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Datasheet for the decision of 24 September 2024

Case Number: T 0315/22 - 3.5.05

Application Number: 13702426.1

Publication Number: 2952015

IPC: H04R25/00

Language of the proceedings: EN

Title of invention:
State of charge indication in a hearing device

Patent Proprietor:
Sonova AG

Opponent:
Oticon A/S

Headword:
Horse vs. camel/SONOVA

Relevant legal provisions:
EPC Art. 116(1), 123(2)
RPBA 2020 Art. 12(8), 13(2)

Keywords:

Decision in written proceedings - (yes): withdrawal of proprietor's request for oral proceedings at very short notice + oral proceedings neither necessary nor expedient
Added subject-matter - main request and auxiliary requests 1, 1A, 2 to 5 (yes): unallowable intermediate generalisation
Admittance of claim amendments filed after Art. 15(1) RPBA communication - new auxiliary requests 1 to 5 (no): no "exceptional circumstances" justified by cogent reasons + amendments not suitable to resolve the relevant issues

Decisions cited:

T 1428/17, T 1924/20, T 0010/22, T 0124/22, T 0986/22

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Case Number: T 0315/22 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 24 September 2024

Appellant: (Opponent)	Oticon A/S Kongebakken 9 2765 Smoerum (DK)
Representative:	Cohausz & Florack Patent- & Rechtsanwälte Partnerschaftsgesellschaft mbB Bleichstraße 14 40211 Düsseldorf (DE)
Respondent: (Patent Proprietor)	Sonova AG Laubisrütistrasse 28 8712 Stäfa (CH)
Representative:	Schwan Schorer & Partner mbB Patentanwälte Bauerstraße 22 80796 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 25 November 2021 rejecting the opposition filed against European patent No. 2952015 pursuant to Article 101(2) 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 reject the opposition (Article 101(2) EPC). The opposition division deemed that neither

- the opposition ground under Article 100(a) EPC in conjunction with Article 54 or 56 EPC nor
- the one under Article 100(c) EPC in conjunction with Article 123(2) EPC

prejudiced the maintenance of the opposed patent in its granted form.

II. In the appeal proceedings, the parties' requests were as follows:

The opponent (appellant) requested with its statement of grounds of appeal that the appealed decision be set aside and that the patent be revoked.

The proprietor (respondent) requested that the appeal be dismissed as its **main request**, i.e. that the patent be maintained as granted. In the alternative, the proprietor requested that the patent be maintained in amended form on the basis of one of the five auxiliary requests ("**first to fifth auxiliary requests**") filed during the opposition proceedings or a further auxiliary request ("**auxiliary request 1A**"), filed for the first time with its written reply to the statement of grounds of appeal.

III. The parties were summoned to oral proceedings before the board. A communication was issued under Article 15(1) RPBA including the board's negative

preliminary opinion as to the compliance with Article 123(2) EPC for all claim requests then on file.

IV. By its letter of reply, the proprietor maintained its main request and requested, in the alternative, maintenance of the patent in amended form based on one of five auxiliary requests ("**new first to fifth auxiliary requests**") as attached with that letter of reply.

V. With a notification received one day before the scheduled oral proceedings, the proprietor stated that it withdrew its request for oral proceedings and would not be participating in those oral proceedings. No further substantive submissions were made.

VI. Subsequently, the oral proceedings were cancelled.

VII. Claim 1 of the **main request** reads as follows (board's feature labelling and underlining):

(a) "Hearing device (10) comprising
(b) a function module (11),
(c) a rechargeable battery (15), and
(d) a battery power management unit (14),
(e) the battery power management unit (14) comprising:
- a voltage regulator (16) in operative connection with the rechargeable battery (15), the voltage regulator (16) being adapted to output a supply voltage (V_HI) to the function module (11);
(f) - a control unit (17) in operative connection with the voltage regulator (16) and with the rechargeable battery (15), the control unit (17) being adapted to measure the rechargeable battery output voltage (V_BATT) and to control the supply

voltage (V_HI) output by the voltage regulator (16);

(g) characterized in that the control unit (17) is adapted to control the voltage regulator (16) so as to encode a signal in dependence of the rechargeable battery output voltage (V_BATT) onto the supply voltage (V_HI);

(h) and wherein the function module (11) is adapted to decode said signal and to determine a state of charge of the rechargeable battery (15) based on said signal."

VIII. Claim 1 of the **first auxiliary request** comprises all the features of claim 1 of the main request, where the word "and" at the beginning of feature (h) was removed, and further comprises, respectively between features (g) and (h) and at the end, the following features (board's feature labelling):

(i) "characterized in that the function module (11) is adapted to control the voltage regulator (16) so as to decode said signal and to determine a state of charge of the rechargeable battery (15) based on said signal;"

(j) "; and wherein the control unit (17) is adapted to encode said signal digitally onto the supply voltage (V_HI)".

IX. Claim 1 of **auxiliary request 1A** comprises all the features of claim 1 of the main request and further comprises, between features (g) and (h), the following feature (board's feature labelling and underlining, the latter reflecting an amendment vis-à-vis feature (i)):

(k) "characterized in that the function module (11) is adapted to control the voltage regulator (16) so as to decode said signal and to determine a state of charge of the rechargeable battery (15) based on said decoded signal;".

X. Claim 1 of the **second auxiliary request** comprises all the features of claim 1 of the first auxiliary request, where the word "and" at the beginning of feature (j) was removed, and further comprises, at the end, the following feature (board's feature labelling):

(l) ", and wherein said signal is encoded as at least one of a pulse width modulated signal and a binary encoded signal such as an ASCII signal".

XI. Claim 1 of the **third auxiliary request** comprises features (a) to (i) and further comprises, between features (g) and (i), the following feature (board's feature labelling):

(m) "wherein the function module comprises signal processing circuitry (12) and a receiver (13);".

XII. Claim 1 of the **fourth auxiliary request** differs from claim 1 of the third auxiliary request in that the word "and" at the beginning of feature (h) was removed and in that it comprises, at the end, feature (j).

XIII. Claim 1 of the **fifth auxiliary request** differs from claim 1 of the fourth auxiliary request in that the word "and" at the beginning of feature (j) was removed and in that it comprises, at the end, feature (l).

XIV. Claim 1 of **new auxiliary request 1** differs from claim 1 of the main request in that feature (h) is replaced by

the following feature (board's feature labelling and underlining):

(n) "and wherein the function module (11) is adapted to decode said signal and to determine a state of charge of the rechargeable battery (15) based on said decoded signal."

XV. Claim 1 of **new auxiliary request 2** differs from claim 1 of the main request in that features (g) and (h) are, respectively, replaced by the following features (board's feature labelling and underlining):

(o) "characterized in that the control unit (17) is adapted to control the voltage regulator (16) so as to encode a signal in dependence of the rechargeable battery output voltage (V_BATT) onto the supply voltage (V_HI) to obtain an encoded signal relating to a state of charge of the rechargeable battery;

(p) and wherein the function module (11) is adapted to decode said encoded signal to obtain an encoded signal and to determine a state of charge of the rechargeable battery (15) based on said decoded signal."

XVI. Claim 1 of **new auxiliary request 3** differs from claim 1 of new auxiliary request 2 in that feature (o) is replaced by the following feature (board's feature labelling and underlining):

(q) "characterized in that the control unit (17) is adapted to control the voltage regulator (16) so as to encode a signal in dependence of the rechargeable battery output voltage (V_BATT)

digitally onto the supply voltage (V_HI) to obtain an encoded signal relating to a state of charge of the rechargeable battery;".

XVII. Claim 1 of **new auxiliary request 4** differs from claim 1 of new auxiliary request 3 in that it comprises, between features (q) and (p), feature (l) with the word "and" at the beginning of feature (l) removed.

XVIII. Claim 1 of **new auxiliary request 5** differs from claim 1 of new auxiliary request 4 in that it comprises, at the end, feature (m) without a semicolon at the end and with, at the beginning of feature (m), the addition of the word "and".

Reasons for the Decision

1. *Procedural matters*

1.1 Late notification of non-attendance at oral proceedings

In this case, the proprietor's representative provided his videoconferencing details only three working days before the arranged oral proceedings, after having been prompted to do so by the registry. It appeared that these details had not been provided earlier due to an oversight. The board can only conclude from this that the proprietor had every intention to participate.

However, the proprietor's representative notified the board of their non-participation **one day** before the scheduled proceedings (cf. point V above). This is regrettably late and of course unacceptable for the board and the other party. While the board acknowledges the representative's apology in this case and

understands that late instructions can occur, timely communication with the board's registry is essential, particularly as scheduled oral proceedings approach (see also **T 124/22**, Reasons 1.1). Given that the board and other parties evidently invest time in preparation, late announcements of non-participation disrupt proceedings and show a lack of consideration. Such announcements should thus be given well in advance.

1.2 Decision in written proceedings and requests on file

1.2.1 The proprietor withdrew its request for oral proceedings (cf. point V above). In turn, the board did not consider the conduct of oral proceedings to be expedient (cf. Article 116(1) EPC), and the opponent's auxiliary request for oral proceedings did not apply. As a consequence, the decision is handed down in written proceedings (Article 12(8) RPBA).

1.2.2 When the proprietor filed new auxiliary requests 1 to 5 (cf. point IV above), it did not expressly indicate that the earlier six auxiliary requests, mentioned in point II above, were withdrawn. Therefore, in the proprietor's favour, the board will also address those six auxiliary requests in the present decision.

2. *Technical background*

2.1 The opposed patent relates to hearing devices having rechargeable batteries, also known as "secondary cells". According to the patent, traditional hearing devices with "primary cells" (like zinc-air batteries) allowed for direct measurements of battery voltage to indicate the state of charge of those batteries. However, rechargeable batteries, coupled with battery-power management systems for ensuring safety

and a constant voltage output, obscure the true battery voltage from the hearing device's circuitry. This can lead to unexpected device shutdowns due to battery depletion.

2.2 The patent aims to avoid the user being surprised by a sudden shutdown of the hearing device (10) by informing the user when the battery's output voltage (V_BATT) drops below a certain threshold. To do so, it suggests using a control module (17) that controls a voltage regulator (16) of the battery-power management system to encode a signal (CS) relating to the state of charge of the rechargeable battery onto a supply voltage (V_HI) that is output by the voltage regulator to a function module (11) of the hearing device. This function module can then decode the encoded signal and derive the battery's state of charge based on the result of the decoding.

2.3 A typical embodiment of the invention is shown in Figure 1 of the opposed patent:

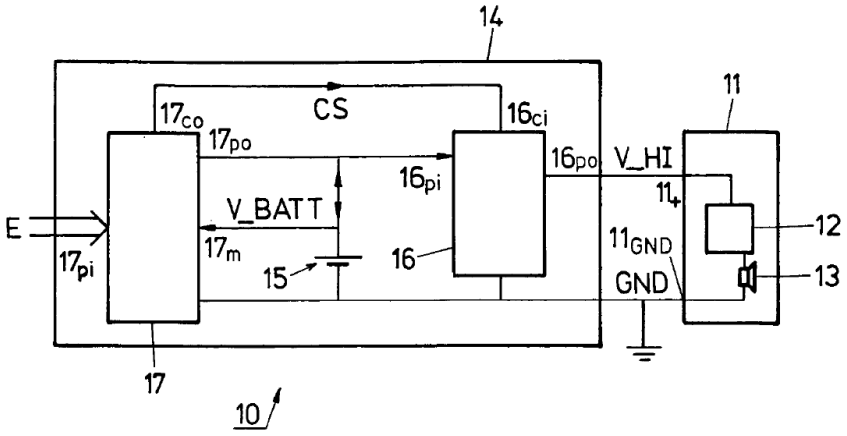

FIG.1

There, hearing device 10 comprises function module 11 which contains function-module circuitry 12 and

receiver 13. Battery-power management system 14 encompasses rechargeable battery 15, generating the battery voltage V_BATT. Control unit 17 measures the battery voltage V_BATT at measurement input 17_m and then outputs control signals CS via its control output 17_{co} which are received by voltage-regulator control input 16_{ci}. Control signals CS are generated dependent on battery voltage V_BATT and, hence, are dependent on the state of charge of rechargeable battery 15. Voltage regulator 16 regulates the battery voltage so as to output regulated supply voltage V_HI at output 16_{po}, to which function module 11 is connected. Based on the received control signals CS, it modulates ("encodes") a signal onto the supply voltage V_HI subsequently supplied to function module 11. Function-module circuitry 12 measures supply voltage V_HI. By decoding the signal encoded onto supply voltage V_HI, it determines the state of charge of rechargeable battery 15. The user can then be informed accordingly about the state of charge of rechargeable battery 15 via acoustic or visual means.

3. *Main request: claim 1 - construction*

Prior to the assessment of added subject-matter in point 4 below, it is expedient to determine how **features (g) and (h)** should be construed in view of the terms that were underlined in point VII above.

3.1 As regards **feature (g)**, the board concurs with the opponent that the "signal" mentioned in this feature can be any electrical signal. The skilled reader would understand the expression "in dependence of the rechargeable battery output voltage" used in feature (g) to relate to the way in which the "signal" is *encoded*. Accordingly, the "encoding" is performed in

dependence of the rechargeable battery output voltage, rather than generating the "signal" in dependence of that output voltage (as e.g. required by page 9, lines 25-29 of the underlying description as filed). To give an example, the "signal" could thus be a *sine signal* modulated onto the claimed "supply voltage" in a way that is somehow dependent on the "rechargeable battery output voltage". This sine signal could perhaps have an arbitrary frequency and could itself be modulated to reflect a particular content (see also point 3.3 below).

3.2 In any case, the mere presence of such a "signal" in the claimed supply voltage, irrespective of its content, can suffice for the function module to determine "a state of charge of the rechargeable battery" in accordance with **feature (h)**. In one scenario, the "control unit" could realistically encode, for instance, a series of random numbers onto the supply voltage for as long as the rechargeable battery output voltage is *above* a certain threshold. Such random numbers have no bearing on the *actual* battery output voltage but will allow the "function module" to determine that the battery output voltage (and, hence, the associated "charge") is above the threshold.

3.3 Concerning **feature (h)**, it is apparent that this feature requires the "function module" of feature (b) to perform two operations (continuing with the *sine signal* as set out in point 3.1 above as an example of the "signal" according to feature (g)):

(1) to decode the sine signal;
(2) to determine a state of charge of the rechargeable battery based on that sine signal.

Operation (1) implies that the sine signal *itself* is somehow modulated or otherwise encoded.

Operation (2) need not be more elaborate than that the "function module" determines the "state of charge of the rechargeable battery" (e.g. to be above or below a certain threshold) based on the mere fact that the sine signal is present in the claimed supply voltage. This determination can be performed not only irrespective of the sine signal's potential content but also regardless of whether the sine signal *itself* has been decoded. The board therefore does not agree in this respect with the proprietor arguing that the term "'*said signal' only can mean that the rechargeable battery is determined based on the decoded signal*" (proprietor's emphasis).

3.4 Reasons 10.1.4 of the appealed decision seems to have interlinked operations (1) and (2) such that

- feature (g) is considered to imply yielding "an encoded signal" and

- the "decoding" underlying operation (1) is considered to act on this encoded signal rather than on the ("original") signal mentioned in feature (g), where the result of this decoding is used for operation (2).

The board can only speculate as to why this interlinking was adopted. It seems, however, that this was done to bring claim 1 as granted more in line with the description of the opposed patent, for instance (emphasis added)

- paragraph [0007]: "... *the function module is provided with information relating to the voltage*

of the rechargeable battery, and hence the state of charge of the rechargeable battery, and thus can decode this information ...";

- paragraph [0012]: "... *the function module is adapted to determine the state of charge of the rechargeable battery at least partly based on measurement of the supply voltage and decoding of the signal encoded therein ...*".
- paragraph [0017]: "... *the signal relating to the state of charge of the rechargeable battery is decoded by the function module, and the state of charge of the rechargeable battery is determined by the function module based on the decoded signal*".

3.5 The board does not endorse the approach adopted by the opposition division in this regard. It does not consider the description to be a tool for narrowing down the claimed subject-matter to an extent beyond what would objectively occur to the skilled reader based on their common general knowledge from reading the claims alone (cf. **T 1924/20**, Reasons 2.7). From the board's perspective, claim 1 as granted does not restrict the "signal" mentioned in features (g) and (h) other than that it should be an *electrical* signal.

3.6 In that regard, the proprietor argued that it was generally accepted that the skilled reader "should try, with synthetical propensity, i.e. building up rather than tearing down, to arrive at an interpretation of the claim which is technically sensible and takes into account the whole disclosure of the patent". The proprietor also emphasised that the "patent must be construed by a mind willing to understand, not a mind desirous of misunderstanding".

The board recalls at this point that the frequently

used reference to a "willing" skilled reader is about relying on a skilled reader who is prepared to interpret a claim *objectively*, and not on a skilled reader who is concerned with "understanding" the alleged intention of the applicant or patent proprietor at a certain point in time (cf. **T 10/22**, Reasons 2.3; **T 986/22**, Reasons 2.2.3). Nonetheless, the board agrees with the proprietor that the skilled reader would indeed understand feature (g) such that the "signal" is modulated "onto the supply voltage" in a manner in which a typical "modulation/demodulation (or encoding/decoding) process" is conducted. It also accepts that the "signal" according to feature (g) must be consistent with "said signal" in accordance with feature (h). However, as illustrated by the realistic "random-numbers sequence" scenario set out in point 3.2 above, this does not mean that it is only technically possible and thus sensible for the "function module" as per feature (h) "to determine a state of charge of the rechargeable battery" based on "said signal" if, as argued by the proprietor, "the signal includes information regarding the state of charge of the rechargeable battery, with such information being provided by the rechargeable battery output voltage recited in feature (g) in the context of the signal encoding". This is because the random-number sequence itself does not inherently convey ("include") any specific information about the battery's "state of charge". Instead, its mere presence or absence in the "supply voltage" indicates whether the battery charge is above or below a predetermined threshold. Crucially, this binary information will typically lack the granularity to provide the user with a timely warning that recharging is necessary.

4. *Main request: claim 1 - added subject-matter*

Claim 1 as granted relates to original claim 1 with amendments leading to **features (g) and (h)**. For the following reasons, the board holds that these amendments amount to an unallowable intermediate generalisation.

4.1 The proprietor refers in this respect to the passages on page 3, line 25 to page 4, line 5 and page 7, lines 15 to 19 of the description as originally filed. Especially the passage on page 7 seems to have convinced the opposition division with respect to a proper basis, as apparent from Reasons 10.1.3 of the appealed decision. While the board agrees with the proprietor that the passage bridging original pages 3 and 4 "provides for a literal disclosure of feature (g)", it is not satisfied that the proprietor's references to the application as filed constitute a direct and unambiguous disclosure of **feature (h)** for the reasons set out below.

4.1.1 When a claim is restricted to a particular embodiment, as is presently the case, it is normally not permitted to extract isolated features from a set of features which have originally been disclosed in combination for that embodiment. As set out in **T 1428/17** (Reasons 1.4), such an amendment, i.e. an intermediate generalisation, is only justified in the absence of a clearly recognisable functional or structural relationship among those features.

4.1.2 In the case in hand, there is, however, at least a functional relationship. The paragraph bridging pages 3 and 4 of the original description in fact emphasises the ability of the claimed invention to inform the user

about the battery's state of charge, thereby preventing unexpected device shutdowns. It further states that the function module can "decode this information and inform the user of the hearing device appropriately, such as by giving a signal when the rechargeable battery requires recharging". While the phrase "such as" might suggest that giving a signal is merely an example of appropriate user information, the context of the entire application as filed directly and unambiguously discloses that informing the user about the need for recharging is a crucial aspect of the invention, not an *optional* one. The original application's objective, as stated on page 2, lines 16 to 24 as filed, is to prevent users from being "surprised by sudden powering down of the hearing device without warning due to the battery being exhausted". The only mechanism described in the application as filed to achieve this is by encoding actual battery information onto the claimed supply voltage and having the function module decode it to inform the user. Therefore, the ability to provide a warning signal when the battery requires recharging is essential to fulfilling the original application's purpose, not just an *optional* feature. This is also corroborated by the phrase "*the signal relating to the state of charge of the rechargeable battery is decoded by the function module*" at lines 15 to 17 of page 7 of the description as filed.

By contrast, it was already mentioned in point 3.6 above that the "signal" according to features (g) and (h) need not encompass any information allowing to *prevent* unexpected device shutdowns: as demonstrated in points 3.1 to 3.3 above, the "signal" on which the "determining" step in accordance with feature (h) is based can be any electrical signal that is encoded "in

dependence of the rechargeable battery output voltage".

4.1.3 On a general note, the scenario described in point 3.2 above can be used here to indicate in which way subject-matter has been added by the amendments underlying features (g) and (h). There, the encoded series of random numbers allows the claimed "function module" to determine whether or not the rechargeable battery output voltage is above, say, half of its maximum value. Since a rechargeable battery is normally not recharged when it still comprises half of its maximum charge, this determination cannot contribute to informing the user that the rechargeable battery requires recharging, i.e. no prior user warning may take place. The hearing device according to granted claim 1 can therefore continue operating without issuing any warning to the user until the rechargeable battery output voltage drops below a threshold where the control module is no longer operational (e.g. 1200 mV as referred to in lines 5 to 12 of page 11 as filed).

Metaphorically speaking, this means that, like a *camel*, the "hearing device" described in granted claim 1 operates diligently until it abruptly ceases to function when its battery is depleted. There is no advance warning, similar to how a camel, despite its endurance, can suddenly collapse without prior indication. Conversely, the original application envisions a "hearing device" akin to a *horse*. A horse will typically exhibit clear signs of distress or fatigue (neighing, slowing down or resisting commands) well before reaching its limits. Similarly, the hearing device described in the application as filed actively communicates its battery status to the user, thereby

providing ample warning before a shutdown.

4.2 The proprietor also referred, within the context of features (g) and (h), to original claim 18. For the following reasons, this additional reference could not sway the board either:

4.2.1 The "determining a state of charge" step recited in original claim 18 relates to "said decoded signal", which is, as set out in point 3.3 above, not necessarily the same as "said signal" in accordance with feature (h). Moreover, original claim 18 comprises, by virtue of original claim 11 on which it depends, the step of "measuring the rechargeable battery output voltage" by an unspecified entity (e.g. the "function module"?), whereas, in granted claim 1, it is clearly specified that it is the "control unit" that is "adapted to measure the rechargeable battery output voltage".

4.2.2 Even if one were to acknowledge that "said signal" according to feature (h) must be read in the sense of "said encoded signal" and that parts of original claims 11 and 18 can be combined with parts of original claim 1 in the way as suggested in granted claim 1, there would still be no disclosure for the amendment underlying feature (g) that the "control unit" is indeed adapted to control *the voltage regulator* so as to encode the "signal" onto the supply voltage. This control exerted by the "control unit" onto the "voltage regulator" has only been expressed in lines 25 to 28 of page 3 as filed.

4.3 Hence, the amendments underlying granted claim 1 do not comply with Article 123(2) EPC. Contrary to the finding set out in Reasons 10.3 of the appealed decision, the

ground for opposition under Article 100(c) EPC in fact prejudices the maintenance of the patent in its granted form.

5. *First to fifth auxiliary requests and auxiliary request 1A: added subject-matter*

5.1 Regardless of any admittance issues relating to the **first to fifth auxiliary requests** and **auxiliary request 1A** and irrespective of the proprietor's observation that the insertion of feature (i) constituted an "obvious error", the board holds that none of the **features (i) to (m)** provides a remedy for the objection under Article 123(2) EPC raised in point 4 above against feature (h). In particular, none of these features narrows down the "signal" mentioned in features (g) and (h) to one encompassing only originally disclosed subject-matter.

5.2 Hence, the first to fifth auxiliary requests as well as auxiliary request 1A are not allowable under Article 123(2) EPC either.

6. *New first to fifth auxiliary requests: admittance*

6.1 The **new first to fifth auxiliary requests** constitute amendments of the proprietor's appeal case that were filed *after* notification of the board's communication under Article 15(1) RPBA. Their admittance is therefore at the board's discretion (cf. Article 13(2) RPBA).

6.2 The proprietor invoked "exceptional circumstances" under Article 13(2) RPBA because the amendments sought to "directly address an objection which was raised for the first time in the grounds of appeal" and which was

also found in the [board's] preliminary opinion".

6.3 The board notes, however, that, if the proprietor felt the need to respond to the opponent's objection raised in the statement of grounds of appeal with claim amendments, it should have done so already with its written reply to the opponent's appeal. There is nothing exceptional about the circumstances, and no justification for waiting, and submitting new first to fifth auxiliary requests only at this late stage in the appeal proceedings.

6.4 Moreover, even if there were indeed "exceptional circumstances", the board notes that, contrary to one of the criteria for the board to exercise its discretion under Article 13(1) RPBA, the new first to fifth auxiliary requests would not be suitable to resolve the issues raised in point 4 above against claim 1 of the main request. This is because none of the amendments underlying these "new auxiliary requests" seems to include the missing information that indeed ensures that the user is given a warning when the hearing device's rechargeable battery requires recharging.

6.5 Consequently, the board decides not to admit the new first to fifth auxiliary requests into the proceedings (Article 13(2) RPBA).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated