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(54) **HEARING AID WITH AN IMPROVED SWITCH ASSEMBLY**

(57) A hearing device is disclosed, which comprises an improved switch assembly. In more detail, the hearing aid comprises a switch incorporated in a part of the hearing aid, wherein the switch comprises a switch base which is connected to a substrate in the hearing aid, an activation plate configured in connection with said switch base, and a dome arranged in between the activation plate and a protection membrane, wherein the dome and protection membrane is configured to be integrated into each other.

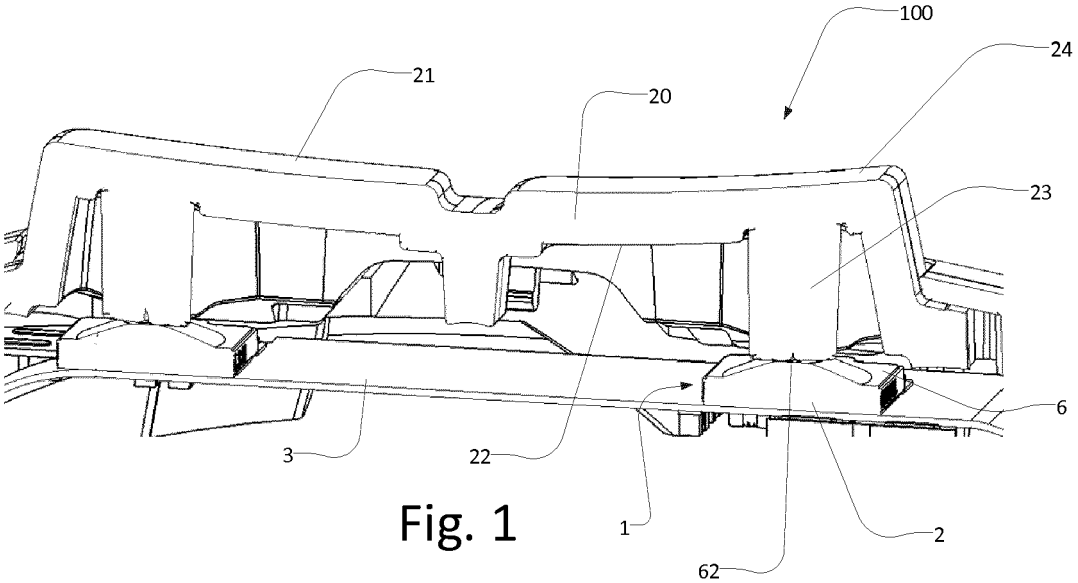

Fig. 1

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Description

FIELD

[0001] The present disclosure relates to hearing aids having one or more switches for activating and/or controlling for example a volume of the hearing aid, and/or switching between programs in a hearing aid. More particularly, the disclosure relates to an improved switch configuration having an integrated dome.

BACKGROUND

[0002] Hearing aids generally comprises a button, which may be used for controlling a setup of the hearing aids, such as a program setting and/or to control a volume of the hearing aid. Such buttons for controlling a hearing aid setup, generally comprises a switch having a switch plate, an activation plate and a push-button at the outer surface of the hearing aid, wherein applying a pressure to the push-button, ensures that a contact is made between a membrane of switch and the activation plate, whereby a control of a setup in the hearing aid is enabled.

[0003] Such switch, enabling a push-button to control a hearing aid, are prone to wear and tear, and if an internal part of the switch, which ensure that a pressure can be transmitted from the push-button via the membrane to an activation plate and which is normally connected to the activation plate, starts to disconnect from the activation plate, the function of the switch decreases rapidly.

[0004] In existing switches for at least some hearing aids, this may happen if the membrane between the push-button and the activation plate starts to disengage from the switch base. This may cause the internal part, such as a dome, which are arranged between the membrane and the activation plate to loosen from the activation plate, whereby the internal part starts moving around inside the switch assembly. Consequently, the transmission of the push applied to the push-button from the user during activation of the switch gets degraded, and the activation plate, which in normal situation would bend, and close electrical circuits is no longer functional.

[0005] Therefore, there is a need to provide an improved switch solution that addresses at least some of the above-mentioned problems. The present disclosure provides at least an alternative to and improvement of existing switch solutions for hearing aids, on the market.

SUMMARY

[0006] Accordingly, the present disclosure provides an improved switch assembly used in hearing aids. The hearing aid comprises a switch incorporated in a part of the hearing aid, wherein the switch comprises a switch base which is connected to a substrate in the hearing aid, an activation plate configured in connection with said switch base, and a dome arranged in between the activation plate and a protection membrane, wherein the dome is configured as an integrated part of said protection membrane. By making the protection membrane and the dome as one part, wherein the dome is integrated into the material of the protection membrane it is ensured that the dome is always positioned in a pre-defined position in relation to the protection membrane and the activation plate. Furthermore, it is ensured, that the dome cannot disengage and/or loosen from the protection membrane and thus, will stay in place in the pre-defined position upon assembly of the switch. Thus, the problems of degraded functionality of known switches, due to movement of the dome within the switch assembly is avoided.

[0007] In an embodiment, the switch is configured as part of a push-button of the hearing aid, wherein the push-button upon activation of the switch configures the hearing aid to be switched between one or more modes of operation and/or wherein the switch is configured as part of a volume control switch. Thus, in one embodiment, the switch is configured to be arranged beneath a push-button configuration of a hearing aid, thus forming an internal part of the hearing aid, wherein the push-button forms a part of the outer surface of the hearing aid. Upon applying a pushing force by a user to the push-button, the push-button is arranged in connection with the switch assembly, to activate the switch.

[0008] In an embodiment, the protection membrane is made from a elastomeric material, such as silicone or rubber, ensuring a flexibility of the switch, allowing the push-button to apply a pressure to the protection membrane which forces the dome towards the activation plate of the switch.

[0009] In a further embodiment, the dome is made from silicone and configured to be integrated into said protection membrane. By providing the dome in a silicone material easy integration into the protection membrane may be achieved. Furthermore, the silicone material allows a flexibility of the dome ensuring that the switch is easily compressed via the push-button. It should be noted that the dome could similar be integrated in to the protection membrane with a harder material than a silicone material. This could allow a "harder" switch assembly, which could transfer a pressure more directly.

[0010] For attached the protection membrane to the switch base, the protection membrane may be connected to the switch base by means of an adhesive or welding. In one embodiment, the adhesive may be provided by a suitable glue which does not easily dissolve due to moisture, dirt or other material meeting the internal parts of the hearing aid.

[0011] In another embodiment, the protection membrane may be configured to be integrated into a sealing cup of the switch assembly. The sealing cup ensures that a firm mechanical fixation of the protection membrane and the integrated dome. Additionally, the sealing cup ensures an improved protection against ingress of humidity or other substances into the protection membrane, which could dissolve any glue material which in one em-

bodiment are used to connect the protection membrane to the switch base.

[0012] In a further embodiment, the sealing cup with the protection membrane is connected to the switch base by means of gluing and/or mechanical snapping. In a preferred embodiment, the sealing cup is mechanically connected to the switch base, allowing a connection which is less likely to loosen from the switch base. The mechanical connection could be made from a snapping, such as provided by a grooves and protrusion on the sealing cup and the switch base, respectively. The attaching means could also include a welding or as previously mentioned a gluing material provided on one or more of the surface of the switch base and/or the sealing cup. In any case, the application of the sealing cup, ensures that the protection membrane and the integrated dome is protected against ingress of humidity and thus the degradation of the switch is decreased.

[0013] In a further embodiment the push-button comprises a first surface configured to be operated by a pushing motion from a user, and a second surface facing internal parts of the hearing aid, wherein the second surface is configured to abut the protection membrane, such that upon applying a force to the first surface of the push-button, said protection membrane is pushed towards said activation plate, where via a force applied to the activation plate from said integrated dome the activation plate and the protection membrane is configured to bend.

[0014] In a preferred embodiment the dome is configured to be incorporated in a center part of said protection membrane. This ensures that the dome may transmit the external forces applied to the protection membrane via the push-button is transferred directly to a center of the activation plate allowing a bending of the activation plate, which as a consequence establishes contact with the switch base and the underlying substrate. Thus, when a contact is established between the activation plate and the switch base, an electronic circuit is closed allowing energy to one or more electronic components which are arranged on the substrate.

[0015] The construction of the switch of the hearing aid is in one embodiment such that the protection membrane comprises a surface base having outer edges and inner edges, wherein from the inner edges a rounded inclination rises towards a top surface, wherein said dome is integrated into the protection membrane at a position below the top surface. It should be noted that the inclination rising from the inner edges could have any other suitable geometric shape, such a triangular or rectangular. In general, the inclination of the protection membrane ensures that a top surface is configured in a distance from the surface base. This top surface is configured to abut a part of the push button of the hearing aid so as to transfer a pressure to the integrated dome in an efficient manner.

[0016] In one embodiment, the protection membrane and the dome are formed from the same silicone material and configured as a single piece. This ensures that the protection membrane and the dome provide a flexible switch parts, which acts as one element, and which do not become disengaged.

[0017] In more detail, in an embodiment configured with a sealing cup, the sealing cup is configured with an undercut, wherein one or more edges of the protection membrane is configured to be arranged within the undercut of the sealing cup.

[0018] In a further embodiment, the sealing cup has an opening through which an inclination of the protection membrane rises from a surface base of the protection membrane to be substantially aligned with a top surface of the sealing cup. It should be noted that in an even further embodiment, the top surface of the protection membrane may also extend higher and/or lower than a top surface of the sealing cup. Especially upon applying a pressure from the push-button, the top surface of the protection membrane will in an embodiment be forced down below the top surface of the sealing cup.

[0019] In an even further embodiment, the hearing aid comprises two switches arranged beneath a push-button of the hearing aid, wherein the two switches are configured to be operated by a pushing motion form a user in a configuration according to any one of claims 1 to 13.

BRIEF DESCRIPTION OF DRAWINGS

[0020] The embodiments of the disclosure may be best understood from the following detailed description taken in conjunction with the accompanying figures. The figures are schematic and simplified for clarity, and they just show details to improve the understanding of the claims, while other details are left out. Throughout, the same reference numerals are used for identical or corresponding parts. The individual features of each embodiments may each be combined with any or all features of the other embodiments. These and other embodiments, features and/or technical effect will be apparent from and elucidated with reference to the illustrations described hereinafter in which:

Figure 1 illustrates a cross-section of a hearing aid, comprising a push-button and a switch assembly in connection with the push-button;

Figure 2 illustrates a top view of a switch according to a first embodiment;

Figure 3 illustrates a cross-sectional side view of a switch according to Figure 2;

Figure 4 illustrates an exploded cross-sectional view of the switch according to Figure 2 and 3;

Figure 5 illustrates a second embodiment of the switch; and

Figure 6 illustrates a cross-sectional view of the switch according to Figure 6.

DETAILED DESCRIPTION

[0021] The detailed description set forth below in connection with the appended drawings is intended as a de-

scription of various configurations. The detailed description includes specific details for the purpose of providing a thorough understanding of various concepts. However, it will be apparent to those skilled in the art that these concepts may be practiced without these specific details. Several aspects of the apparatus are described by various elements and depending upon particular application, design constraints or other reasons, these elements may be implemented using e.g. electronic hardware and mechanical components or a combination thereof.

[0022] 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.

[0023] The hearing device is adapted to be worn in any known way. This may include i) arranging a unit of the hearing device behind the ear with a tube leading air-borne acoustic signals into the ear canal or with a receiver/ loudspeaker arranged close to or in the ear canal such as in a Behind-the-Ear type hearing aid, and/ or ii) arranging the hearing device entirely or partly in the pinna and/ or in the ear canal of the user such as in an In-the-Ear type hearing aid or In-the-Canal/ Completely-in-Canal type hearing aid, or iii) arranging a unit of the hearing device attached to a fixture implanted into the skull bone such as in Bone Anchored Hearing Aid or Cochlear Implant, or iv) arranging a unit of the hearing device as an entirely or partly implanted unit such as in Bone Anchored Hearing Aid or Cochlear Implant.

[0024] A "hearing system" refers to a system comprising one or two hearing devices, and a "binaural hearing system" refers to a system comprising two hearing devices where the devices are adapted to cooperatively provide audible signals to both user's ears. The hearing system or binaural hearing system may further include auxiliary device(s) that communicates with at least one hearing device, the auxiliary device affecting the operation of the hearing devices and/or benefitting from the functioning of the hearing devices. A wired or wireless communication link between the at least one hearing device and the auxiliary device is established that allows for exchanging information (e.g. control and status signals, possibly audio signals) between the at least one hearing device and the auxiliary device. Such auxiliary devices may include at least one of remote controls, remote microphones, audio gateway devices, mobile phones, public-address systems, car audio systems or music players or a combination thereof. The audio gateway is adapted to receive a multitude of audio signals such as from an entertainment device like a TV or a music player, a telephone apparatus like a mobile telephone or a computer, a PC. The audio gateway is further adapted to select and/or combine an appropriate one of the received audio signals (or combination of signals) for transmission to the at least one hearing device. The remote control is adapted to control functionality and operation of the at least one hearing devices. The function of the remote control may be implemented in a SmartPhone or other electronic device, the SmartPhone/ electronic device possibly running an application that controls functionality of the at least one hearing device.

[0025] 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.

[0026] 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 or percutaneously to the skull bone or a vibrator for providing a structure-borne or liquid-borne acoustic signal. In some hearing devices, the output unit may include one or more output electrodes for providing the electric signals such as in a Cochlear Implant.

[0027] Now referring to Figure 1 a push-button 20 of a hearing aid 100 is illustrated in an example. The push-button comprises a first surface 21 configured to be operated by a pushing motion from a user, and a second surface 22 facing internal parts of the hearing aid 100. At least a part 23 of the second surface 22 is configured to abut a protection membrane 6 of a switch 1, such that upon applying a force to the first surface 21 of the push-button 20, the protection membrane 6 is pushed towards an activation plate (not shown), where via a force applied

to the activation plate from an integrated dome (not shown) in the protection membrane 6, the activation plate and the protection membrane 6 is configured to bend.

[0028] As can be seen in figure 1, the switch 1 is configured to have a switch base, which is connected to a substrate 3, such as a printed circuit board of the hearing aid 100. The substrate comprises one or more electronic components which are used to set a program, control a volume or similar mechanism of the hearing aid. Thus, upon applying a pressure to the push-button 20, the switch enables electrical contact between the electronic components and the switch such that control of the hearing aid is enabled. Accordingly, as is described, the switch is configured to interplay with a push-button of the hearing aid, wherein the push-button upon activation of the switch configures the hearing aid to be switched between one or more modes of operation and/or wherein the switch is configured as part of a volume control switch.

[0029] The disclosure is preferably related to a new switch design which improves the life-time of the switch by avoiding a degradation of the elements which causes the switch to function. Thus, as described in the background of the disclosure, a switch is normally configured with a dome which enables the pressure contact between the push-button and an activation plate of the switch. This dome is normally centered on the activation button in order to ensure a direct transfer of the pressure force. However, in existing solutions, this dome easily becomes displaced from the center of the activation plate, which causes a dysfunctional switch.

[0030] Thus, in the following, details of an improved switch assembly which overcomes these and other problems according to this disclosure, will be described. Thus, the switch assembly as described in relation to any one of Figures 2 to 7, should be considered as the switches illustrated in the push-button of Figure 1.

[0031] Referring now to Figure 2 to 4 a first embodiment of a switch will be described. In this embodiment, the switch comprises a switch base 2, which is connected to a substrate (refer to Figure 1) in the hearing aid. The switch 1 furthermore comprises an activation plate 4, configured in connection with the switch base 2. In more detail the activation plate is freely placed on the switch base, thereby permitting electrical connection. A dome 5 is arranged in between the activation plate 4 and a protection membrane 6. As can be seen from Figure 3, the dome 5 is configured as an integrated part of the protection membrane 6, which ensures that the dome cannot disengage from the protection membrane 6 and thus will remain in its position in relation to the activation plate 4 as provided by the integration of the dome 5 into the protection membrane 6. This solves the problems of the existing switches, where humidity of other foreign substances entering the hearing aid would cause the dome to loosen from its position below the protection membrane.

[0032] As can be seen in especially Figures 3 and 4, the dome 5 is configured to be incorporated in a center part 61 of the protection membrane 6. This ensures that the dome 5 via a pressure upon the push-button and therethrough on the protection membrane 6, transfer a direct pressure to the center of the activation plate 4, thereby allowing a bending of the activation plate 4. This ensures that an electrical contact is established between the switch base and the activation plate whereby electronic components of the hearing aids can be controlled. In more detail, as illustrated in Figure 1, upon pushing an outer part 24 of the push-button, an extension part 23 of the push-button which is arranged on top of the switch 1 is activated, and ensures that a pressure is applied to a top surface 62 of the protection membrane 6. Just below the top surface 62, as illustrated in figures 2 to 4, the dome 5 is arranged. Thus, activated of the push-button by a pushing force, transfers energy via the top surface 62 of the protection membrane 6 to the dome 5 and further to the activation plate 4.

[0033] In order to allow the protection membrane 6 to transfer energy via the dome 5 to the activation plate 4, the protection membrane is as illustrated in the Figures configured with a surface base 63 having outer edges 63a, 63b, 63c, 63d and inner edges 64a, 64b, 64d, 64c, wherein from the inner edges 64a, 64b, 64c, 64d a rounded inclination 64 rises towards a top surface 62. It should be noted that the inner edges may be considered as one continuous circular edge. As previously described the dome 5 is integrated into the protection membrane 6 at a position below the top surface 62. By the word rounded, is meant that the general geometrical shape of the inclination is substantially rounded at a transition between the surface base 63 and towards the top surface 62. It could be contemplated that the inclination rises form the surface base 63 of the protection membrane 6 substantially in the shape of a pyramid, where the top of the pyramid is a flat surface. Furthermore, the inclined behavior of the rounded inclination 64 ensures that the protection membrane 6 is able to bend slightly towards the activation plate 4 upon a pressure applied form the push-button, as described above.

[0034] In the embodiments of especially Figures 2 to 4 it should be noted that the protection membrane 6 is configured to be connected to the switch base 2 by means of an adhesive or welding. That is, in an example the protection membrane 6 is glued to the switch base 2, or in an alternative example welded thereto.

[0035] Referring now to Figures 5 and 6 a second embodiment of the switch assembly is illustrated in a top view and from a cross-sectional side view, respectively. Generally speaking the switch comprises all of the elements as mentioned in relation to the Figures 2 to 4 of the first embodiment, however with added elements for providing an improved retaining of the protection membrane 6 on the switch base 2. Thus, it should be understood the like elements of the two embodiments will be given the same reference numerals and only the features which are added in view of this second embodiment, will be discussed in detail.

[0036] Accordingly, as illustrated in Figure 5, the switch 1 comprises a switch base 2 and a protection membrane 6. As described in relation to the first embodiment, the protection membrane comprises a surface base 63 having outer edges 63a, 63b, 63c, 63d and inner edges 64a, 64b, 64d, 64c, wherein from the inner edges 64a, 64b, 64c, 64d a rounded inclination 64 rises towards a top surface 62. It should be noted that the inner edges may be considered as one continuous circular edge.

[0037] The second embodiment is illustrated in more detail in the cross-sectional view of Figure 6. Here it is seen how the protection membrane 6 is arranged in a sealing cup 7. The sealing cup 7 ensures that the durability of the switch is improved, in that the sealing cup 7 ensures an improved stability of the protection membrane 6 and the integrated dome 5 above the center of the activation plate 4. Furthermore, the sealing cup 7 provides a firm mechanical fixation of the protection membrane 6 and at the same time an improved protection against ingress of humidity and other foreign substances. In result, and improved durability in that the protection membrane does not easily loosen from the position above the activation plate.

[0038] In more detail the sealing cup 7, with the protection membrane 6 arranged therein, is connected to the switch base by means of gluing and/or mechanical snapping. Accordingly, in an embodiment, the sealing cup 7 is, as illustrated in Figure 6, configured with an undercut 71, wherein one or more outer edges 63a, 63b, 63c, 63d of the protection membrane 6 is configured to be arranged within the undercut 71 of the sealing cup 7. This ensures that the protection membrane 6 with the integrated dome 5 is configured to stay in place above the activation plate 4 in a center thereof. Thus allowing a more direct energy transfer from the push-force applied from the push-button (see Figure 1), to the activation plate 4.

[0039] In order to allow the push-button part 23 of the second surface 22 of the push-button to abut the protection membrane 6 of the second embodiment of the switch 1, the sealing cup 7 is provided with an opening 72 through which the inclination 64 of the protection membrane 6 rises from the surface base 63 of the protection membrane 6 to be aligned with a top surface 74 of the sealing cup 7. In alternative, however the top surface of the protection membrane may extend higher than a top surface of the sealing cup. In part 23 of the second surface 22 is configured to abut a protection membrane 6 of a switch other words, the opening 72 allows the top surface 62 of the protection membrane 6 to extend freely from the sealing cup 7, such that the part 23 of the push-button may come into contact with the top surface 62 upon a user applying a pushing force to the push-button, as previously described in relation to especially Figure 1.

[0040] The following elements should be understood to form part of both embodiments, and could be combined in any way with any of the embodiments described herein.

[0041] Accordingly, it should be understood that in the embodiments described herein, the protection membrane 6 is made from a silicone material. This allows a flexibility of the switch ensuring that the switch may easily react to a push from the user.

[0042] Furthermore, the dome is similarly made from silicone and configured to be integrated into said protection membrane. Silicone is a preferred choice of material, due to the flexibility and non-sticky surface of a silicone material. However, in an alternative embodiment, the dome could also be made out of rubber or any other elastomeric material.

[0043] In an even further embodiment, the protection membrane 6 and the dome 5, as illustrated in all of the embodiments should be contemplated to be formed from the same silicone material, and configured as a single piece. This ensures that the dome does not become disengaged from the protection membrane due to humidity, moisture or other environmental influences to the switch.

[0044] It should be noted that one or more switches could be implemented into a hearing aid, as described in relation to Figure 1. Thus, it should be contemplated that the hearing aid may comprise two switches arranged beneath a push-button of the hearing aid, wherein each of the switches are configured as one or both of the embodiments described herein and are configured to be operated by a pushing motion from a user, as described especially in relation to Figure 1.

[0045] 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.

[0046] 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.

[0047] 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.

[0048] Accordingly, the scope should be judged in terms of the claims that follow.

Claims

1. A hearing aid comprising:

   a switch incorporated in a part of the hearing aid, wherein the switch comprises a switch base which is connected to a substrate in the hearing aid,
   an activation plate configured in connection with said switch base, and
   a dome arranged in between the activation plate and a protection membrane,
   wherein the dome is configured as an integrated part of said protection membrane.

2. Hearing aid according to claim 1, wherein the switch is configured as part of a push-button of the hearing aid, wherein the push-button upon activation of the switch configures the hearing aid to be switched between one or more modes of operation and/or wherein the switch is configured as part of a volume control switch.

3. Hearing aid according to any one of the previous claims, wherein the protection membrane is made from an elastomeric material.

4. Hearing aid according to any one of the previous claims, wherein the dome is made from silicone and configured to be integrated into said protection membrane.

5. Hearing aid according to any one of the previous claims wherein the protection membrane is connected to the switch base by means of an adhesive or welding.

6. Hearing aid according to any one of claims 1 to 4, wherein the protection membrane is further integrated into a sealing cup.

7. Hearing aid according to claim 6, wherein the sealing cup with the protection membrane is connected to the switch base by means of gluing and/or mechanical snapping.

8. Hearing aid according to any one of the previous claims, wherein said push-button comprises a first surface configured to be operated by a pushing motion form a user, and a second surface facing internal parts of the hearing aid, wherein
   at least a part of the second surface is configured to abut the protection membrane, such that upon applying a force to the first surface of the push-button, said protection membrane is pushed towards said activation plate, where via a force applied to the activation plate from said integrated dome the activation plate and the protection membrane is configured to bend.

9. Hearing aid according to any one of the previous claims, wherein the dome is configured to be incorporated in a center part of said protection membrane.

10. Hearing aid according to any one of the previous claims, wherein the protection membrane comprises a surface base having outer edges and inner edges, wherein from the inner edges a rounded inclination rises towards a top surface, wherein said dome is integrated into the protection membrane at a position below the top surface.

11. Hearing aid according to any one of the previous claims, where in the protection membrane and the dome is formed from the same silicone material and configured as a single piece.

12. Hearing aid according to claim 6, wherein the sealing cup is configured with an undercut, wherein one or more edges of the protection membrane is configured to be arranged within the undercut of the sealing cup.

13. Hearing aid according to claim 6 wherein the sealing cup has an opening through which an inclination of the protection membrane rises from a surface base of the protection membrane to be aligned with a top surface of the sealing cup.

14. Hearing aid, wherein the hearing aid comprises two switches arranged beneath a push-button of the hearing aid configured to be operated by a pushing motion form a user in a configuration according to any one of claims 1 to 13.

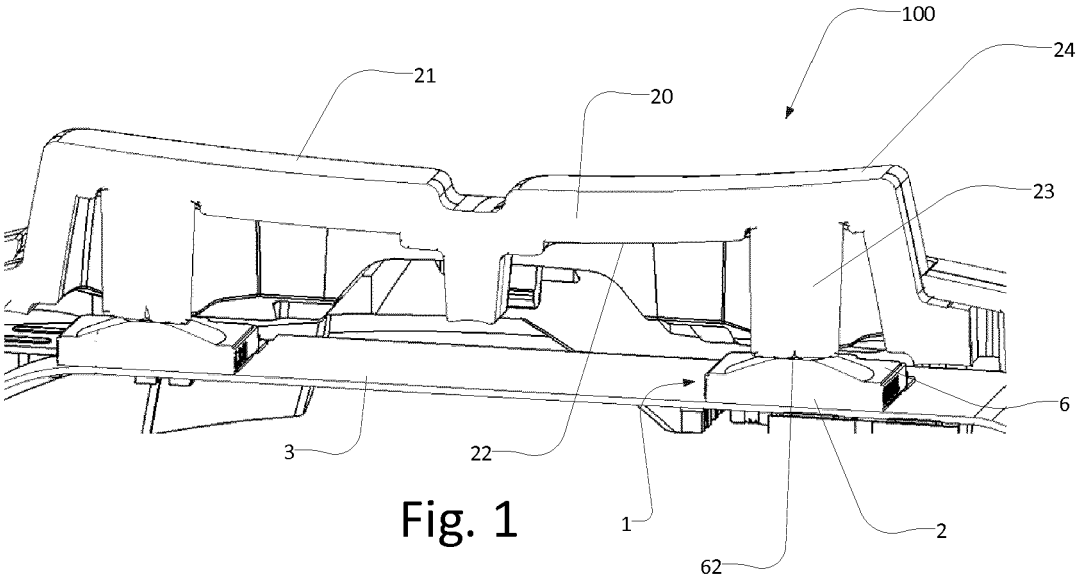

Fig. 1

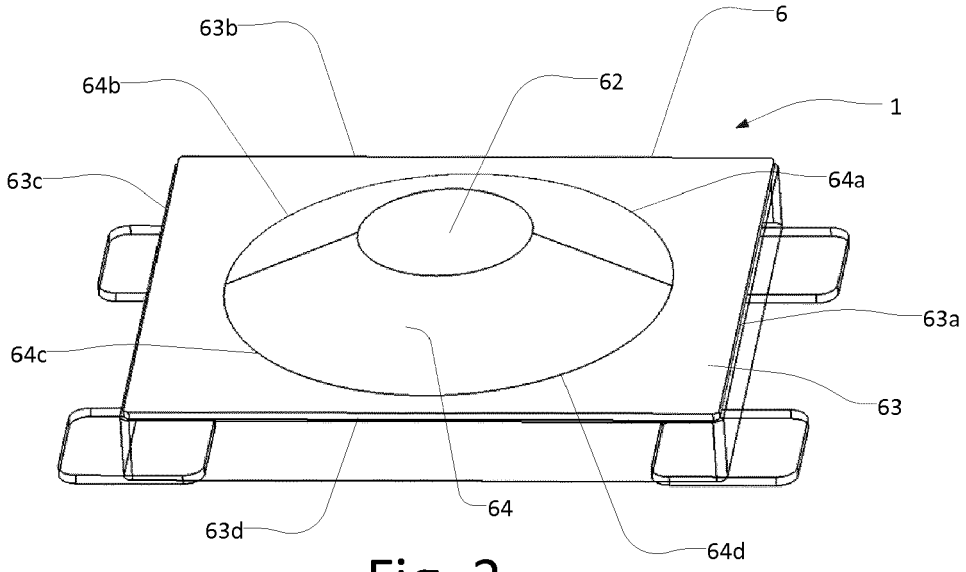

Fig. 2

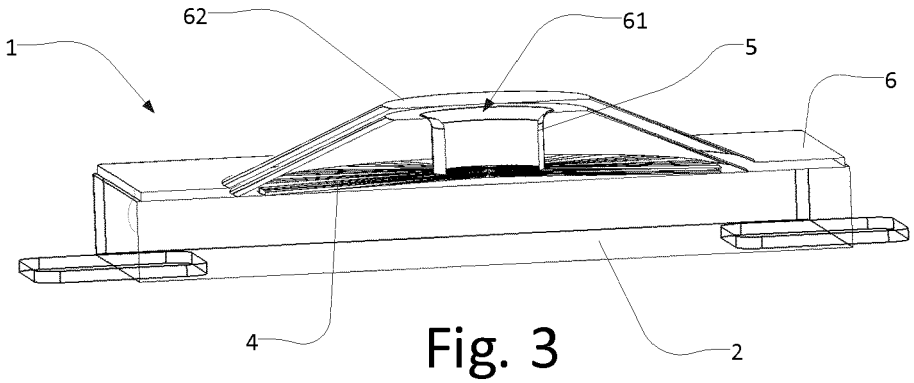

Fig. 3

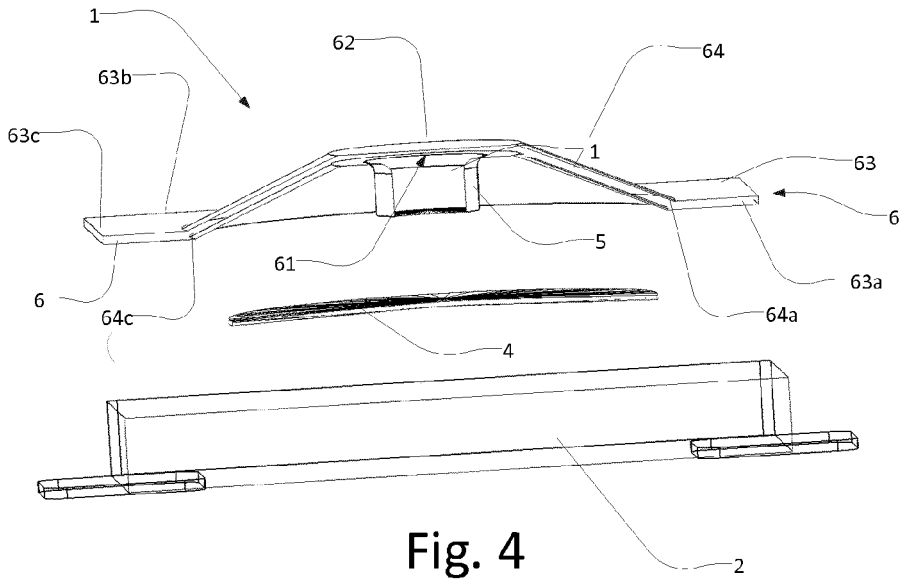

Fig. 4

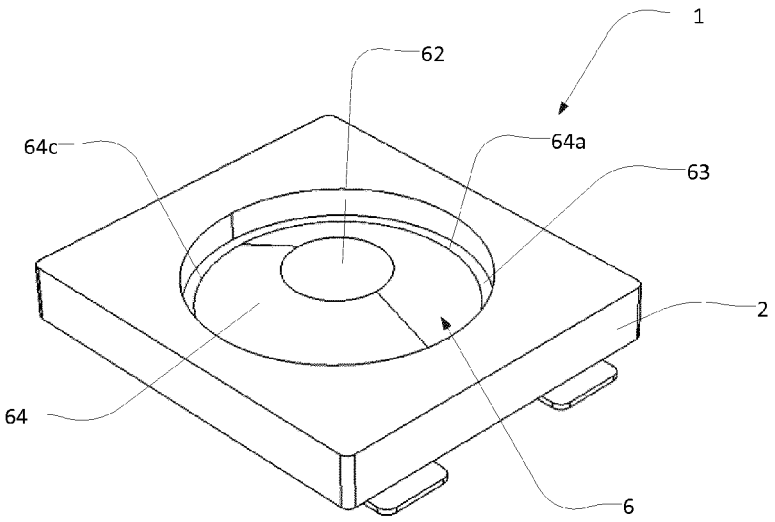

Fig. 5

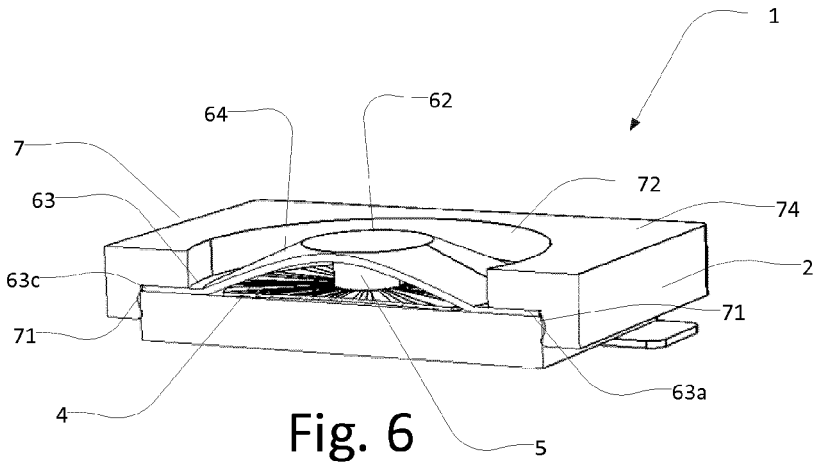

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 18 19 1707

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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
Munich	1 February 2019	Kunze, Holger

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