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71 Applicant: **N.V. Philips' Gloeilampenfabrieken**
Groenewoudseweg 1
NL-5621 BA Eindhoven(NL)

72 Inventor: **Biermans, Jan**
c/o INT. OCTROOIBUREAU B.V. Prof.
Holstlaan 6
NL-5656 AA Eindhoven(NL)

74 Representative: **van der Kruk, Willem**
Leonardus et al
INTERNATIONAAL OCTROOIBUREAU B.V.
Prof. Holstlaan 6
NL-5656 AA Eindhoven(NL)

54 **In-the-ear hearing aid.**

57 The cover plate (2) of an earmould (1) of an in-the-ear hearing aid is provided with an aperture (3). A unit (4) can be inserted detachably in this aperture. The unit (4) comprises the amplifier (6), control means (8) and a battery compartment (7), which are all mounted on or are at least partly accommodated in, respectively, a carrier plate (5).

The detachable connection between the cover plate (2) and the carrier plate (5) is realised by one or more keys. Thus, unintentionally removing the unit (4) from the earmould (1) can be prevented.

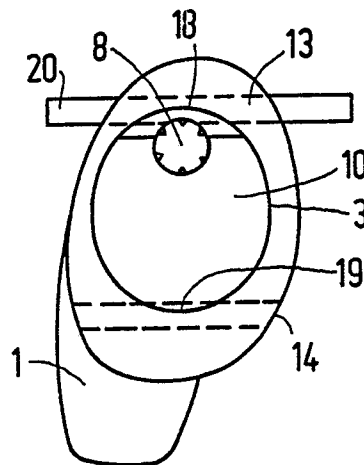


FIG.1

In-the-ear hearing aid.

The invention relates to an in-the-ear hearing aid, comprising a unit which comprises an amplifier, control means for adjusting a parameter of the hearing aid and a battery compartment which is accommodated in an earmould whose external shape is substantially adapted to the interior of the ear of a user of the hearing aid, and which for this purpose has a substantially tapered shape, viewed in the longitudinal direction of the earmould, the unit being disposed on a carrier plate which is detachably accommodated in an aperture provided in the end of comparatively large cross-section of the earmould, in the earmould. Such an in-the-ear hearing aid is described in Hearing Instruments Vol. 32, No. 3, 1981, page 5. The hearing aid described there relates to a hearing aid which is partly accommodated in the ear shell and partly in the auditory canal. In addition, the unit here includes the microphone and the receiver of the hearing aid. The detachable connection between the earmould and the unit is in this article realised by means of a construction in which the unit is snapped into the earmould, for example by means of a spring-loaded detent mechanism. Detaching is effected by pulling the two components apart. The construction is however such that the two components, also in situations in which it is unwanted, can be pulled apart. This may, for example, happen when the hearing aid is removed from the ear.

The invention has for its object to provide a hearing aid in which unintended detaching of the two components is prevented.

To that end, the hearing aid according to the invention is characterized, in that the detachable connection of the unit in the earmould is realised by means of at least one key which cooperates with the carrier plate and the earmould. The key(s) can cooperate with the facing boundary faces of the carrier plate and the aperture in the earmould. Preferably, the key(s) is (are) made of a synthetic resin material.

The invention and its advantages will now be described in greater detail by way of example with reference to an embodiment shown in the accompanying drawing. In the drawings

Fig. 1 is a first view of the hearing aid,

Fig. 2 is a different view of the hearing aid, and

Fig. 3 is a side view of the unit.

Figs. 1 to 3 show an in-the-ear hearing aid which can be positioned in the auditory canal of the ear. To that end the earmould 1 has an external shape which is adapted to the interior of the ear of a user of the hearing aid. The earmould has a tapered shape, viewed in the longitudinal direction

of the earmould. The cover plate 2 (see Fig. 2) which constitutes the end of comparatively large cross-section of the earmould is located in an aperture 3 (see Fig. 1) in which the first unit 4 (see also Fig. 3) is accommodated. The first unit is assembled from a carrier plate 5 on which at least the electronic components of the amplifier 3 (shown schematically only in Fig. 3) of the hearing aid are disposed. In addition, the first unit 4 includes a battery compartment 7 and optionally also a microphone (not shown). Furthermore, control means 8 for adjusting a parameter of the hearing aid are shown. These control means 8 may, for example, be in the form of an on/off switch or a volume control. In the first case the parameter is the supply voltage for the hearing aid, in the second case the parameter is the gain factor of the amplifier 3. The battery compartment 7 is covered by means of a (hingeable) cover 10. The receiver, not shown, of the earmould is provided in the end of smaller cross-section of the earmould.

The unit 4 is mounted detachably in the aperture 3 of the earmould. The detachable connection between the unit 4 and the earmould 1 is provided by one or more keys which cooperate with the carrier plate 5 and the earmould. To that end, the cover plate 2 is provided with, in this case, two ducts 13 and 14 in which two keys are pushed. The detachable connection is realised in that the two keys each cooperate with the facing boundary faces of the carrier plate 5 and the (aperture in the cover plate 2 of the) earmould 1.

Fig. 3 shows this very clearly, in that the boundary face of the carrier plate 5 is provided with two slots 16 and 17. The boundary face of the aperture 3 in the cover plate 2 has corresponding slots, namely in that position where the ducts 13 and 14 intersect this boundary face. In Fig. 1 these positions are denoted by 18 and 19.

The keys may be made of a synthetic resin material. Keys in the shape of pins, one of which is denoted in Fig. 1 by reference numeral 20, are pushed into the ducts 13 and 14 after the unit 4 has been positioned in the cover plate 2. The projecting portions of the pin(s) (20) can then be removed.

Optionally, only one key would be sufficient to mount the unit 4 in the aperture 3 of the cover plate 4, for example only the key 20. At the opposite side along the periphery of the carrier plate, at 17 in Fig. 3, one or two lugs must be provided by means of which the carrier plate 5 can then be coupled at that side to the cover plate 2.

It is alternatively possible that one or more keys fully intersect the carrier plate 5, that is to

say, that, by inserting one or more keys, the connection between the cover plate and the carrier plate is effected via one or more ducts which are cut out in both the cover plate 2 and the carrier plate 5.

Preferably however the construction shown in the Figures is used for interconnecting the two components. In that case the key(s) operate(s) with the facing boundary faces of the carrier plate and the aperture in the earmould. This has the advantage that it is not necessary to cut ducts into the carrier plate, which might reduce the strength of the carrier plate and might complicate positioning of the different components on the carrier plate.

It should be noted that the invention is not limited to the embodiment shown. The invention also applies to those embodiments which differ from the embodiment shown in respects not relevant to the invention.

Thus, the invention is not only applicable to hearing aids which are to be inserted into the auditory canal but is also applicable to hearing aids which are provided partly in the auditory canal and the ear cavity (ear shell).

Claims

1. An in-the-ear hearing aid, comprising a unit which comprises an amplifier, control means for adjusting the parameter of the hearing aid and a battery compartment, which unit is accommodated in an earmould whose external shape is substantially adapted to the interior of the ear of a user of the hearing aid and which for this purpose has a substantially tapered shape, viewed in the longitudinal direction of the earmould, the unit being disposed in a carrier plate which is detachably accommodated in an aperture provided in the end of comparatively large cross-section in the earmould, characterized in that the detachable connection of the unit in the earmould is realised by means of at least one key which cooperates with the carrier plate and the earmould.

2. An in-the-ear hearing aid as claimed in Claim 1, characterized in that the key(s) cooperate(s) with the facing boundary faces of the carrier plate and the aperture in the earmould.

3. An in-the-ear hearing aid as claimed in Claim 1 or 2, characterized in that the key(s) is (are) made of a synthetic resin material.

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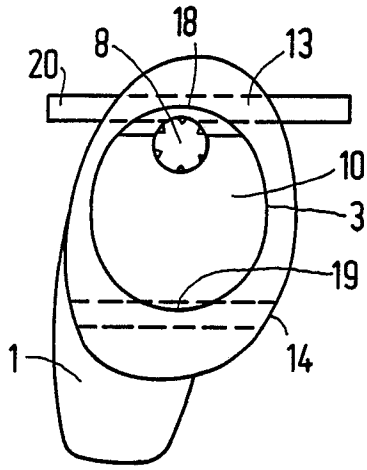


FIG. 1

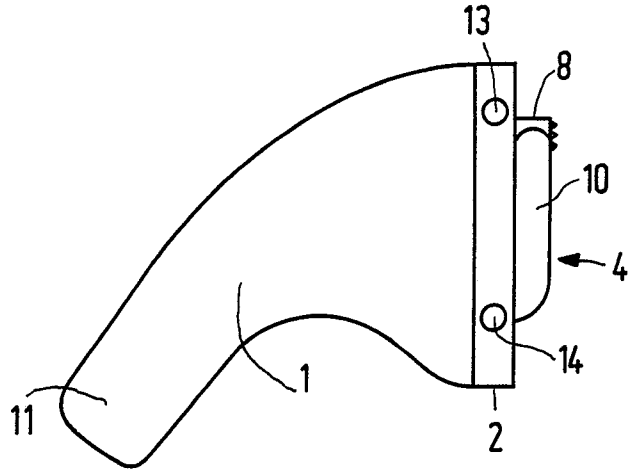


FIG. 2

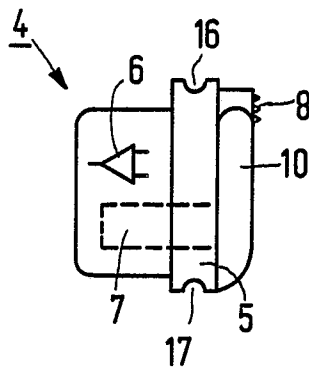


FIG. 3

EP 89 20 2544

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
X	EP-A-0 186 748 (VIENNATONE GmbH) * Page 3, lines 15-22; page 4, lines 10-18; claims 1,5; figures 1,9 *	1,2	H 04 R 25/02
A	----	3	
A	EP-A-0 108 734 (DANAVOX A/S) * Figures; claim 4; page 7, lines 11-21 *	2,3	
A	DE-A-2 949 992 (PHONAK AG) * The whole document *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			H 04 R
Place of search		Date of completion of the search	Examiner
THE HAGUE		18-01-1990	GASTALDI G.L.
CATEGORY OF CITED DOCUMENTS		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	
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			