the carrier unit 15 from the base 11 since a part (not shown) locks the carrier unit 15 to the base 11 of the tool 10. In Figure 2C, the microphone filter 34 and the receiver filter 35 are schematically shown.

[0057] Now referring to Figure 3, which shows the modular design of the hearing aid 30. The reusable hearing aid module 32 has a microphone 37 and a speaker 38. The speaker snout 39 protrudes from the hearing aid module 32 in the longitudinal direction of the hearing aid module 32 and supports the insertion of the hearing aid module 32 into the disposable module 31 by guiding the movement of the hearing aid module 32. The battery module 31 has a shell (dome) 33, a battery 36 and a pull-out member 40. The battery 36 is a consumable of the hearing aid 30 in the present embodiment. The hearing aid module 32 can be inserted into the battery module 31 by a linear movement in the longitudinal direction of the hearing aid module 32 and the battery module 31. After being inserted into the battery module 31, the hearing aid module 32 can be secured within the battery module 31 by a coupling (not shown). The hearing aid module 32 is mechanically less flexible than the battery module 31, i.e., has a higher stiffness.

[0058] The above disclosure is not limited to the case in which the reusable module is accommodated in the base and the disposable module is accommodated in the carrier unit, as long as the two modules are accommodated in different parts of the tool, which are separable from each other. In other words, the tool can be configured such that the reusable module is accommodated in the carrier unit and the disposable unit is accommodated

in the base.

[0059] It is intended that the structural features of the devices described above, either in the detailed description and/or in the claims, may be combined with steps of the method, when appropriately substituted by a corresponding process.

[0060] 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 elements 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.

[0061] 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.

[0062] 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.

[0063] Accordingly, the scope should be judged in terms of the claims that follow.

Claims

1. Tool (10) for changing consumables of a hearing aid (30), the hearing aid (30) having a modular design including a disposable first module (31) and a reusable second module (32), the tool (10) comprising

a base (11) having

an engaging mechanism configured to be engaged to and released from the second module (32),
 a movable separating mechanism (12) being coupled to the engaging mechanism and being configured to separate the first and the second module (31, 32) from each other and to join the first and the second module (31, 32) together, and
 a base receptacle (13) configured to accommodate the separated second module (32), and

a carrier unit (15) being detachably attachable to the base (11) and having

a carrier receptacle (16) configured to accommodate the hearing aid (30), and
 a fixing mechanism (17) configured to releasably fix the first module (31) in the carrier receptacle (16),

wherein, in an attached state of the carrier unit (15), the base receptacle (13) and the carrier receptacle (16) are intercommunicated by a path (18) being configured to allow the second module (32) to move between the carrier receptacle (16) and the base receptacle (13).

2. Tool (10) according to claim 1, further comprising a locking mechanism (19) being configured to prevent detachment of the carrier unit (15) from the base (11).
3. Tool (10) according to claim 2, wherein the separating mechanism (12) is configured to release the locking mechanism (19) while moving to separate the first and the second module (31, 32) from each other.
4. Tool (10) according to claim 2 or 3, wherein the separating mechanism (12) is configured to lock the locking mechanism (19) while moving to join the first and the second module (32) together.
5. Tool (10) according to any of the preceding claims, wherein
 a separating direction (X) of the first and the second module (32) and a detaching direction (Y) of the carrier unit (15) from the base (11) differ from each other preferably in that the directions (X, Y) are opposite or perpendicular to each other.
6. Tool (10) according to any of the preceding claims, wherein
 one of the base (11) and the carrier unit (15) comprises a guide hole (20) and the other of the base

(11) and the carrier unit (15) comprises a protrusion being configured to engage the guide hole (20).

7. Tool (10) according to any of the preceding claims, wherein
 the separating mechanism (12) is a slide mechanism being configured to slide in the longitudinal direction (X) of the base (11).
8. Tool (10) according to any of the claims 1 to 6, wherein
 the separating mechanism (12) is a rotating mechanism.
9. Tool (10) according to any of the preceding claims, wherein
 the fixing mechanism (17) comprises an elastically deformable clamp (21) and/or catch (22).
10. Hearing device, comprising
 the tool (10) according to any of the preceding claims, and
 the hearing aid (30).
11. Hearing device according to claim 10, wherein
 the hearing aid (30) is a Completely-in-Canal type hearing aid (30), preferably a Deep-in-Canal type hearing aid (30).
12. Hearing device according to claim 10 or 11, wherein
 the disposable first module (31) of the hearing aid (30) comprises
 the consumable, preferably being a battery (36),
 a shell (33),
 a microphone filter (34),
 a receiver filter (35), and
 a fixing portion, and
 the reusable second module (32) of the hearing aid (30) comprises
 a microphone (37),
 an amplifier,
 a speaker (38),
 an NL coil, and
 an engaging portion, wherein
 the engaging mechanism of the tool (10) is configured to releasably engage the engaging portion of the hearing aid (30), and
 the fixing mechanism (17) of the tool (10) is configured to releasably fix the fixing portion of the hearing aid (30).
13. Hearing device according to any of the claims 10 to 12, wherein
 the second module (32) has smaller external dimen-

sions than the first module (31), and the path (18), by which the base receptacle (13) and the carrier receptacle (16) are intercommunicated, is a passage (23) having inner dimensions being larger than the external dimensions of the second module (32) and smaller than the external dimensions of the first module (31). 5

14. Hearing device according to any of the claims 10 to 13, wherein 10
the hearing aid (30) comprises a coupling being configured to releasably couple the first module (31) and the second module (32).

15. Hearing device according to any of the claims 10 to 14, wherein 15
the second module (32) is less mechanically flexible than the first module (31).

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FIG. 1A

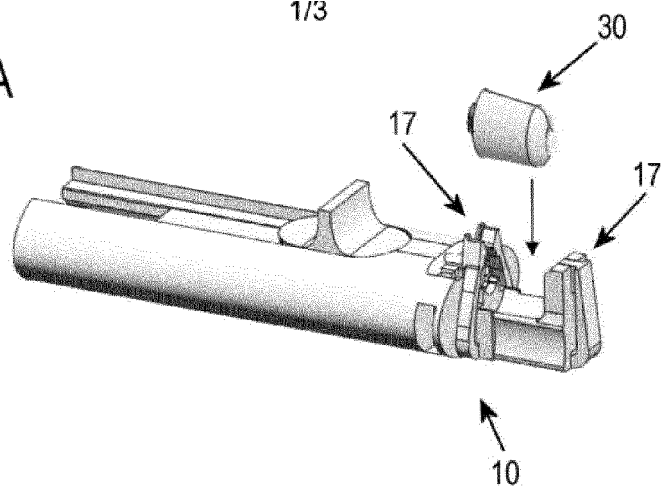


FIG. 1B

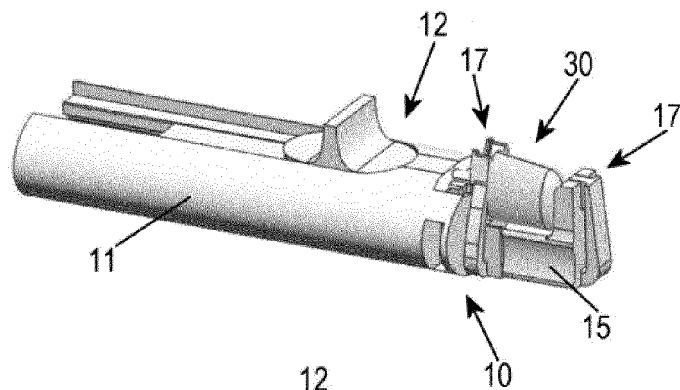


FIG. 1C

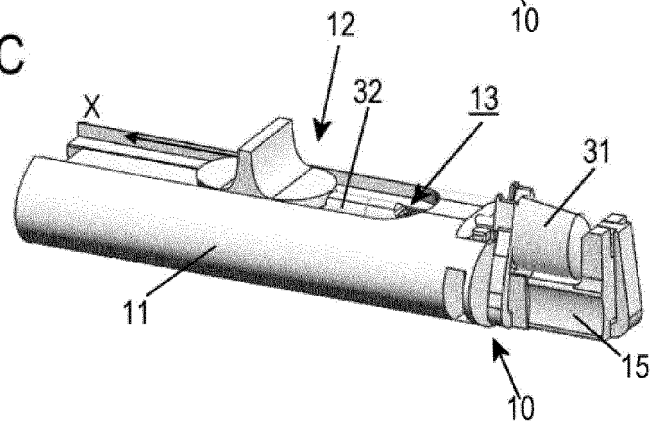


FIG. 1D

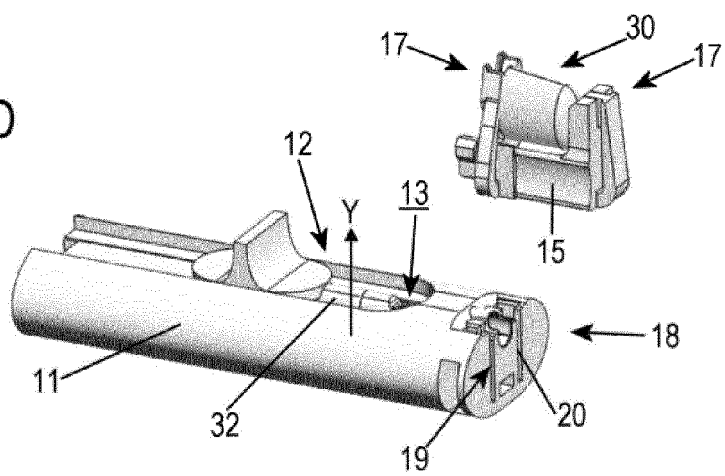


FIG. 2A

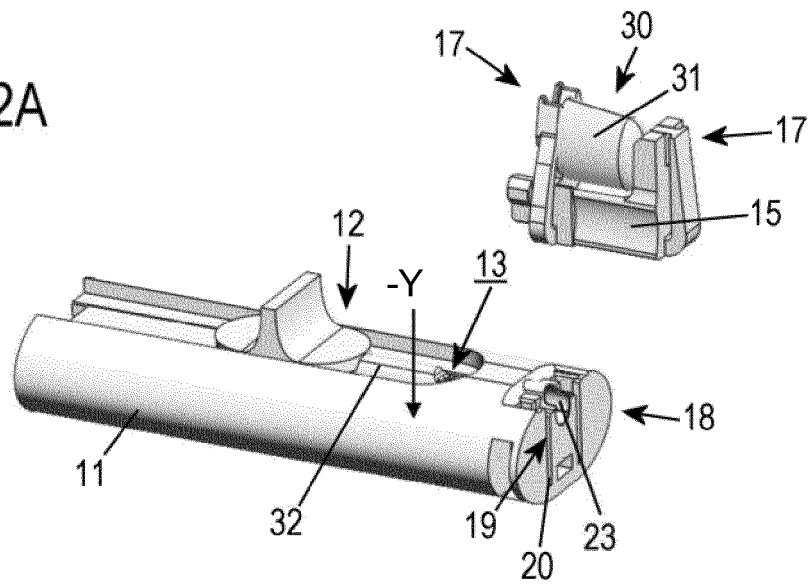


FIG. 2B

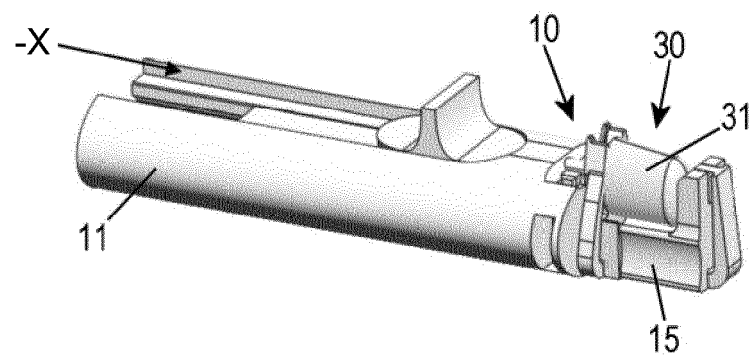


FIG. 2C

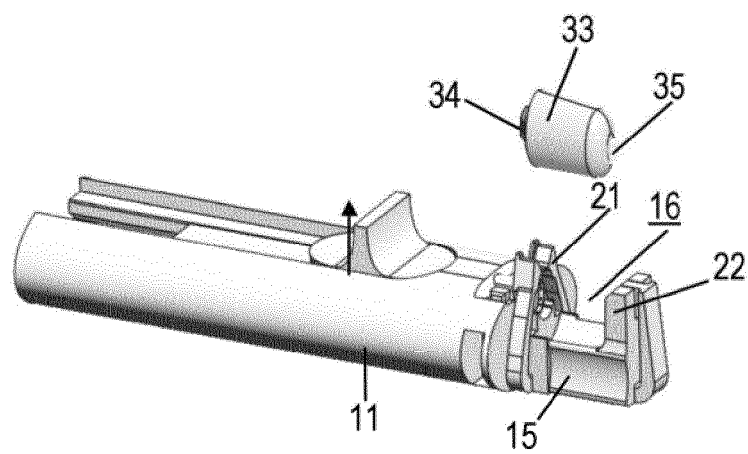
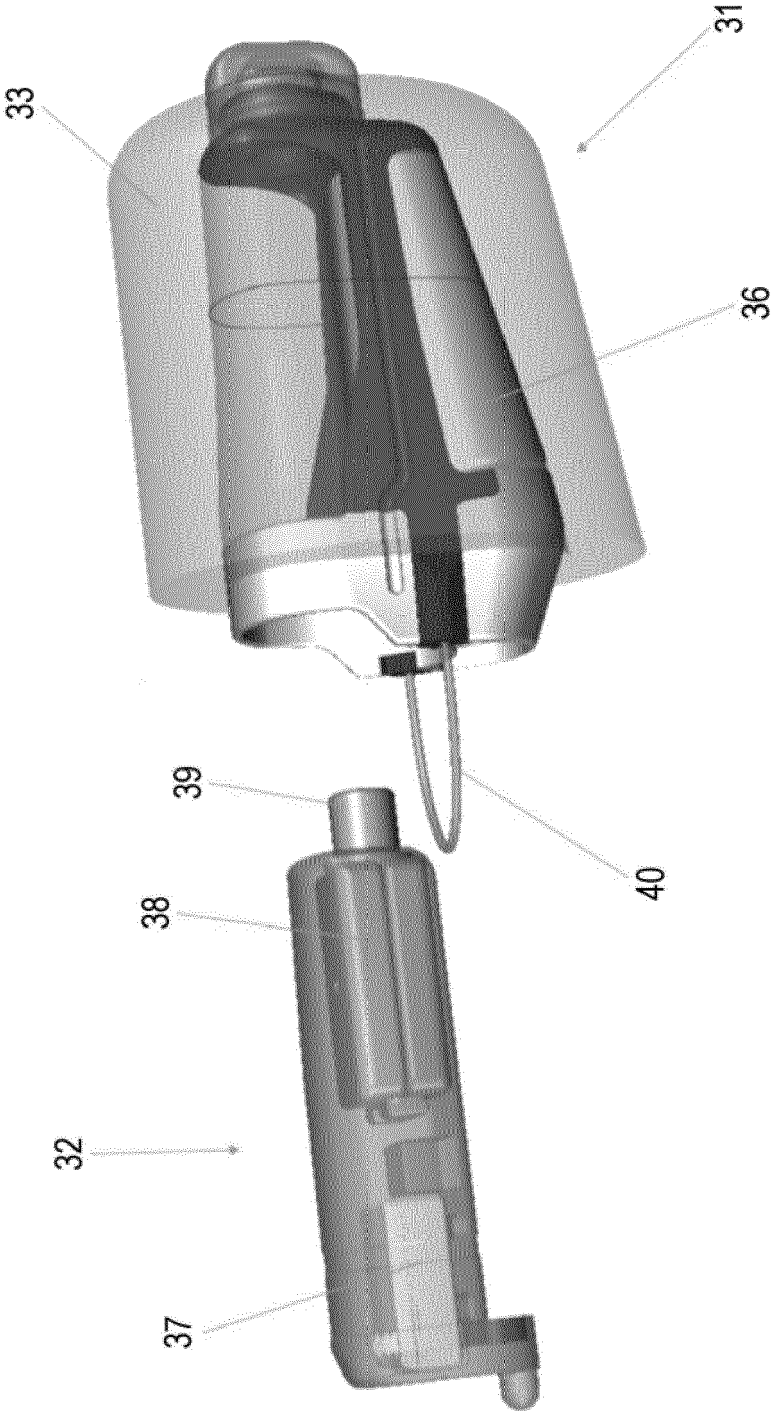


FIG. 3





EUROPEAN SEARCH REPORT

 Application Number
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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)
A	US 2014/254843 A1 (SHENNIB ADNAN [US] ET AL) 11 September 2014 (2014-09-11) * abstract * * paragraph [0026] - paragraph [0047] * * figures 1-13 *	1-15	INV. H04R25/00
A	US 2016/323681 A1 (KIM MYUNG-KYU [KR] ET AL) 3 November 2016 (2016-11-03) * abstract * * paragraph [0041] - paragraph [0070] * * figures 1-5 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			H04R
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 April 2019	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			

 1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 18 20 6174

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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30-04-2019

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2014254843 A1	11-09-2014	NONE	
US 2016323681 A1	03-11-2016	KR 20160128055 A	07-11-2016
		US 2016323681 A1	03-11-2016

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