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**Datasheet for the decision
of 7 April 2022**

Case Number: T 2622/19 - 3.5.03

Application Number: 12795674.6

Publication Number: 2783525

IPC: H04R25/00

Language of the proceedings: EN

Title of invention:

CIC hearing device

Patent Proprietor:

Insound Medical, Inc

Opponents:

Oticon A/S / Widex A/S / GN Hearing A/S

Headword:

Deep-in-the-canal hearing device/INSOUND

Relevant legal provisions:

EPC Art. 54, 56, 83, 123(2)

Keyword:

Sufficiency of disclosure - (yes)

Added subject-matter - (no)

Novelty - (yes)

Inventive step - (yes): problem-solution approach with partial problems - ex post facto analysis

Decisions cited:

T 0005/81, T 0641/00, T 1639/07, T 1213/15, T 1601/15

Catchword:

As to the application of the problem-solution approach, in particular the determination of the objective technical problem and the choice of the "second document", see points 6.3.2 and 6.3.4 of the Reasons.



Beschwerdekammern

Boards of Appeal

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Case Number: T 2622/19 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 7 April 2022

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Decision under appeal: **Decision of the Opposition Division of the
European Patent Office posted on 9 July 2019
revoking European patent No. 2783525 pursuant to
Article 101(3) (b) EPC.**

Composition of the Board:

Chair K. Bengi-Akyürek
Members: K. Peirs
C. Almberg

Summary of Facts and Submissions

I. The appeal lies from the decision of the opposition division to revoke the patent in suit on the grounds of added subject-matter (Article 100(c) EPC in conjunction with Article 123(2) EPC) of granted dependent claims 11 to 13 (insofar as referring to claims 11 and 12) and lack of inventive step of granted claim 1 (Articles 100(a) and 56 EPC).

The decision of the opposition division had regard to the following prior-art documents:

E1: WO 2011/031881 A2;

E2: US 2009/074220 A1;

E5: US 2002/085728 A1.

II. Oral proceedings before the board were held on 7 April 2022 by videoconference. At the end thereof, the board's decision was announced.

The appellant (proprietor) requests that the decision under appeal be set aside and that the patent be maintained

- as granted, i.e. the opposition be rejected, as a **main request**, or
- as amended based on one of **six auxiliary requests**.

The opponents (respondent) request that the appeal be dismissed.

III. **Claim 1** of the main request, i.e. claim 1 as granted, reads as follows (board's feature labelling):

(a) "A hearing device, comprising:

- (b) a hearing device core (60) including a microphone (102), a receiver (104), circuitry (106), and a battery (200), and defining a medial-lateral axis dimension D_{ML} , a superior-inferior dimension D_{SI} , and an anterior-posterior dimension D_{AP} ,
- (c) where $D_{AP}/D_{ML} \leq 0.38$ and $D_{SI}/D_{ML} \leq 0.64$ and $D_{ML} = 10-12$ mm; and
- (d) a seal apparatus (70) on the hearing device core,
- (e) wherein the microphone (102) and the receiver (104) define respective medial ends and respective lateral ends; the microphone and receiver are positioned such that the lateral end of the receiver substantially abuts the medial end of the microphone to form an acoustic assembly (100); and
- (f) the battery (200) and acoustic assembly are arranged such that one of the battery and acoustic assembly is superior to the other of the battery and acoustic assembly".

IV. Dependent **claim 5** as granted reads as follows:

"A hearing device as claimed in any one of claims 1 to 4, wherein the battery (200), the microphone (102) and the receiver (104) define respective medial ends and respective lateral ends; the medial end of the receiver is substantially aligned with the medial end of the battery; and the lateral end of the microphone is substantially aligned with the lateral end of the battery".

V. Dependent **claim 8** as granted reads as follows:

"A hearing device as claimed in claim 1, wherein the hearing device (50) is for use in an ear including

a tympanic membrane, an ear canal bony region, an ear canal cartilaginous region, and bony-cartilaginous junction;

the hearing device core (60) defines a size and a shape; and

the size, shape and configuration of the hearing device core, and the flexibility of the seal, are such that the hearing device is positionable within the ear canal bony region with the entire microphone (102) medial of the bony-cartilaginous junction and the receiver sound port either communicating directly with an air volume between the hearing device and the tympanic membrane or communicating with the air volume through a short sound tube (105)".

VI. Dependent **claim 9** as granted reads as follows:

"A hearing device as claimed in claim 8, wherein the microphone (102) and the receiver (104) define respective medial ends and respective lateral ends, and the microphone and the receiver are positioned such that the lateral end of the receiver substantially abuts the medial end of the microphone".

VII. Dependent **claim 10** as granted reads as follows:

"A hearing device as claimed in any one of claims 8 to 9, wherein the tympanic membrane defines a cant; and the hearing device (50) includes a medial end with an exterior surface defining a cant that is at least substantially similar to the tympanic membrane cant".

VIII. Dependent **claim 11** as granted reads as follows:

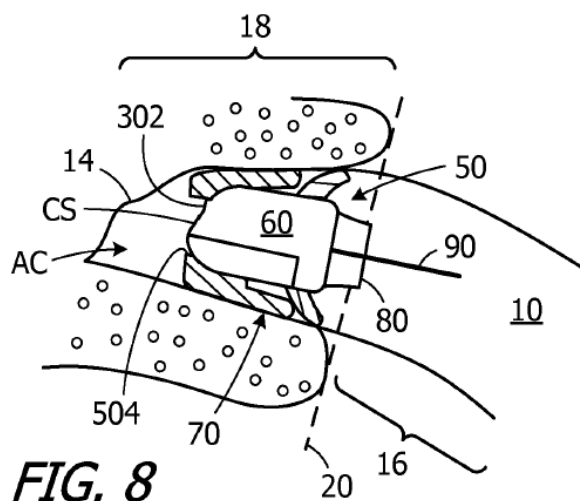
"A hearing device as claimed in claim 1, wherein the hearing device core (60) defines a medial end and a

lateral end;
the microphone (102), the receiver (104) and the circuitry (106) are located within encapsulant, and the encapsulant and at least a portion of the battery (200) define the exterior surface of the hearing device core between the medial and lateral ends of the hearing device core".

Reasons for the Decision

1. Technical background

1.1 The present invention relates to a completely-in-the-canal (CIC) hearing aid 50 which is inserted into the ear canal's bony region 18 (see Figure 8 of the opposed patent as reproduced below). This so-called "deep insertion" brings the hearing aid close to tympanic membrane 14, where it can stay continuously for an extended period of time, for instance longer than one month.



1.2 CIC hearing aids which are configured for "deep insertion" and "extended wear" represent a particular

challenge with respect to miniaturisation. On the one hand, such hearing aids must be small enough to allow for deep insertion. On the other hand, a small hearing aid can only accommodate a small battery, which restricts the time span covered by the extended wear. The diaphragm of the microphone and the receiver of such a small hearing aid will inevitably be of a reduced dimension, which in turn affects the microphone's sensitivity and the receiver's output capability. Moreover, the smaller the space to which the microphone and receiver are confined, the more severe feedback between these two transducers can be.

1.3 The invention underlying the opposed patent aims to address this challenge.

2. *Main request: claims 1, 8 and 11 - added subject-matter*

2.1 **Claim 1 as granted** is a combination of original claims 1 and 2, where the expression "when $D_{ML}=10-12$ " of original claim 1 is replaced by "and $D_{ML}=10-12$ ".

The board endorses the reasoning in point 3.2 of the decision under appeal that this amendment does not add subject-matter which was not derivable from the application as filed.

2.2 Dependent **claim 8 as granted** has the same wording as original claim 9 but, since the latter claim merely refers back to original claim 1 and not to original claim 2, it must be assessed here whether the skilled reader would readily combine the subject-matter of claims 1, 2 and 9 as filed.

Original claim 9 comprises two aspects, i.e. first, that the hearing device is placed in the bony part of

the ear canal and, secondly, that the receiver output communicates either directly with the air volume between the hearing device and the tympanic membrane or indirectly via a short sound tube. Concerning the latter aspect, it would be immediately apparent to the skilled reader that these two distinct alternatives are directly combinable with original claim 2. As to the former aspect, the skilled reader would readily understand that the dimensions expressed in original claim 1 are such that the hearing device can indeed be inserted into the bony region of the ear canal.

Given that original claim 2 depends on original claim 1, the skilled reader would therefore immediately gather that the subject-matter of original claim 2 can be combined with that of original claim 9.

- 2.3 Dependent **claim 11 as granted** has the same wording as original claim 12, which, similar to original claim 9, refers back only to original claim 1 and not to original claim 2. The opposition division concluded in Reasons 3.4 of the decision under appeal that subject-matter was added that extends beyond the original disclosure because "it appears that the encapsulant also covers at least a part of the battery, which is not what is stated in dependent claim 11".

However, dependent claim 11 as granted is unspecific as to whether encapsulant 300 indeed covers a part of the battery. The board holds that original claim 12 in combination with Figure 5 as filed and page 16, lines 10 to 16 of the description as filed provide a direct and unambiguous basis for present claim 11, especially in view of the statement

"... the core in the exemplary implementation includes an acoustic assembly 100, a battery 200 and encapsulant 300 that encases some or all of the acoustic assembly and battery" (emphasis by the board).

This statement makes it readily apparent for the skilled reader that the battery can be (at least in part) encased by the respective encapsulant. In particular, it encompasses hearing devices in which the battery is completely exposed from the encapsulant.

2.4 Consequently, claims 1, 8 and 11 as granted comply with Article 123(2) EPC.

3. *Main request: claims 1, 5, 9 and 10 - sufficiency of disclosure*

The board has reviewed and endorses Reasons 6 of the decision under appeal. For the following reasons, the patent in suit provides sufficient disclosure for a person skilled in the art to carry out the invention as per granted claims 1, 5, 9 and 10, in particular to implement features (e) and (f) of claim 1 as granted.

3.1 Concerning potential feedback problems due to a mechanical coupling between a receiver and a microphone either directly in view of their proximity as per **feature (e)** or intermediately via the battery positioned as per **feature (f)**, a myriad of solutions are known to the skilled person based on their common general knowledge, such as orthogonal placement of the transducers' respective membranes, ensuring resiliency of these transducers' suspension, provision of a dampening layer between the transducers and the battery as well as electric feedback compensation.

Concerning thermal coupling, the board doubts that the receiver and the microphone will produce excessive heat, given the respective diaphragm's limited excursion and, correspondingly, limited driving force. Similarly, any heat production due to a drain of the battery (or signal processing) will be limited. Also, given that the hearing device of granted claim 1 is to be worn *inside* the ear canal, i.e. with limited ventilation possibilities and high temperature sensitivity of the wearer, the skilled person would be aware of the need to implement the hearing device such that temperature rises are moderate or at least dissipate easily.

3.2 Moreover, the board holds that the skilled person knows how to carry out the substantial abutting of **feature (e)** and of **granted claim 9** as well as the "substantial alignment" of **granted claim 5**, e.g. to provide abutment and alignment as optimised as possible.

3.3 Finally, the tympanic membrane's form may be more intricate than a straight surface, but the skilled person is presented with sufficient information, e.g. by means of the schematic representation of tympanic membrane 14 in Figure 8, on how to implement the "cant" in **granted claim 10**.

3.4 As a result, granted claims 1, 5, 9 and 10 comply with Article 83 EPC.

4. *Main request: claim 1 - claim construction*

4.1 While present claim 1 concerns a "device" rather than the "use of a device", the terms "medial-lateral", "superior-inferior" and "anterior-posterior" cannot be

freely chosen. Rather, within the context of a hearing device as defined in claim 1, human anatomy is always a relevant aspect and it would have been immediately apparent to the skilled reader that these terms correspond to the main standardised anatomical terms of location.

- 4.2 The board agrees with the interpretation adopted in Reasons 7.2.2 of the decision under appeal that the skilled reader would have construed the dimensions referred to in **feature (b)** as a *maximum* extension, reflecting the total extension of the hearing device core in a particular direction. Any other interpretation would render **feature (c)** meaningless, given that, for almost every possible hearing device known to the skilled reader, sub-extensions, e.g. a "sub-length", in the three dimensions referred to in feature (b) can be defined that *automatically* fulfil the requirements of feature (c).

5. *Main request: claim 1 - novelty*

The board has reviewed and endorses, at least to a large extent, the novelty analysis set out in Reasons 7 of the decision under appeal relating to claim 1 as granted.

- 5.1 In particular, document **E1** discloses, in paragraphs [0038], [0043] and [0044] as well as Figure 6, a hearing device with hearing-device core 40, receiver 41, microphone 42, battery 52, seal apparatus 59 with seal tip 63 and hearing-aid electronics. Moreover, given that, in accordance with paragraphs [0015] and [0017] of E1, the hearing aid of E1 is to be worn in the cartilaginous part of the ear canal, its structural form is made congruent to the

standard anatomical dimensions of "medial-lateral", "superior-inferior" and "anterior-posterior" typically applicable to a human ear canal.

- 5.1.1 As a result, E1 discloses **features (a), (b) and (d)**. For the sake of argument, the board adopts the view set out in Reasons 7.2 of the decision under appeal that Figure 6 of E1 shows that microphone 42 and receiver 41 substantially abut, i.e. that E1 likewise discloses **feature (e)**.
- 5.1.2 By contrast, as to **feature (c)**, the cartilaginous part of the ear canal into which, in accordance with paragraphs [0015] and [0017] of E1, the hearing device of E1 is to be placed may be, on average, 10 mm, but this does not mean that the total length, i.e. the "medial-lateral" axis dimension, of the hearing device must also be 10 mm. As apparent from paragraph [0047] of E1, relating to the hearing device shown in Figures 4, 10 and 11, battery module 50 "is placed just at the aperture of the ear canal to allow the user easy access for insertion and removal" (emphasis by the board). This means that the hearing device extends laterally beyond cartilaginous part 12, as illustrated in Figure 4 of E1. From this Figure, it is also apparent that tip connector 62, which provides the output signal of receiver 41 to the tympanic membrane, extends into the bony part of the ear canal. As a result, the dimensions mentioned in paragraphs [0060] and [0062] of E1, citing a length of 5 mm for the receiver and a diameter of the battery of 6 mm, do not allow, taken by themselves, to derive the total length of the hearing device, which includes other components such as circuitry, microphone 42, tip connector 62 and the housing.

As regards **feature (f)**, Figure 11 of E1 may show an oblique arrangement of battery 52 with respect to acoustic assembly 40, which houses microphone 42 and receiver 41. But it would be immediately apparent to the skilled reader that this differs from a "superior" arrangement as required by feature (f), as is also shown in the arrangement of Figure 4 and described in paragraph [0047] of E1.

- 5.1.3 Therefore, the subject-matter of claim 1 differs from the disclosure of E1 at least in features (c) and (f) and novelty of claim 1 over E1 is thus acknowledged (Article 54 EPC).

- 5.2 Moreover, document **E5** discloses in paragraphs [0003], [0072], [0077] to [0084] together with Figures 1, 3, 5 to 7 and 13 a hearing device with core assembly 45 having microphone section 60 to be placed in cartilaginous region 11 of the ear canal, receiver section 70 to be positioned in bony region 13 of the ear canal, battery assembly 50, signal-processing amplifier 65 and sealing retainer 80.
 - 5.2.1 Hence, the board agrees with the analysis given in Reasons 7.3 of the decision under appeal that E5 discloses **features (a), (b) and (d)**.

 - 5.2.2 By contrast, as regards **feature (c)**, the same considerations as for E1 apply in view of Figures 1, 3 and 5 taken in combination with paragraph [0072] of E5. As an aside, it is noted that the cross-sections of the cartilaginous and bony region of the ear canal as shown in Table 2 in paragraph [0103] of E5 at most correspond to an upper limit for the corresponding dimensions of the hearing aid, because, as apparent from e.g. paragraphs [0072], [0078], [0079] and [0084] of E5,

lateral section 40 fits in a non-occluding manner in cartilaginous part 11 of the ear canal.

5.2.3 Moreover, **feature (e)** is not shown in E5 because from Figures 6 and 7 of E5 it is immediately apparent that receiver section 70 and microphone section 60 are spaced apart by flexible connection 79. As further apparent from paragraph [0074] of E5, this flexible connection must enable the receiver and microphone sections to move with respect to each other, such as to facilitate insertion of the hearing device through the second bend at bony junction 19. This means that the receiver and microphone sections must necessarily have a considerable space between them. This is opposed to the configuration of Figure 10 of the application as filed, which illustrates that microphone 102 and receiver 104 only have tabs 140 and 142 between them. Those tabs are indispensable, because, as apparent from page 23, lines 7 to 10 of the application as filed, they provide an electrical interconnection between microphone 102, receiver 104 and the signal-processing circuitry of the hearing device. The space required by these tabs amounts to the bare minimum, equalling to the thickness of a flex circuit, which is considerably less than the flexible connection of E5.

5.2.4 As to **feature (f)**, even when interpreting this feature broadly in that the battery does not need to be superior to the *entire* acoustic assembly (or *vice versa*) but that it suffices when the battery is superior to one of the constituents of the acoustic assembly (or *vice versa*), Figures 6 and 7 of E5 show that microphone section 60 is inserted into battery assembly 50, which is emphasised by E5 having a dedicated name and a reference sign for the combination of microphone 60 and battery assembly, namely "lateral

section 40" (see paragraph [0072] of E5). Likewise, according to Figure 13, battery assembly 50 and (non-removable) microphone section 60 form, in combination, lateral section 40, which is assembled together with receiver section 70 to form the hearing device. The skilled reader is moreover not presented with the information that the microphone and receiver sections are to be grouped together, forming an acoustic assembly that is, as one unit, put on top or below battery assembly 50. Consequently, the skilled reader would not consider that E5 discloses any arrangement as mandated by feature (f).

5.2.5 Therefore, the subject-matter of claim 1 differs from the disclosure of E5 at least in features (c), (e) and (f), and novelty of claim 1 over E5 is acknowledged.

5.3 In conclusion, the subject-matter of granted claim 1 is novel over the available prior art (Article 54 EPC).

6. *Main request: claim 1 - inventive step*

The board has further reviewed the analysis concerning inventive step set out in Reasons 8 of the decision under appeal, which relates to claim 1 as granted and which starts from document **E2** as the most suitable starting point. The board agrees with the opposition division's choice of the starting point, because E1 and E5 aim, unlike E2, at placing the hearing device in the cartilaginous rather than in the bony area of the ear canal, which, when focusing on feature (c), in fact impacts the dimensions which the skilled reader would deem to be plausible.

6.1 Disclosure of E2

6.1.1 Document E2 discloses in paragraphs [0002], [0009], [0010] and [0040] to [0046], together with Figures 2 to 4, hearing device 20 for extended wear to be worn in bony part 12 of the ear canal with the hearing-device core comprising microphone 23, receiver 24, battery 27 and flex circuit 28. The hearing device is held in the ear canal by means of seals 30 and 32 and has a length of 12 mm or less. Microphone 23 is placed directly below receiver 24 in Figure 3 (and vice versa in Figure 4), thereby abutting the receiver, with an optional viscoelastic dampening layer 21 in between, forming, together with flex circuit 28, the acoustic assembly 22. Battery 27 is placed medially from the acoustic assembly formed by the microphone-receiver combination and a dedicated sound conduit 25 guides sound from receiver 24 through battery 27 to output 37. Consequently, E2 discloses **features (a), (b), (d)**, the **part of feature (c)** with $D_{ML} = 10-12$ mm and the **part of feature (e)** that the microphone and receiver abut.

6.1.2 Although paragraphs [0009] and [0010] of E2 provide detailed information on which type of receiver and microphone to use, it is apparent from Figures 3 and 4 that the "superior-inferior" and "anterior-posterior" dimensions of hearing device 20 are defined predominantly by the dimensions of oval-shaped battery 27. In particular, while Figure 4 of E2 may be schematic, it shows that the "superior-inferior" and "anterior-posterior" dimensions include the measures of microphone 23, receiver 24, optional viscoelastic layer 21, a housing and an additional spacing between the receiver, microphone and housing to allow the housing to accommodate battery 27 shown in Figure 3. Due to this additional spacing, the type of receiver and microphone does not unequivocally define the "superior-inferior" and "anterior-posterior" dimensions

of hearing device 20.

6.1.3 Hence, E2 does not disclose that

(g) $\frac{D_{AP}}{D_{ML}} \leq 0.38$ and $\frac{D_{SI}}{D_{ML}} \leq 0.64$;

(h) the acoustic assembly is formed by the microphone and receiver abutting at their respective medial and lateral ends rather than at their respective *superior* and *inferior* ends;

(i) the battery is above or below the acoustic assembly rather than *besides* it.

6.2 Technical effect - objective technical problem - obviousness

Although the dimension requirements according to **feature (g)** may imply that a hearing device as claimed can only be assembled with standard components when the arrangement of *both features (h) and (i)* are present *simultaneously*, it is assumed, for the sake of argument, that the three distinguishing features (g) to (i) represent a simple juxtaposition without involving any synergistic effect and that a problem-solution approach involving partial problems can be adopted.

6.2.1 As to the individual technical effects caused by those distinguishing features,

- the technical effect of **feature (g)**, taken in isolation, is that a practical implementation of the "anterior-posterior" and the "superior-inferior" dimension of hearing device 20, i.e. its width and height, is provided such that the hearing device fits in the bony part of the ear

canal.

- The technical effect of **feature (h)** is that it provides an *alternative* way to form acoustic assembly 22.
- The technical effect of **feature (i)** is that it provides an *alternative* placement of the battery with respect to the acoustic assembly.

6.2.2 As an aside, it is noted that it would not have been apparent to the skilled reader that any of these distinguishing features relate to maximising the volumetric energy efficiency of hearing device 20, since this would have required more tangible specifics on at least the battery, rather than its mere relative position with respect to the acoustic assembly as per feature (i). As a result, the following correspondence can be drawn between the above features and their associated objective technical (partial) problems:

- **feature (g)**: "how to provide for a practical implementation of the width and height of hearing device 20 in the system of E2";
- **feature (h)**: "how to provide for an *alternative* way to form the acoustic assembly compared to that of E2";
- **feature (i)**: "how to provide for an *alternative* placement of the battery with respect to the acoustic assembly compared to that of E2".

6.2.3 Concerning **feature (g)**, the board agrees with the assessment set out in Reasons 8.4 of the decision under appeal that the skilled person, taking into account that hearing device 20 is to be fitted into the bony part of the ear canal and that it has a length of 12 mm

or less, would have arrived at a width and height of hearing device 20 as in feature (g) by means of routine design. This has not been contested by the appellant.

6.2.4 As regards **features (h) and (i)**, the board holds that the skilled person would not arbitrarily have re-positioned the microphone, receiver and battery to solve the respective partial problems posed. Rather, from paragraph [0041] of E2, in particular the optional articulation mentioned therein, it would have been immediately apparent to the skilled person that acoustic assembly 22 should be considered as a single unit that is to be positioned with respect to battery 27. While it would have been a matter of "workshop modification" for the skilled person to re-position the receiver and microphone *within* the acoustic assembly such that they abut as required by **feature (h)**, it is questionable whether the resulting structure would fit within the hearing-device core's length of 12 mm when using standard components in the case where battery 27 remains to the side of acoustic assembly 22. The result of such a workshop modification would, therefore, have been that the skilled person might have needed to re-design the microphone, receiver and/or battery.

Conversely, as regards **feature (i)**, the board can see no reason why the skilled person would have moved the battery from its medial position such that it is either above or below the acoustic assembly since this would have involved dispensing with or at least modifying sound conduit 25 and, with it, changing the design of battery 27. It is namely apparent from Figure 3 of E2, which represents a *cross-section* (rather than a projection, see E2, paragraph [0036]), that oval-shaped battery 27 *comprises* sound conduit 25. Moving

battery 27 up or down would have required sound conduit 25 to bend, thereby negating the efforts of designing this sound conduit with a low-profile "D shape", as apparent from paragraphs [0041] and [0046] as well as Figure 6 of E2. Moreover, even when considering that dispensing with the sound conduit would have been a strong motivation for the skilled person to try out alternative arrangements, moving battery 27 up or down and dispensing with the sound conduit would have necessitated an *additional* re-design of the battery in view of the limited dimensions fixed by feature (g) taken in combination with the hearing-device core's length being 12 mm or less. Therefore, modifying E2's configuration such as to arrive at features (h) and (i) would have involved a series of steps that imply a substantial re-design of one or more components. It is however doubtful that the skilled person would have indeed been able to carry out this series of steps, or, for that matter, any other appropriate re-design process involving a multitude of cascading design choices, without the benefit of hindsight.

6.3 Furthermore, the respondent's inventive-step analysis regarding **feature (h)** together with **feature (i)** based on a combination of E2 with E5 was not convincing for the following reasons.

6.3.1 The respondent considered the objective technical problem regarding these features in combination of "how to get rid of sound tube 25 of Figure 3 of E2". It referred in this respect specifically to the opposed patent itself, where lines 7 to 11 of column 13 state that "present core 60" does not need a sound tube as is found in the "Shennib" hearing device. The respondent emphasised in this context that the "Shennib" document

is, in fact, E2. It argued that the skilled person would have recognised that this sound tube 25 may introduce acoustic artefacts when sound is reproduced by receiver 24 of Figure 3 of E2 and that it also takes up space that could be used for the battery.

- 6.3.2 Whether or not the skilled person would have realistically considered the respondent's objective technical problem in the context of E2, the board notes, when applying the problem-solution approach, that the objective technical problem is not to be derived from the document that is used as the starting point for the inventive-step analysis. Rather, such objective technical problem is to be derived from technical effects that the skilled reader would credibly associate with the technical features of the claimed invention (cf. **T 1639/07**, Reasons 2.5).

Otherwise, the notional skilled person who has eventually to assess the claimed solution's inventiveness, having regard to the chosen starting point, could virtually pose their own "objective problem". This, however, could arguably lead to an inadmissible hindsight bias. This is because the "person skilled in the art" within the meaning of Article 56 EPC could then confront themselves with their "subjective" technical problem to be solved, as e.g. apparently supported in **T 1213/15** (cf. Reasons 10.2.2: "... the skilled person would normally have to be one ... who would have **posed him or herself** the objective technical problem."; emphasis added) or **T 1601/15** (cf. Reasons 5.1.3: "... dass der Fachmann, der von der Lehre der Druckschrift D1 ausging und **sich die Aufgabe stellte, ...**"; emphasis added). This board does not follow this logic.

To avoid any misunderstandings, it is of course generally recognised that the objective problem must be a *realistic* one which the skilled person in the particular technical field might indeed be asked to solve at the respective priority date (see e.g. **T 641/00**, Reasons 5, second paragraph). In the board's view, that does however not mean that the notional skilled person under Article 56 EPC is expected to formulate their own technical problem which the same person has subsequently to solve.

- 6.3.3 In the present case, the board is, for several reasons, not convinced that features (h) and (i), in combination, would necessarily allow to "get rid of" sound tube 25 as shown in e.g. Figure 3 of E2. First, features (a) to (f) are silent about any sound tube, such that the hearing device of claim 1 as granted can be *with* or *without* a sound tube. Secondly, whether or not a sound tube is required to guide the sound produced by a receiver such as receiver 24 of Figure 3 of E2 does not only depend on the placement within the acoustic assembly of the microphone and the receiver relative to each other according to feature (h) or the position of the battery with respect to the acoustic assembly as specified in feature (i): these features do not require the receiver to be directly abutting a sound output port of the hearing device and, as a result, a sound tube may still be required in a hearing device with features (h) and (i), depending on how the remaining components of the hearing device of granted claim 1 are arranged. As an example, the board notes that the seal apparatus of feature (d) could be placed at the medial side of the receiver. Moreover, from features (h) and (i), no conclusion can be drawn about the placement of other components that constitute a necessary part of any hearing device according to

granted claim 1, such as processing circuitry and any electrical connections between the battery, the microphone, the receiver and such a processing circuitry. These other components may very well be placed at least partly between the receiver and the sound output port.

6.3.4 Even if the technical effect of allowing to dispense with the sound tube were credibly attributable to features (h) and (i) in combination, the board is not convinced that the skilled person would have arrived at the subject-matter of granted claim 1 without the benefit of hindsight. While it could have made technical sense for the skilled person, based on their common general knowledge, to consider the respondent's objective technical problem of point 6.3.1 above in the context of Figure 3 of E2, the board does not agree that the skilled person would have readily combined E2 with E5 as suggested by the respondent. The reasons for this are as follows:

- First, E2 and E5 concern *different* hearing devices, the former being for placement in the *bony* part of the ear canal only (E2: Figure 2, bony part 12 of the ear canal) and the latter being for placement along the entire length of the ear canal (E5: Figure 5). Moreover, paragraph [0019] (penultimate sentence), paragraph [0040] (fifth and sixth sentences) and paragraph [0042] (first sentence) of E2 emphasise the importance of the receiver and microphone's parallel placement, having their respective diaphragms in a mutually orthogonal arrangement, whereas E5 is silent about any such placement.

- More importantly, E5 is not concerned with the respondent's objective technical problem in the first place. While one could argue that the skilled person, drawing upon their common general knowledge, would have immediately recognised that the battery and microphone configuration of Figure 16 of E5 solves the respondent's objective problem, the board considers it doubtful that the skilled person would have indeed considered E5 as the second document in the framework of the inventive-step analysis.

It is generally considered to constitute an *ex post facto* approach if the assessment of inventive step is performed by interpreting the prior-art documents at hand with the benefit of knowledge of the problem solved in the application or patent itself (see the first paragraph of point 6.3.1 above), where this problem was neither mentioned nor suggested in the prior-art documents (see e.g. **T 5/81**, Reasons 11). Moreover, the "second document" (the prior-art document with which the "closest prior art" is to be combined) should - at least implicitly - address or deal with the objective problem formulated. Otherwise, prior-art documents could arbitrarily be combined, on the basis of simply searching for the features, missing from a "closest prior art", in another prior-art document without having the proper context. Accordingly, given that E5 does not touch upon the above objective problem, it cannot be considered an appropriate choice of a "second document" in the present case.

- As indicated by the appellant, the skilled person would not (necessarily) have had to resort to a

prior-art document such as E5 to solve the respondent's objective problem. Instead, they could have relied on their common general knowledge to simply swap the acoustic assembly and the battery in Figure 3 of E2. While such a swapping most probably would have caused acoustic artefacts to be generated at the hearing device's sound-detection side rather than at its sound-reproduction side, it indeed represents, in the board's view, a viable solution to the respondent's objective problem.

- As a further alternative, the skilled person could have adopted a custom design for the battery. The respondent had alleged that such a custom design would have been apparent to the skilled person already based on E2 itself, namely in view of the expression "tapered oval battery" of paragraph [0045] of E2. In the respondent's view, this expression would have taught the skilled person that the "button-cell form" which is typically used for batteries of small devices can be omitted in favour of a custom design. Assuming that the respondent's opinion is correct, this would mean that the skilled person could have easily designed the battery with a shape such that the battery can receive the microphone on the lateral side and the receiver on the medial side. By doing so, the skilled person would have solved the objective problem posed by the respondent without recourse to E5.

As a result, the board agrees with the appellant that there would have been no good reason for the skilled person to combine documents E2 and E5, other than with knowledge of the invention, i.e. hindsight.

6.3.5 However, even if the skilled person had combined E2 with E5, they would still not have arrived at the subject-matter of claim 1 as granted: a further modification would still have been required. This modification concerns what the skilled person would have done with flexible connection 79 and receiver section 70 of Figure 5 of E5 when combining this document with E2. The respondent argued that the skilled person would have immediately realised that the flexible connection can be dispensed with in view of the small dimensions of E2's hearing device. This is because in E5 this connection merely serves to facilitate insertion of the hearing device through the second bend at bony junction 19 (see Figure 1 and paragraph [0074] of E5). Even if one were to agree with this argument, the skilled person would not have necessarily needed to place the receiver next to the microphone underneath the battery, as shown in Figure 16 of E5. Rather, based on their common general knowledge, the skilled person would arguably have attempted to place the microphone and the receiver of a hearing device as far apart as possible to avoid the notorious problem of feedback (cf. point 1.2 above).

As a result, when re-configuring the microphone, receiver and battery assembly of E2 based on the teaching of Figure 16 of E5, the skilled person might have preferred a solution in which the microphone and receiver are no longer abutting. In this case, the skilled person could have adopted the configuration of Figure 16 of E5 with the battery being superior to the microphone and altered the battery's shape such that it allows to place the receiver at the medial end of the battery. By doing so, the receiver's placement relative to battery assembly 50 and microphone section 60 as apparent from Figure 5 of E5 would have been preserved.

With such a placement, feedback would have been less likely to occur. Therefore, even if the skilled person had combined E2 with E5, they would not have arrived in a "one-way street" manner at the subject-matter of granted claim 1.

- 6.4 Hence, the subject-matter of granted claim 1 involves an inventive step over the available prior art (Article 56 EPC).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The opposition is rejected.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated