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**Datasheet for the decision
of 9 June 2026**

Case Number: T 0909/24 - 3.5.05

Application Number: 17792310.9

Publication Number: 3453189

IPC: H04R25/02, G10L25/84,
H04W88/02, H04R1/10, H04R3/00

Language of the proceedings: EN

Title of invention:

Device and method for improving the quality of in-ear
microphone signals in noisy environments

Patent Proprietor:

Eers Global Technologies Inc.

Opponent:

K/S HIMPP

Headword:

Speech detection via filter weights/EERS

Relevant legal provisions:

EPC Art. 83, 116(1)
RPBA 2020 Art. 12(8)
EPC R. 103(1)(a), 111(2)

Keywords:

Decision in written proceedings - (yes): indication of proprietor's non-attendance; oral proceedings neither necessary nor appropriate

Sufficiency of disclosure - auxiliary request 2 (no): undue burden on the skilled person

Reimbursement of appeal fee in full - (yes): appealed decision insufficiently reasoned



Beschwerdekammern

Boards of Appeal

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Case Number: T 0909/24 - 3.5.05

D E C I S I O N
of Technical Board of Appeal 3.5.05
of 9 June 2026

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Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office
posted/electronically transmitted on 8 May 2024
concerning maintenance of the European Patent
No. 3453189 in amended form.**

Composition of the Board:

Chair

K. Bengi-Akyürek

Members:

K. Peirs

C. Heath

Summary of Facts and Submissions

- I. The appeal of the opponent lies from the interlocutory decision of the opposition division to maintain the opposed patent in amended form in accordance with the proprietor's **"auxiliary request 2"** (Article 101(3)(a) EPC).

The opposition division found that the ground for opposition under Article 100(c) EPC in conjunction with Article 123(2) EPC prejudiced the maintenance of the patent as granted. It also found the proprietor's "auxiliary request 1" not to be allowable under Article 123(2) EPC.

- II. The parties made the following requests:

- The appellant (opponent) requested that the appealed decision be set aside and that the patent be revoked. It also requested a reimbursement of the appeal fee.
- The respondent (proprietor) requested that the appeal be dismissed.

- III. The appellant was summoned to oral proceedings before the board. A communication was issued under Article 15(1) RPBA including the board's negative preliminary opinion on "auxiliary request 2" under Article 83 EPC.

- IV. With a letter of reply, the respondent stated that it would not be attending the arranged oral proceedings.

V. Subsequently, the oral proceedings were cancelled.

VI. Claim 1 of **auxiliary request 2** underlying the appealed decision reads as follows (board's feature labelling):

- (a) "A device (10, 10') for enhancing speech generated from bone and tissue conduction of a user and captured using an in-ear microphone signal in a noisy environment (30), the device (10, 10') comprising:
- (b) an intra-aural unit (12, 12') adapted to be positioned into an ear of the user, the intra-aural unit (12, 12') having an in-ear microphone (16) located inside an outer ear canal (3) of the ear and an outer ear microphone (22) adapted to be in fluid communication with an environment outside the ear;
- (c) a transmitter (24);
- (d) a processing unit (26) operatively connected to the in-ear microphone (16) to receive an internal signal therefrom, to the outer-ear microphone (22) to receive an external signal therefrom and to the transmitter (24), the processing unit (26) having an associated memory comprising instructions stored thereon, that when executed on the processing unit (26) performing the steps of:
- (e) acquiring the internal signal from the in-ear microphone (16);
- (f) acquiring the external signal from the outer-ear microphone (22);
- (g) applying an adaptive filter to the acquired in-ear microphone signal to produce a denoised signal, the adaptive filter:
- (h) being initialized by an estimated transfer function of the intra-aural device (10, 10') based on the

outer-ear microphone signal and the in-ear microphone signal;

- (i) having an adaptation process continuously adjusting the estimated transfer function using the acquired in-ear microphone signal and outer ear microphone signal;
- characterized in that the processing unit (26) further performs the steps of:
- (j) detecting speech from the user by monitoring values of filter coefficients of the adaptive filter by performing the sub-steps of:
 - (k) computing filter weights of the adaptive filter;
 - (l) upon detecting an increase in the filter weights for two consequent time indexes greater than a triggering threshold, providing an indication of detection of speech by the user;
 - (m) interrupting application of the adaptation process upon detecting speech by the user;
 - (n) restarting the application of the adaptation process once speech is no longer detected; and
 - (o) providing the denoised signal via the transmitter (24)."

Reasons for the Decision

1. *Decision in written proceedings*

As the respondent effectively withdrew its request for oral proceedings by declaring its intent not to attend them, and as the board does not consider the conduct of oral proceedings to be expedient either (cf. Article 116(1) EPC), the decision is handed down in written proceedings (Article 12(8) RPBA).

2. *Opposed patent - technical background*

2.1 The opposed patent concerns communications in excessively noisy environments while wearing a hearing protection. In this context, traditional boom microphones are said to capture too much ambient noise. Moreover, capturing speech via bone and tissue conduction using an in-ear microphone may provide a good signal-to-noise ratio but, according to the patent, suffers from a limited frequency bandwidth. Furthermore, in extremely noisy situations, residual ambient noise typically still penetrates the occluded ear canal and degrades the captured internal signal.

2.2 The invention underlying the opposed patent aims to address these difficulties by using an intra-aural device equipped with both an in-ear microphone (IEM) and an outer-ear microphone (OEM). A processing unit applies an adaptive filter to de-noise the internal speech signal by using the external noise captured by the OEM as a reference. Crucially, to avoid cancelling out the user's own voice, the adaptation process is interrupted when speech is detected. This speech detection is achieved by monitoring the values of the filter coefficients. Once the signal is successfully de-noised, its quality is further improved by applying a non-linear bandwidth-extension process to artificially recreate the missing high-frequency harmonics.

2.3 Figure 4B (reproduced below) of the opposed patent illustrates the overall system architecture and the signal flow:

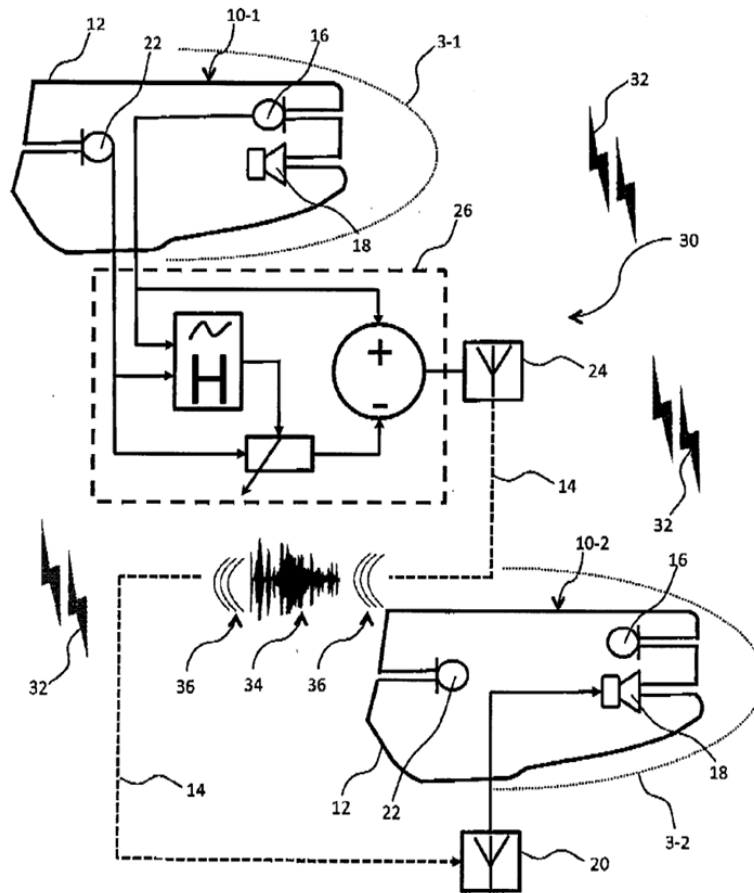


Figure 4B

The intra-aural unit (12) is worn in the user's ear and contains both the IEM (16) and the OEM (22). The OEM picks up the external ambient noise. The IEM captures an overall internal signal comprising the user's speech generated via bone and tissue conduction, residual speech and residual noise inside the user's ear canal. The signals from the OEM and IEM are fed into the digital signal-processing unit (26). This digital signal-processing unit applies an adaptive filter to the external noise signal to estimate the residual noise inside the ear. The estimated residual noise is then removed via a subtractor (represented by the "+/-" circle here) from the overall internal signal picked up by the IEM. The resulting de-noised and enhanced speech

signal (34) is then sent via a transmitter (24) over a wireless communication link (14) to a receiver (20) and played through a loudspeaker of either the intra-aural unit or of another device like a smartphone.

3. *Auxiliary request 2: claim 1 - sufficiency of disclosure*

The board considers that the opposed patent does not disclose the invention as defined in claim 1 of **auxiliary request 2** in a manner compliant with Article 83 EPC. The reasons for this are as follows:

- 3.1 In the appealed decision (Reasons 24.1 and 24.2), the opposition division addressed only the objection raised by the opponent under Article 83 EPC in the initial notice of opposition. As will be detailed in point 4 below, the opposition division in the appealed decision failed to address the opponent's further arguments concerning the speech detection method defined by **feature (j)**, which were properly maintained during the opposition proceedings.
- 3.2 In terms of allowability under Article 83 EPC of auxiliary request 2, the board concurs with the opponent's line of argument concerning claim 1. The opponent first argued in points [4] to [7] of its written reply of 17 February 2023 to the opposition division's summons to oral proceedings that the disclosure of one specific embodiment for the speech detection as per feature (j) was not sufficient to enable the claimed invention to be performed over the whole scope claimed. This argument was further substantiated in points 8.13 to 8.21 of the statement of grounds of appeal, where the opponent correctly identified a fundamental defect underlying **features (j)**

to (1). The board finds these arguments persuasive and notes a threefold ambiguity in the speech detection in accordance with features (j) to (l) that, taken together, places an undue burden on the skilled person in the field of hearing devices:

- 3.2.1 First, claim 1, according to **feature (1)**, requires a comparison between a plurality of "filter weights" and a single "triggering threshold" but fails to specify the metric (e.g. "maximum valued filter weight" mentioned in paragraph [0050] of the opposed patent or a particular vector norm) needed to convert the vector of weights into a single comparable value.
- 3.2.2 Secondly and more fundamentally, the detection criterion underlying feature (1) is technically unsubstantiated. Claim 1 merely relies on detecting a stable "increase" in the chosen (but undefined) metric. A skilled person would however expect that the introduction of the user's powerful and uncorrelated speech is likely to cause large, erratic oscillations in the filter weights, making a stable "increase" an unreliable criterion for detection. The patent's own disclosure appears to give credence to this assessment of unreliability, as paragraph [0052] teaches that this filter-weights-based trigger is used only for the *onset* of speech, while a different mechanism (i.e. monitoring signal energy) is required to detect the *end* of speech.
- 3.2.3 This lack of a reliable and workable principle has however direct consequences for the determination of the "triggering threshold" necessary according to feature (1). While paragraph [0051] of the opposed patent describes an empirical method for selecting a "threshold", this method presupposes that a reliable relationship between the metric and the presence of

speech exists. Given the unsubstantiated nature of the "increase" criterion addressed in point 3.2.2 above, the skilled person would have doubts as to whether this empirical method would yield a single, reproducible "threshold" applicable over the whole scope claimed, which covers all types of users and all "noisy environments". The skilled person would in this regard be forced to embark on a new research programme for each specific scenario, which typically constitutes an undue burden.

3.3 In its written reply to the statement of grounds of appeal, the respondent did not provide any substantive counter-arguments to this specific objection.

3.4 Consequently and contrary to the opposition division's finding set out in Reasons 24 of the appealed decision, the claimed invention is not disclosed in a manner sufficiently clear and complete for it to be carried out by the skilled person (Article 83 EPC).

4. *Substantial procedural violation: reimbursement of the appeal fee*

4.1 As to the appellant's request for a reimbursement of the appeal fee in view of a substantial procedural violation on the part of the opposition division, the board makes the following observations:

4.1.1 A party's right to be heard under Article 113(1) EPC requires the deciding body to consider all pertinent arguments properly submitted during the respective proceedings. This requirement is fundamental to ensuring that a decision is based on the substance of the case as presented by the parties and not, arbitrarily, on a selective or incomplete assessment of

their arguments.

- 4.1.2 In the present case, the board observes that the opponent, in its written reply of 17 February 2023 to the opposition division's summons to oral proceedings, raised a substantive objection concerning insufficiency of disclosure relating to the speech detection method underlying features (j) to (l). Point 5.4 of the minutes of the "first oral proceedings" before the opposition division on 20 April 2023 confirms that the opponent maintained this written objection, while not wishing to discuss it further orally. The opposition division was therefore actually obliged to consider this maintained argument.
- 4.1.3 However, the appealed decision is silent on this specific argument, addressing only a different objection under Article 83 EPC raised in the initial notice of opposition (cf. point 3.1 above). The disregarded argument, which concerned the fundamental reproducibility of the distinguishing feature of the claimed invention for which inventive step was acknowledged (appealed decision, Reasons 27.2), was, as is apparent from point 3.2 above, highly relevant and of such a nature that it could indeed have persuaded the opposition division to come to a different conclusion on sufficiency of disclosure.
- 4.1.4 By failing to address this central and pertinent argument, the opposition division based its positive finding on sufficiency of disclosure on an incomplete assessment of the opponent's case. Accordingly, the board agrees with point 10.1 of the statement of grounds of appeal that the appealed decision is not sufficiently reasoned as required by Rule 111(2) EPC. This indeed constitutes a substantial procedural

violation.

- 4.2 Given that the appeal is allowable, this violation is of a nature to also justify the full reimbursement of the appeal fee under Rule 103(1) (a) EPC.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked.
3. The appeal fee is reimbursed in full.

The Registrar:

The Chair:



B. Brückner

K. Bengi-Akyürek

Decision electronically authenticated