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(54) **Hearing aid device with a lockable battery compartment and method for manufacturing such a hearing aid device**

(57) A hearing aid device (1) is provided with a lockable battery compartment. The battery door (2) is pivotable relatively to a device body (4) around an axis (5). The battery door (2) can be secured in its closed position by a clamping means (3). The first end (8) of the clamping means (3) snaps into a recess (7) within the battery door

(2). The second end of the clamping means (3) is mounted rotatably on the device body (4). It shares an axis (6) with a rocker element of a volume control (11). The clamping means (3) exerts a closing force on the battery door (2). This contributes to the protection of the device against ingress, for example of water.

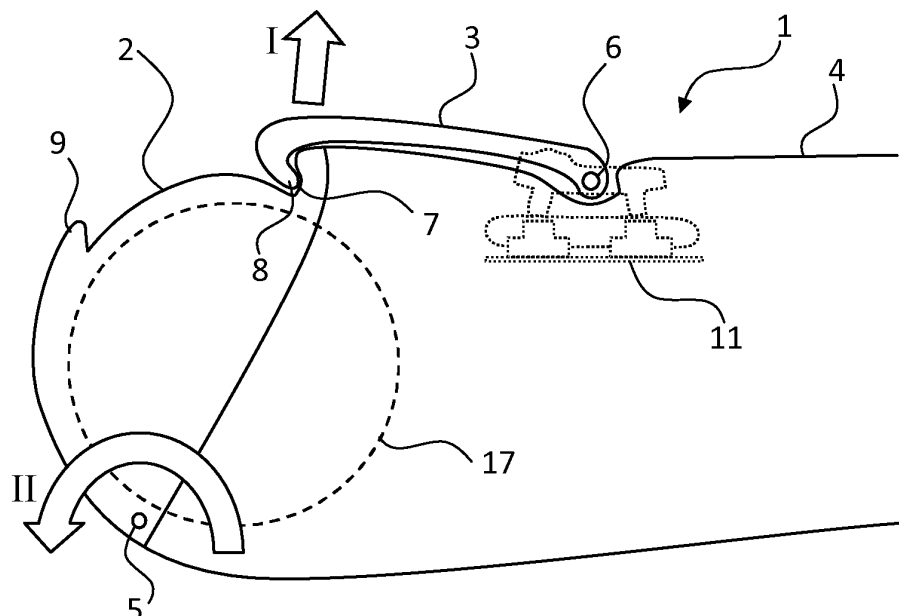


Fig. 1

Description

Technical Field

[0001] The invention relates to the field of hearing aid devices. More particularly, it relates to a hearing aid device according to the preamble of claim 1 and to a method for manufacturing a hearing aid device according to the preamble of claim 13.

Background of the Invention

[0002] A hearing aid device is a device for aiding an individual in regard to its hearing. It may be a hearing prosthesis for compensating a hearing loss, namely a conventional acoustic hearing aid amplifying sound or a cochlear implant electrically stimulating nerve cells. It may also be a hearing protection device which helps individuals to hear without damage in noisy environments. It may also be a tinnitus treatment device. The individual may be an adult, but it may also be an infant or child. Hearing aid devices are nowadays typically powered by a non-rechargeable battery, which has to be replaced on a regular basis. If the user is an infant or mentally handicapped individual, it may be important to lock the battery compartment such that the battery cannot be removed and possibly swallowed. Such hearing aid devices may be referred to as childproof, tamperproof or pediatric. There are numerous ways of locking a battery compartment of a hearing aid device known in the art.

[0003] US 5,386,476 by Bisgaard discloses a locking device for a hearing aid comprising a displaceable pin, which can be maneuvered by means of a tool.

[0004] US 2004 / 062408 A1 by Joergensen discloses a hearing aid battery drawer which is mounted pivotally. The battery drawer comprises side elements for preventing gripping of the battery. A tool is inserted into an aperture for pressing the battery out of the battery drawer.

[0005] US 2005/286732 A1 by Linkenkaer discloses a latching element for child proofing of a hearing aid. It involves additional manipulation to unlatch before opening the battery compartment. The part is interchangeable, so as to provide the battery compartment with a child-proof element for children and with a simple element for elderly people.

[0006] US 2010 / 202644 A1 by Angst discloses a locking mechanism for a hearing aid with does not require a tool. The battery is locked in the compartment instead of preventing opening the compartment itself.

[0007] US 2010 / 260366 A1 by Heerlein discloses a locking mechanism for a hearing aid comprising a slide which can be moved on a shaft to lock and unlock a battery compartment.

[0008] WO 2010 / 151225 A1 by Lim discloses a hearing aid with a battery chamber housing locking mechanism. Locking portions may have complementary shape. Access to the battery may be allowed upon application of an outward force.

[0009] DE 196 01 231 A1 by Schiess discloses a hearing aid with a pivotable battery compartment. There are audio and/or programming contacts. An audio flap is pivotably mounted and covers the contacts in its closed state. It also blocks the battery compartment from being opened. For this, the audio flap comprises a holding lobe which engages with an engagement recess in the battery compartment.

Summary of the Invention

[0010] It is an object of the invention to provide a hearing aid device with a lockable battery compartment with an alternative locking mechanism, which is advantageous in regard to at least one of the following aspects:

- The mechanism should be well to manufacture. It should be in particular implementable with a single additional component which saves time and money.
- The mechanism should be suited for upgrading, i.e. a basic product comes initially without it and can be enhanced later, for example at the point of sale.
- The mechanism should be reliable and should withstand large forces, not only forces as applied during a conventional opening attempt, but also for example shearing forces which may result in a breaking-off of the whole battery door or compartment.
- The mechanism should be easy and intuitive to operate by an adult and at the same time withstand tampering by an infant.
- The mechanism should be suited for operation with a simple, widely available tool such as a ballpoint pen.
- The mechanism should be well suited for implementing a device which is protected against ingress.

[0011] This object is achieved by the hearing aid device as defined in claim 1. Using one axis for both, the clamping means and a user control may save at least one component. This reduces the cost of the device and saves time not only during initial manufacturing, but also during upgrading and servicing since replacement of the clamping means and a moveable user control element can be carried out in a synergic manner by removing only one common axis. Finally this construction opens up the possibility to provide upgradeable hearing aid devices without additional cost and without any visual impairment compared to non-upgradeable hearing aid devices.

[0012] The hearing aid device of claim 2 is advantageous in that unlocking by lifting a component is very intuitive.

[0013] The hearing aid device of claim 3 is advantageous in that snapping a component on or clicking it in

is very intuitive and provides tactile feedback such that the user knows if the component is properly attached. The solution can be implemented without additional fastening components, such that the manufacturing is not expensive. A snap or click-mechanism can be implemented in such a way that unsnapping or -clicking requires such a large force that a tool is necessary for detachment.

[0014] The hearing aid device of claim 4 is advantageous in that a recess in the battery door is inconspicuous and there is substantially no interference with other components. Accordingly, the battery door with the recess can be used for both, non-lockable standard adult hearing aid devices and lockable child-proof hearing aid devices.

[0015] The hearing aid device of claim 5 is advantageous in that such a hearing device with protection against ingress can be reliable and well to manufacture.

[0016] The hearing aid device of claim 6 is advantageous in that a blind hole as opposed to a through hole does not provide a passage for ingress.

[0017] The hearing aid device of claim 7 is advantageous in that a seal may protect against ingress and may provide the battery door with an elastic pivoting behavior, such that it opens slightly by itself once the locking mechanism is unlocked. An elastic pivoting behavior may also be useful in regard to certain snap-in mechanisms.

[0018] The hearing aid device of claim 8 is advantageous in that application of a closing force, even if the battery compartment is already closed, opens up the possibility to implement a device which is protected against ingress. The clamping means does not only hold the battery door in place, but also pushes it against the device body. This solution provides a good child-safeness, because the device is more flexible and it is less likely that a component is broken off.

[0019] The hearing aid device of claim 9 is advantageous in that designing the locking mechanism for operation with a tool opens up the possibility to make it more user friendly, to make it smaller and to put into effect a higher force limit in regard to the unlocking. The latter further improves the child-safeness and allows the fulfillment of requirements of standards.

[0020] The hearing aid device of claim 10 is advantageous in that a rocker switch is very intuitive to operate and well suited for any kind of up/down adjustment.

[0021] The hearing aid device of claim 11 is advantageous in that providing a moveable user control element which is protected against accidental operation and/or which requires a tool is a good compromise between having a tamper-exposed user control and removing or disabling the user control completely. In case of a hearing aid device for a child the parents may have an interest to be able to adjust the volume, while it should not be changed by the child. Finally, this feature may come almost for free since the moveable user control element may have to be replaced for mounting the clamping means anyway.

[0022] The hearing aid device of claim 12 is advantageous in that making the clamping means expandable by a curved shape opens up the possibility to use harder materials which are per se substantially not expandable, as for example metal.

[0023] It is a further object of the invention to provide a method for manufacturing a hearing aid device with a lockable battery compartment, which is cost and time efficient and fulfills well the needs of the customers.

[0024] This object is achieved by the method as defined in claim 13. This aspect of the invention is advantageous in that the possibility of converting a basic hearing aid device into a hearing aid device with a lockable battery compartment reduces the number of devices a sales agent has to have in stock. The modification or upgrading can be carried out after the device has left the factory and even after the device has been sold and used, for example when a customer returns to the sales agent reporting dissatisfaction.

[0025] The method for manufacturing of claim 14 is advantageous in that a replacing of the moveable user control element can be carried out together with the mounting of the clamping means in a synergic manner. Two tamperproof features, namely a tamperproof user control and a tamperproof battery compartment, can be installed at once. This allows to save time and money.

[0026] The method for manufacturing of claim 15 is advantageous in that a replacing of battery door opens up the possibility to provide the basic hearing aid device with a battery door not having any provisions for a locking mechanism.

[0027] Further embodiments and advantages of the invention are described with reference to the attached drawings.

Brief Description of the Drawings

[0028] Below, the invention is described in more detail by referring to the drawings showing exemplified embodiments.

Fig. 1 is a schematic, partial side view of a behind-the-ear hearing aid with a lockable battery compartment;

Fig. 2 is a schematic sectional side view of the volume control shown in Fig. 1;

Fig. 3 is a schematic sectional top view of the volume control shown in Fig. 1;

Fig. 4 is a partial schematic side view of a locking mechanism according to the invention while it is being unlocked with a ballpoint pen;

Fig. 5 is a partial schematic front view of the locking mechanism shown in Fig. 4.

[0029] The described embodiments are meant as examples and shall not confine the invention.

Detailed Description of the Invention

[0030] Fig. 1 is a schematic, partial side view of a behind-the-ear hearing aid 1 with a lockable battery compartment in a locked condition. It's an exemplary embodiment of the invention. A battery door 2, or more precisely a battery compartment door, is pivotable relative to a device body 4 around a pivotable-element-axis 5. The battery door 2 is shown in a closed position, in which removal of a battery 17 is prevented. It can be pivoted to an open position for removing the battery 17. A grip 9 may be provided to facilitate the opening, however it should not be too large to avoid exposure to tampering forces. The battery door 2 is preferably flush with the casing of the device body 4 for the same reason.

[0031] There is a locking mechanism for locking the battery door 2 in the closed position. The locking mechanism comprises a clip or clamping means 3 designed for clamping the battery door 2 to the device body 4. The clamping means 3 is arranged on the back of the hearing aid 1.

[0032] A first end of the clamping means 3 is attached in a detachable manner to the battery door 2. It has been snapped onto and/or clicked into the battery door 2 and engages with it. For unlocking the first end of the clamping means 3 is lifted away from the battery door 2, as indicated by arrow I. Afterwards the battery compartment can be opened by pivoting the battery door 2, as indicated by arrow II. The battery door 2 comprises a dent or recess 7 and the first end of the clamping means 3 comprises a protrusion or hook 8 designed for engaging with the recess 7. The recess 7 is on the surface only, i.e. it is preferably a blind hole, i.e. not a through hole. This is essential if the device should be protected against ingress.

[0033] A second end of the clamping means 3 is attached rotatably to the device body 4 in a during normal use permanent manner. The clamping means 3 is mounted on the clamping-means-axis 6 and can be released by removing the axis, for example when it is worn and needs to be replaced by a new part. Such a replacement may be carried out by an audiologist and is, as opposed to locking and unlocking, not regarded as "normal use". The clamping-means-axis 6 is part of, or supported by, the device body 4. The clamping-means-axis 6 also serves as an axis for a moveable user control element, in particular a rocker element of a volume control 11.

[0034] Preferably, the hook 8 does not only engage with recess 7, but applies also a force to it in the direction towards the clamping-means-axis 6. The force presses the battery door 2 against the device body 4. The force may preferably be at least 1 Newton, at least 2 Newton or at least 5 Newton. Larger forces may be better for devices which are to be protected against ingress. These devices may have a rubber seal at the junction between battery door 2 and device body 4. The clamping means

3 presses the battery door 2 onto the casing of the device body 4 thereby improving the effectiveness of the seal. For the sake of completeness it should be mentioned that the seal is not only compressed by the force exerted by the clamping means but also by forces in relation to the pivotable-element-axis 5.

[0035] The pivotable-element-axis 5 is substantially at a second end of the battery door 2 and the first end of the clamping means 3 is attached to the battery door 2 substantially at a first end of the battery door 2, which is substantially opposite to the second end of the battery door 2. The battery door 2 may be dismounted by a professional by removing the pivotable-element-axis 5. Such a dismounting is not regarded as "normal use". A replacement of the battery door 2 may be necessary for example if the recess 7 is worn and/or does not properly match the mounted clamping means 3. A replacement may also be carried out for switching from an element without recess to one with, or vice versa. It may also be desirable to mount an element without a grip 9 or with a smaller and/or less tamper-prone grip. A device may be upgraded to one being protected against ingress by mounting a battery door having the above mentioned seal and/or the not through-going recess 7. Finally, it is also possible to replace the battery door 2 by one having an additional circuitry, as for example a wireless audio receiver and/or transmitter for connection with FM systems, companion microphones, cellphones, audio players, Bluetooth devices and/or the like.

[0036] Fig. 2 and Fig. 3 are schematic views of the volume control 11 of Fig. 1. A sectional side view is shown in Fig. 2. A top view is shown in Fig. 3. The volume control 11 is implemented as a rocker switch. The clamping-means-axis 6 serves also as a rocker-element-axis. The moveable switch or rocker element 14 is sunk-in such a way that accidental operation during normal use of the hearing aid is unlikely. Operation of the rocker element 14 is substantially only possible with a tool, in particular a ballpoint pen. The rocker element 14 may be provided with circular indentations 15 for the tool to engage with. The actual electric "down" button 12 and "up" button 13 may be under a protector 16. The operation surface area for "down" is sunk-in in respect to the clamping means 3, while the operation surface area for "up" is sunk-in in respect to the casing of the device body 4. "Operation surface area" denominates here the part of the rocker element which is touched by a tool or by hand during the operation of the user control. In the shown example these areas correspond substantially with the circular indentations 15. The clamping means 3 has the shape of a two-pronged fork, surrounds the "down"-part of the rocker element 14 and is mounted on the clamping-means-axis 6 on both sides of the rocker element 14. The clamping-means-axis 6 is mounted in holes or bores of the casing of the hearing device body 4. For reasons of ingress protection, the holes are preferably designed and arranged such that they do not provide a leakage passage along the axis from the outside to the inside of the casing. This

is the case if both ends of through holes lead to the outside. The electric buttons 12 and 13 are preferably arranged at the inside of the casing. The protector 16 may be made from flexible silicone and provide an ingress-protected transmission of switching forces from the outside of the casing to the inside of the casing.

[0037] Fig. 4 and 5 are partial sectional schematic views of a locking mechanism according to the invention. Fig. 4 is a side view, also showing a tool. Fig. 5 is a front view without a tool. The exemplary tool is a ballpoint pen 18. The locking mechanism comprises a fissure or opening 10 designed such that inserting the tool into it causes the first end of the clamping means 3 to lift away from the battery door 2. Eventually, hook 8 will snap out of recess 7. The clamping means 3 may be temporarily expanded and/or deformed in this process. The device body 4, the battery door 2 and the clamping means 3 have substantially a common symmetry plane. This allows to use the device without modification with on either side, right or left. It also provides best protection against breaking forces applied from the side. However, user control and clamping means may also be arranged at the side, or further towards the side, of the hearing aid facing away from the wearers body.

[0038] Even though, in the above described examples, the hearing aid device is a behind-the-ear hearing aid, the invention may also be applied to other devices, as for example in-the-ear hearing aids or the external part of an cochlear implant. As already indicated, the invention is especially well suited for devices which are protected against ingress.

[0039] This document mentions several times that the device may be "protected" against "ingress". It is to be noted, that such a robustness or protection has a certain extent, i.e. it may provide different protection levels and may cover different sets of substances. The substances may, for example, be solid matter, such as dust, and/or liquids or vapors of liquids, such as water, oil or sweat. The level of protection may be for example, in regard to water, splashing water, immersion for 30 minutes up to one meter or up to two meters. The device may be actually functioning under such a condition, or it may simply withstand such a condition without permanent damage. The most typical example of an ingress protection is what is commonly referred to as "waterproof", "watertight" or "water resistant". Other examples are "dustproof" and "liquidproof". More detailed specifications of ingress protections are provided by so called IP codes (Ingress Protection Rating) of the international standard IEC 60529, such as IP44 and in particular IP54 which is fulfilled by a subgroup of embodiments of the invention. According to the standard, protection against touching with a finger is also a form of ingress protection.

[0040] For a preferred embodiment of the invention a substantial protection against ingress of liquids and/or dust is required.

[0041] "Substantial protection against ingress of liquids" is herewith defined by withstanding an immersion

in water, without movement, for one minute at a depth of 15 cm without permanent damage.

[0042] "Substantial protection against ingress of dust" is herewith defined by withstanding spherical particles having a diameter of more than 25 μm .

[0043] The objective is typically not a maximum protection, but a well-balanced tradeoff between protection and protection cost, such as manufacturing effort and size, conspicuousness and usability restraints of the device. The invention opens up multiple constructive options for implementing a good tradeoff.

[0044] The battery door may simple be a cover element closing an entrance to the battery compartment. However, the battery door may also comprise a battery holder, such that the battery is pivoted out of the battery compartment when the battery door is opened. The battery door may comprise openings as long as it blocks sufficiently the battery removal path.

[0045] Even though the invention has primarily the objective to prevent tampering with the battery, it can also prevent tampering with the on/off state of the device. This is the case, when the on/off switch is integrated with the battery compartment. The device may be switched off by opening the battery compartment at least partially. Accordingly, parents can be sure that the device of their child stays switched on, if they have secured the battery door of the battery compartment with the clamping means.

[0046] Even though in the above described examples the first end of the clamping means comprises a hook which snaps into a recess of the battery door other ways of engagement are possible. There are, among others, the following options, which may also be combined:

- The end comprises a hook which snaps into a recess or hole;
- The end comprises a recess, loop or hole for engaging with a hook;
- The end comprises a slub which engages with a gap or fork;
- The end is removably attached by any kind of form-fit.

[0047] Even though in the above described examples, the second end of the clamping means is mounted rotatably on the clamping-means-axis, it may also be mounted fixedly, e.g. by some engagement or form-fit with the device body. However, in this case the clamping means should be sufficiently flexible.

[0048] The clamping means may be implemented as an elastic plastic or rubber part being somewhat expandable, thereby having a variable length independent of its shape, even if it is completely straight. However, the clamping means may also have, at least in an unlocked state of the locking mechanism, a curved or bend shape and it may be elastically bendable, such that its length

can be increased by a straightening. Such a design is in particular suitable for implementation using a metal part. Metal is by its nature elastically bendable but substantially not expandable unless it has a special shape, as for example of a spiral or bow.

[0049] Even though, in the above described examples, the battery door of the battery compartment is pivotable around an axis, it may also be held on its second end by some kind of hook, such that it may come off completely once the clamping means has been detached.

[0050] The user control in the above described examples is a volume control implemented as a rocker switch. The term "rocker switch" in the present document is hereby defined as any kind of switch having a pivotable element mounted on an axis and having a switching function assigned to each of the two pivoting directions. Accordingly, the pivotable element may also be or comprise a mechanical lever or handle. There may be further user controls and/or the described control may have a different function. In particular the rocker switch may instead of a volume control also be a program control or a generic up/down control, the function of which can be assigned by an audiologist programmatically or during normal use by the user, for example by a separate mode select button. The shared axis may not only be an axis of a rocker switch, but may also be an axis of a push button, for example a toggle button or a mode select button, or an axis of a control wheel. The control wheel may be implemented with a potentiometer and/or with some kind of sensor(s) and/or switch(es) for detecting positive and/or negative rotation. It may allow endless rotation or it may have a restricted rotation range, in particular with physical stop means. It may serve as a volume control, in particular combined with an on/off switching function which comes into play when the volume is adjusted below quiet or silent.

[0051] The hearing aid device may also be provided with a programming socket for connecting a programming cable as for example known from the NOAHlink™ hearing aid programming system. Such a programming socket is substantially only used during fitting. It may be arranged within the battery compartment or somewhere on the hearing aid device body. In the latter case, it is preferably closed by a programming socket cover during normal everyday use of the hearing aid. It can also be implemented in an ingress protected manner, for example by having an O-ring seal. Such a cover may be rotatably mounted on the same axis as the moveable user control element and the clamping means, provided that the socket is at a suitable position close to the user control. The clamping means and the programming socket cover may also be implemented as a single part, provided that the socket is between the user control and the battery door.

[0052] According to the IEC 60601-2-66 standard a hearing aid device for infants under 36 months must withstand forces of 10 Newton, i.e. about one Kilogram. With regard to the battery compartment this means that it must

withstand such forces applied to any point and in any direction. This does not include forces applied onto a tool, but it does include for example:

- 5 • A pivoting or opening force applied to the battery door or a grip on it. The closing force of the locking mechanism is therefore preferably at least 10 Newton and/or increases significantly once the battery door is moved.
- 10 • A force applied from a lateral direction onto the battery door, which may result in a breaking off or shearing away of the battery door.
- 15 • A force necessary to lift or unsnap the first end of the clamping means away from the battery door. A force applied to a tool used in such a lifting may be much smaller than 10 Newton due to leverage effects. However, the force necessary for lifting or un-
- 20 snapping the clamping means may also be smaller than 10 Newton, if the clamping means is sufficiently flush with the battery door, or if the mechanism is sufficiently small, such it is unlikely that a lifting force will ever be applied without a tool.

[0053] A hearing aid device with a lockable battery compartment can be manufactured by modifying a basic hearing aid device which may come without a lockable battery compartment. Such an upgrading or modification may be performed after the basic hearing aid device has left the factory, for example by an audiologist at the point of sale. It is to be regarded as an "additional manufacturing step" or "servicing action" and not as a "normal use". The additional manufacturing step may be in particular carried out after at least one of the following has occurred:

- 30 • The basic hearing aid device has been transported, e.g. by a road vehicle, from the factory to an audiologist at a remote location, which is at least in another building or at least 1 km away from the factory;
- 40 • The basic hearing aid device has been stored at the remote location for at least one week or until the need of an individual for such a modified hearing aid device has been identified;
- 45 • The basic hearing aid device has been fitted to an individual and/or has been used by the individual;
- 50 • It was determined whether the modified hearing aid device will be worn on the left or on the right side;
- 55 • It was determined that a prospective user of the modified hearing aid device is a candidate for a tamper-proof and/or ingress protected device.

[0054] The basic hearing aid device should have at

least mounting means for a switch-axis. The switch-axis does, after the modification, also serve as a clamping-means-axis. The switch-axis may be already mounted or may come as a separate part. The mounting means may, for example, be holes in the casing of the device body. Typically, the basic hearing aid device will have a complete volume control rocker switch for manual operation. Accordingly, the basic moveable user control element is a rocker element and is, just as the switch axis, already mounted. However, the basic hearing aid device may also come with no user control and/or no moveable user control element at all.

[0055] The modification may comprise the step of replacing the basic moveable user control element by an alternative moveable user control element. At least the alternative moveable user control element uses only part of the axis, such that the clamping means can be mounted on the same axis sharing it with the moveable user control element. The modification will typically include the step of removing the axis, replacing the movable user control element, putting the clamping means in place and reinserting the axis. Removing the axis will typically require a special tool such that it is not likely that such an operation would be accidentally carried out during normal use.

[0056] The step of replacing the moveable user control element may also be omitted by providing the hearing aid device from the beginning with a moveable user control element, which leaves part of the axis accessible for mounting of the clamping means.

[0057] Instead of mounting a tamperproof, sunk-in moveable user control element, it is also possible to disable the user control by the fitting software. In this case the operability, by hand or using a tool, is irrelevant. It is also possible to define a special unlock pattern, which a child is unlikely to perform and with is unlikely occur accidentally.

[0058] In summary, the person carrying out the additional manufacturing step may be provided, in addition to the basic hearing aid device, with a kit of parts. This kit may comprise multiple versions of the battery door, in particular versions with and without engagement means for the clamping means, with and without a grip and with and without additional circuitry. This kit may further comprise multiple versions of the moveable user control element or rocker element, in particular versions for manual operation and for operation with a tool as well as versions sharing the axis and versions using substantially the full axis. The kit may further comprise multiple versions of the clamping means, in particular versions sharing an axis and versions using substantially a full axis as well as versions made from different materials. The kit may further comprise multiple versions of a programming socket cover, in particular versions using different portions of the common axis and versions designed for serving or not serving as a clamping means. The kit may further comprise various replacement axes. The objective of the additional manufacturing steps may be pro-

tection against tampering, protection against ingress or both.

[0059] Any parts being mounted during the additional manufacturing step may be provided with a side identification. These parts may include for example the battery door, the moveable user control element, the clamping means and the programming socket cover. There may, for example, be a blue and a red version of the clamping means, a red clamping means indicating "to be worn at the right side" and a blue one indicating "to be worn on the left side". Such a side identification is advantageous because it can be mounted without additional manufacturing effort. Such an effort would be required for mounting special side identification pins.

[0060] The hearing aid device according to the invention may be advantageously provided with further tamper- or child-proofing measures and also further ingress protection measures. Any detachable parts are preferably lockable such that they cannot be accidentally detached, as for example a connection hook for a soundtube or an FM receiver. Further, as already mentioned, any user controls should be disabled or should be designed such that they can only be operated with a tool or after performing some kind of physical and/or logical unlocking action.

Claims

1. A hearing aid device (1) with a battery compartment (2, 5, 9), said battery compartment (2, 5, 9) comprising a battery door (2) which is pivotable relative to a device body (4) of said hearing aid device (1), said hearing aid device (1) comprising a locking mechanism (3, 6, 7, 8, 10) for locking said battery door (2) in a closed position, said locking mechanism (3, 6, 7, 8, 10) comprising a clamping means (3) designed for clamping said battery door (2) to said device body (4), wherein said clamping means (3) is designed for detachably engaging with said battery door (2) and wherein said clamping means (3) is mounted on a clamping-means-axis (6), which clamping-means-axis (6) is part of, or supported by, said device body (4), **characterized in that** said clamping-means-axis (6) also serves as an axis of a moveable user control element (14).
2. The hearing aid device (1) of claim 1, wherein said locking mechanism (3, 6, 7, 8, 10) is designed such that it can be unlocked by lifting said clamping means (3) away from said battery door (2).
3. The hearing aid device (1) of claim 2, wherein said locking mechanism (3, 6, 7, 8, 10) is designed such that said clamping means (3) can be snapped onto and/or clicked into said battery door (2).
4. The hearing aid device (1) of one of the claims 2 or

- 3, wherein said battery door (2) comprises a recess (7) and said clamping means (3) comprises a protrusion or hook designed for engaging with said recess (7).
5. The hearing aid device (1) of one of the preceding claims, wherein said hearing aid device (1) is substantially protected against ingress of liquids and/or ingress of dust. 5
6. The hearing aid device (1) of claims 4 and 5, wherein said recess (7) is a blind hole. 10
7. The hearing aid device (1) of one of the claims 5 or 6 comprising a seal which seals a junction between said battery door (2) and said device body (4). 15
8. The hearing aid device (1) of one of the preceding claims, wherein, in a locked state of said locking mechanism (3, 6, 7, 8, 10), said clamping means (3) presses said battery door (2) against said device body (4) with a force of at least 1 Newton. 20
9. The hearing aid device (1) of one of the preceding claims and claim 2, wherein said locking mechanism (3, 6, 7, 8, 10) comprises a fissure or opening (10) designed such that inserting a tool (18) into it causes said locking mechanism (3, 6, 7, 8, 10) to unlock, in particular by lifting with said tool (18) said clamping means (3) away from said battery door (2). 25 30
10. The hearing aid device (1) of one of the preceding claims, wherein, said moveable user control element (14) is a rocker element of a rocker switch. 35
11. The hearing aid device (1) of one of the preceding claims, wherein operation surface areas (15) of said moveable user control element (14) are sunk-in such a way that accidental operation during normal use of the hearing aid device (1) is substantially impossible and/or that operation of said moveable user control element (14) is substantially only possible with a tool (18). 40
12. The hearing aid device (1) of one of the preceding claims, wherein said clamping means (3) is elastically bendable and has, at least in an unlocked state of said locking mechanism (3, 6, 7, 8, 10), a curved shape, such that its length can be increased by a straightening. 45 50
13. A method for manufacturing the hearing aid device (1) of one of the preceding claims, said method being **characterized by** the steps of: 55
- A) Manufacturing a basic hearing aid device, which basic hearing aid device comprises mounting means for a user-control-axis, and providing said user-control-axis either mounted or as a separate part;
- B) Turning said basic hearing aid device into said hearing aid device (1) by performing at least the modification step of mounting said clamping means (3) on said user-control-axis.
14. The method of claim 13, further comprising the modification step of replacing a basic moveable user control element by said moveable user control element (14).
15. The method of one of the claims 13 or 14, further comprising the modification step of replacing a basic battery door by said battery door (14).

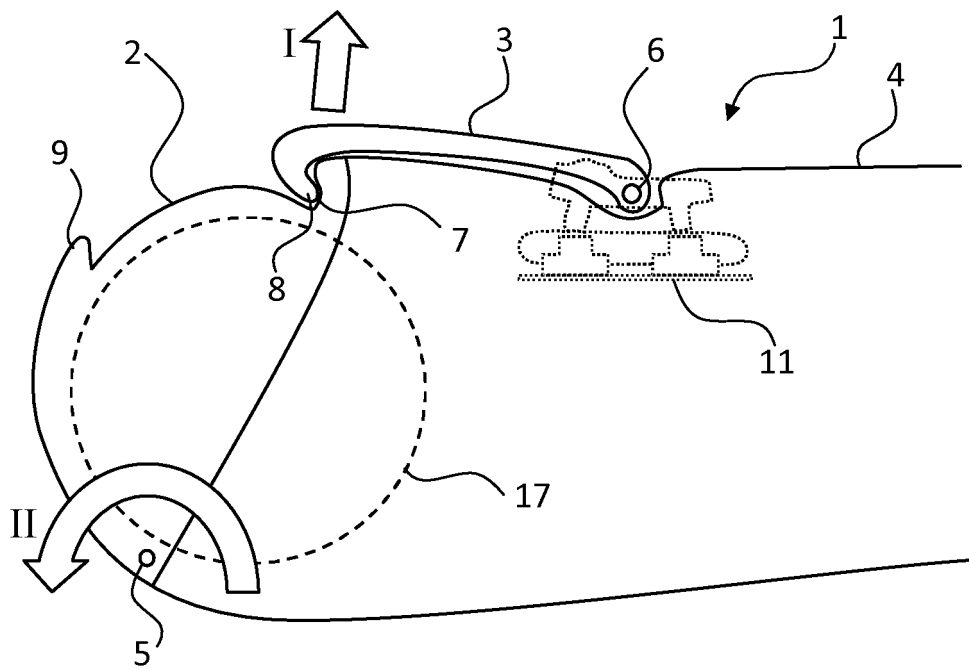


Fig. 1

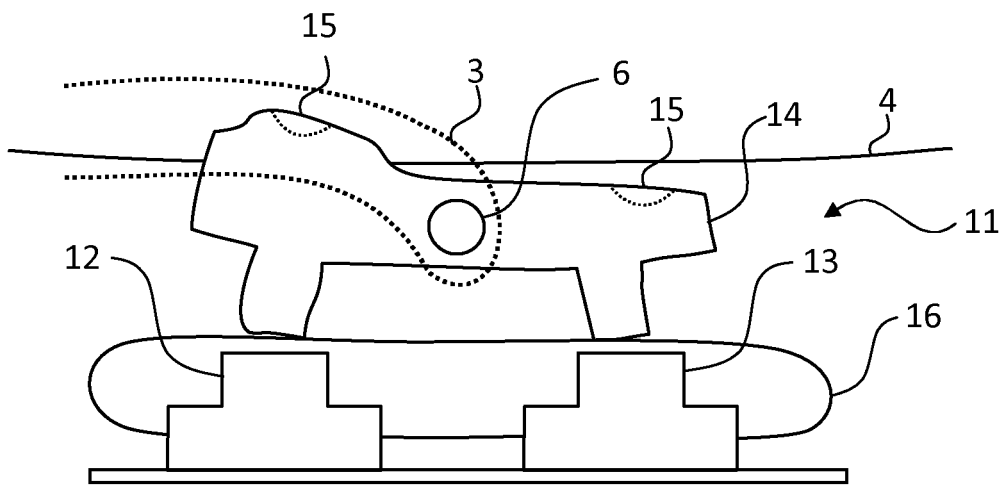


Fig. 2

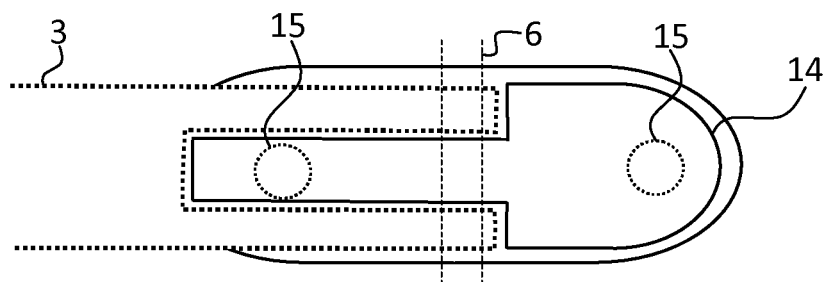


Fig. 3

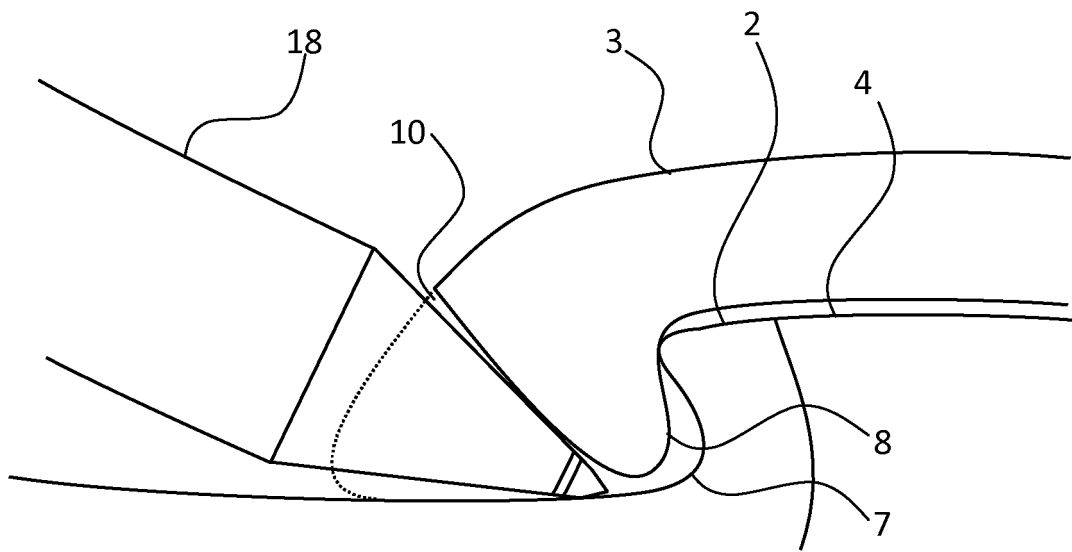


Fig. 4

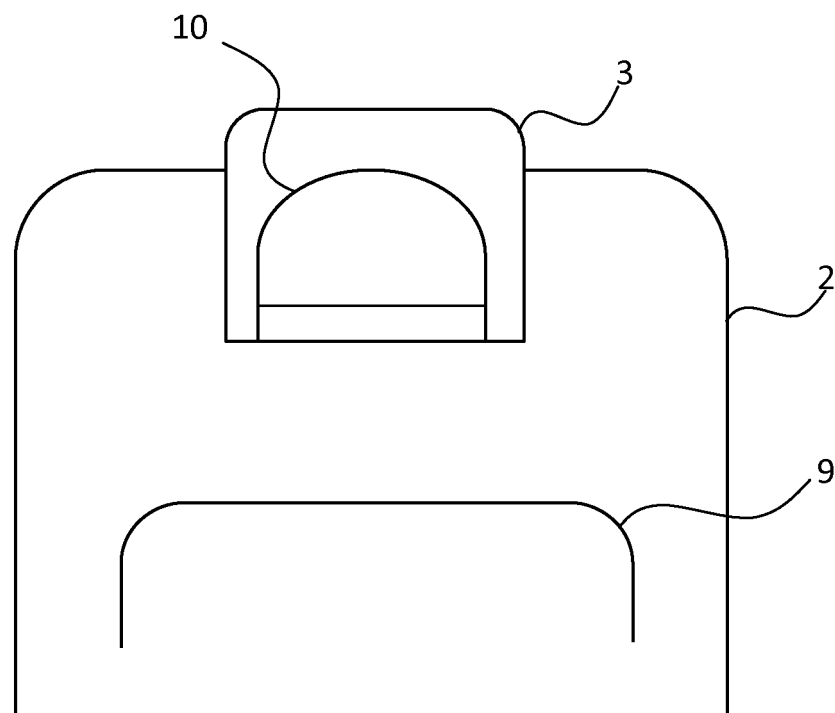


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 12 18 6447

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Y	* abstract * * page 6, line 7 - line 15 * * page 7, line 7 - line 28 * * page 8, line 20 - line 24 * * page 9, line 16 - line 25 * * figures 5,6,8,23 *	5,7,9	
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			H04R
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 19 February 2013	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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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The members are as contained in the European Patent Office EDP file on
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19-02-2013

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