

Internal distribution code:

- (A) [-] Publication in OJ
- (B) [-] To Chairmen and Members
- (C) [-] To Chairmen
- (D) [X] No distribution

**Datasheet for the decision
of 27 April 2023**

Case Number: T 0934/19 - 3.4.01

Application Number: 11841933.2

Publication Number: 2641346

IPC: G10L21/02, H04R25/00, H04B15/02

Language of the proceedings: EN

Title of invention:
SYSTEMS AND METHODS FOR REDUCING UNWANTED SOUNDS IN SIGNALS
RECEIVED FROM AN ARRANGEMENT OF MICROPHONES

Patent Proprietor:
Noopl, Inc.

Opponent:
K/S HIMPP

Headword:
Reducing unwanted sounds / Noopl

Relevant legal provisions:
EPC R. 80
EPC Art. 83, 123(2)

Keyword:

Admission of late filed main request by opposition division
not overturned

Amendments allowable - allowable (yes)

Sufficiency of disclosure - main request (yes)

Decisions cited:

G 0007/93, T 0960/15



Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0934/19 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 27 April 2023

Appellant:

(Opponent)

K/S HIMPP
Nymoellevej 6
3540 Lyngø (DK)

Representative:

Aera A/S
Niels Hemmingsens Gade 10, 5th Floor
1153 Copenhagen K (DK)

Respondent:

(Patent Proprietor)

Noopl, Inc.
1210 G St, Suite B,
Sacramento, CA 95814 (US)

Representative:

Appleyard Lees IP LLP
15 Clare Road
Halifax HX1 2HY (GB)

Decision under appeal:

**Interlocutory decision of the Opposition
Division of the European Patent Office posted on
15 January 2019 concerning maintenance of the
European Patent No. 2641346 in amended form.**

Composition of the Board:

Chair

P. Fontenay

Members:

T. Petelski

C. Almborg

Summary of Facts and Submissions

- I. An opposition was filed against the European patent, based on Articles 100(a), (b), and (c) EPC.

- II. In its interlocutory decision, the Opposition Division maintained the patent in amended form on the basis of the (then) first auxiliary request.

- III. The opponent lodged an appeal against this decision, and requested that the decision be set aside and the patent revoked.

By letter of 13 April 2023, the opponent further requested that the Opposition Division's decision to admit the (then) first auxiliary request (now the main request) be overturned. If the Board decided that the main request did not comply with the requirements of the EPC, the case was to be remitted to the Opposition Division.

- IV. In its reply to the appeal, the proprietor (respondent), requested that the patent be maintained as maintained by the Opposition Division, i.e., that the appeal be dismissed (main request). In the alternative, the proprietor requested that the patent be maintained on the basis of one of five auxiliary requests filed with that reply.

V. During the oral proceedings held before the Board, the parties stood by their previously made requests (as just reproduced).

VI. Independent claims 1 and 10 of the main request read:

1. A method of reducing unwanted sounds in signals received from an arrangement of microphones including the steps of:

sensing sound sources distributed around a specified target direction by way of an arrangement of microphones to produce left and right microphone output signals;

determining the power of each of the left and right microphone signals;

determining the minimum of the two microphone power measures;

time-averaging each of the left microphone power, the right microphone power and the minimum power; and,

attenuating each of the left and right microphone signals based on a comparison of the respective time-averaged microphone power measure with the time-averaged minimum power measure,

wherein the comparison of each of the time-averaged left and right microphone power measures is based on the ratio of the respective time-average microphone power

measure and the time-averaged minimum power measure.

10. A system for reducing unwanted sounds in signals received from an arrangement of microphones including:

sensing means suitable for sensing sound sources distributed around a specified target direction by way of an arrangement of microphones to produce left and right microphone output signals;

determination means for determining the power of each of the left and right microphone signals;

determination means for determining the minimum power of the left and right microphone signals;

time-averaging means for time-averaging each of the left microphone power, the right microphone power and the minimum power; and

attenuation means for attenuating each of the left and right microphone signals based on a comparison of the time-averaged power of the respective microphone signal with the time-averaged minimum power,

wherein the attenuation means is arranged to attenuate each of the left and right microphone signals based on the ratio of the time-averaged power of the respective

microphone signal and the time-averaged minimum power.

- VII. The wording of the dependent claims, as far as relevant for the present decision, will be cited in the context of the respective arguments in the reasons for the decision, further below.
- VIII. The content of the auxiliary claim requests is not relevant for the present decision.
- IX. The arguments of the parties that are relevant to this decision are reproduced below in the reasons.

Reasons for the Decision

Main request - admission

- 1. The opponent requests that the main request not be admitted into the appeal proceedings, because it could and should have been filed earlier than during the oral proceedings before the Opposition Division (then labelled as the first auxiliary request). The late filing could only be seen as an abuse of procedure that put an undue burden on the opponent. In addition, the opponent could not foresee this surprising request, which does not converge with the other auxiliary requests then on file. Lastly, the request was also not clearly allowable.
- 2. These arguments are not persuasive.

3. It is not the Board's task to review all the facts and circumstances of the case as if it were in the Opposition Division's place. The Board should only overrule a discretionary decision of the first instance, if the latter, in taking its decision, applied the wrong principles, took no account of the right principles, or exercised its discretion in an unreasonable way (Case Law of the Boards of Appeal, 10th edition, V.A.3.4.1(b), with particular reference to point 2.6 of the Reasons for the Decision in G 7/93, OJ EPO 1994, 775, as well as T 960/15, points 1 to 9 of the Reasons, with particular reference to the review of a discretionary decision to admit a submission into the proceedings).

4. In the present case, the Opposition Division did apply the right principles in a reasonable way (contested decision, point 3.1.2; minutes of oral proceedings, points 6 - 9). The Board understands that a combination of granted claims 1 and 3 was occasioned by a ground for opposition (Rule 80 EPC), and could not surprise the opponent, who had already attacked both claims in its notice of opposition. The established criterion of *prima facie* allowability was applied, and not unreasonably so (in particular as the request was later found allowable). The filing of claim-requests during oral proceedings is a common occurrence, and it is through the application of the right principles in the exercise of discretion that a proper balance between the interests of the parties can be ensured. Further, there is no indication that the proprietor intentionally withheld the filing for malicious reasons. Therefore, the Board can also not see any abuse of proceedings in the late filing.

5. Hence, the Board does not overturn the Opposition Division's discretionary decision to admit the (then) first auxiliary request (present main request).

The content of the patent

6. The patent is about the reduction of noise in hearing aids. In the typical case, the wearer of the hearing aids looks into the direction of the sound source. Hence, the signals from the left and right microphones will have the same strength. In contrast, any noise from a different direction will have different strengths in the left and right microphones. By reducing the level of the higher of the left and right signals, the noise will be reduced. The invention also works for different known directions of the sound source and is, advantageously, performed in parallel for a plurality of frequency channels.

Main request - added subject-matter - Article 123(2) EPC

7. Summarized, the opponent raises the following objections of added subject-matter against the claims:
 - (a) The original application does not provide a basis for time-averaging each of the left, right, and minimum powers, as it is defined in claim 1. If at all, the time-averaging is disclosed in the original application only in the context of additional features, and, in particular, must be performed in each of multiple frequency channels. Also, the original disclosure is restricted to similar time-averaging techniques for the left,

right, and minimum powers, whereas claim 1 allowed the use of different techniques.

- (b) The original application does not provide a basis for an attenuation based on a comparison of the time-averaged power measures, as it is defined in claim 1, but only of the (instantaneous) power measures themselves. This, however, is something else because power measures are completely different quantities from time-averaged power measures. If at all, the original application discloses an adjustment of time-averaged signals on the one hand, which is different from a comparison, and a very specific comparison of time-averaged power measures in each of multiple frequency channels on the other hand, which cannot be generalized to a single channel.

- (c) The original application does not disclose basing the comparison on the ratio of time-averaged power measures, as it is defined in claim 1. It only discloses a comparison based on (instantaneous) power measures, and an adjustment of signals based on ratios of time-averaged power measures in each of multiple frequency channels, which is not the same. Further, whilst present claim 1 does not exclude the presence of multiple frequency channels, it fails to define that the same method steps are carried out in each of those channels. Hence, claim 1 comprises subject-matter in which a ratio is only determined in some frequency channels, and the signals are attenuated in other channels. Such subject-matter is, however, also not originally disclosed.

- (d) The original application does not provide a basis for the single non-optional feature added by claim 3:

... wherein the ratios between time-averaged powers are scaled by a function.

Original claim 5 is not a valid basis, because it does not define time-averaged powers.

- (e) Claims 2 to 9 are dependent on claims 1 or 3 and their subject-matter extends beyond the application as filed for the same reasons as the subject-matter of the latter claims.

- (f) Claims 10 to 14 extend beyond the application as filed for similar reasons as claims 1 - 9.

8. These arguments are not persuasive.
9. First, it is prefaced that the Opposition Division, contrary to the opponent's view, correctly found that the skilled person would have no problem in understanding that the expressions "power measure" or "power level" are used in the application when emphasizing the reference to the determined power of the microphone signals or to the minimum power.
10. The "summary of the invention" on pages 1 and 2 of the original description discloses the general concept of the invention. The invention manifests in form of a method and of a system, wherein it is implicit that the system provides the means to carry out the method. Reading page 2, line 25 (relating to the system) in context with page 2, line 1 (relating to the method), the skilled person understands that each of the left

and right microphone powers and the minimum power are time-averaged, contrary to the opponent's opinion. The opponent is, however, right in that it is not unambiguous from the summary of the invention alone, if those time-averaged powers are used in the attenuation, or if they are determined for another purpose.

11. Yet, the summary of the invention does not stand alone but must be understood in the context of the whole application. In the absence of any explicit statement indicating otherwise, the inventive concept as disclosed in the summary can only be meant to apply to the following detailed description of the preferred embodiment and its variations, relating to the two only Figures 1 and 2. Although this particular embodiment cannot serve to restrict the meaning of the general concept of the invention, it can serve to interpret unclear or ambiguous definitions therein.
12. It is a common concept of all variations of the preferred embodiment (see page 3, lines 2 - 5 and 15 - 16; page 4, last paragraph; equations 4 - 6 on page 6; and Figure 1) that the left and right power measures and the minimum power measure are time-averaged. The time-averaged monaural (i.e., left and right) power signals are compared to the time-averaged minimum signal, e.g., by determining their ratios (page 3, lines 4 - 5 and 17 - 25; page 4, last paragraph to page 5, first paragraph; and equations 7 - 8). The left and right microphone signals are then adjusted based on that comparison using attenuation means (page 3, lines 4 - 5 and 19 - 25; page 5, first paragraph).
13. Considering this teaching when reading the summary of the invention, the skilled person understands the disclosure on page 1, five last lines, to page 2, line

3, and the disclosure on page 2, lines 19 - 26, such that the time-averaged monaural (left and right) measures are compared to the time-averaged minimum measure. The skilled person also understands that it is the ratio of these time-averaged signals that is used in the comparison and that it is scaled by a function (see in addition page 3, lines 2 - 5 and 17 - 21, transition of pages 4 and 5 and equations 7 to 10). Contrary to the opponent's view, it follows unambiguously from the original description that the comparisons and the formation of the ratios are not two separate steps, but that the comparisons are realized by (or "based on") the formation of the ratios of the time-averaged power measures.

14. The use of the time-averaged power measures in the attenuation steps is also confirmed by the very purpose of the attenuation, which lies in the reduction of noise, while at the same time allowing a satisfactory reproduction of the target sound signal. Relying on instantaneous, non-averaged minimum power measures would, however, interfere with the frequency and information content of the target sound signal, when assuming typical microphone sampling rates. This suggests that the time-averaging is an essential feature.
15. Further, the opponent's view that the claimed subject-matter would also extend to different time-averaging processes for the left, right, and minimum powers is rejected as artificial. Different processes would imply an asymmetric and complex treatment of the three power signals, which would be deprived of any sensible technical meaning in the context of the invention.

16. A multi-channel analysis is explicitly described as optional (page 3, lines 10 - 12). The skilled person understands that the noise reduction works regardless of the number of channels, albeit with varying degrees of performance. The specific example is described in relation to the Figures for an unspecified number of channels, and it suffices to set k equal to one to adapt the example to the case of a single channel.
17. Hence, the opponent's objections regarding added subject-matter in claims 1 and 3 do not stand against a maintenance of the patent according to the main request.
18. The objections put forward with respect to claims 2, 4 to 14 are identical to those raised against claims 1 and 3, and are, therefore, not pertinent for the same reasons.

Main request - disclosure - Article 83 EPC

19. According to the opponent, the patent specification does not disclose how the step of "sensing sound sources" is to be carried out over the whole scope of claims 1 and 10.
20. The Board, in agreement with the Opposition Division, cannot see any problem here. The patent teaches that microphones are arranged, for example as part of a hearing aid, to record the sound from a certain direction. Thereby the microphones "sense the sound sources" that are distributed around that direction and that are causing the sound. The skilled person would not read more into the sensing of sound sources than the mere read-out of microphones that are placed to

sense the sound from a certain direction (cf. Figure 1) "to produce left and right microphone output signals" (claim 1).

21. Further according to the opponent, the patent does also not sufficiently disclose how the minimum of the two microphone power measures can be determined in claims 1 and 10. In order to determine a minimum, the power measures have to be different. However, the patent does not teach how such different power measures can be guaranteed.
22. Again, the Board agrees with the Opposition Division. The determination of the minimum of two measurement values does not require that the two values always be different. The skilled person understands that if, at a certain moment, both values are the same, the minimum of both would be this common value. This is the common way of determining a minimum value in electronics.
23. Still according to the opponent, the method of claim 1 uses the ratio of time-averaged power levels to perform a comparison. This means that the step of comparing was performed after the separate step of determining a ratio. However, the skilled person does not know how to carry out such a method: what should the ratio be compared with, in the step of comparison? The claim excludes the interpretation that the comparison is performed by forming the ratio. The description, on the other hand, only discloses an attenuation or an adjustment of weight parameters based on the ratio of time-averaged power measures, but not a comparison.
24. In addition, the opponent argues that the claim comprises methods which use multiple channels without specifying that identical method steps of time-

averaging, attenuating, and comparing are performed in each channel. The description does not provide any teaching of how to realize the invention in such cases, for example, in cases in which the ratio of power measures is only determined in one channel, whereas the time-averaging is performed in another channel. The description merely discloses one specific realization, which is of no help for carrying out the other realizations covered by the claims. Hence, the skilled person does not know how to carry out the invention over the whole scope of the claim.

25. The Board finds the proprietor's counter-arguments more persuasive.

26. Claims 1 and 10 are about reducing unwanted sounds by attenuating the left and right time-averaged power measures based on a comparison of each of those power measures with the minimum time-averaged power measure. The skilled person understands that an attenuation of the stronger signal reduces the fraction of sound that does not originate from the target direction and caused the inequality in power measures (see also paragraph [0008] of the patent specification). According to the claims, the comparison is based on the ratio of the respective (left and right) time-averaged power measure and the time-averaged minimum power measure. Hence, each comparison of the left and right power measure with the minimum power measure is based on the ratio of the exact same power measures. This can reasonably only be understood to mean that the comparison takes place by forming the ratio of those power measures, an understanding which is supported by the description (cf. paragraphs [0014] and [0021]). A method, in which the comparison is a separate step performed after

calculation of the ratios, is not disclosed anywhere in the patent.

27. The particular embodiment described in the figures in relation with the equations 1 to 16 works for any number of channels, including for a single channel ($k = 1$). Independent of the particular embodiment, the method steps are the same for each channel. This is also clear from claims 1 and 10 alone. The step of time-averaging refers to the previously determined powers of the microphone signals, and the step of attenuating refers to the previously time-averaged powers of the microphone signals. Hence, in case of more than one frequency channels, each having its own (partial) microphone signal, the claims dictate that the method steps are performed similarly on each of those signals. Hence, the opponent's reading that different steps might be performed in different channels is not a valid understanding of the claims, and cannot lead to any problem of realization.
28. The skilled person also understands that the calculation of weights is just one particular way, amongst others, of determining the proper attenuation for reducing unwanted sounds. There are other, well-known ways of using the result of the comparison, in the form of the ratio between power levels, to determine an attenuation. A simple example would be to completely attenuate the higher signal to zero.
29. As a consequence of the above points, the invention as defined by claims 1 and 10 is disclosed in a manner sufficiently clear for it to be carried out by a skilled person.

Remittal

30. The opponent requests a remittal to the Opposition Division "should the Board decide that the Main Request does not comply with the requirements of the EPC" (point 4 of the opponent's letter dated 13 April 2023).
31. The condition for this request is not met. As the Board itself does also not identify any special reasons for a remittal, there is no room or need for remittal of the case (cf. Article 11 RPBA 2020).

Conclusion

32. In its appeal, the opponent has raised objections against the patent in the form in which it was maintained by the Opposition Division (present main request; underlying the appealed decision as first auxiliary request) under Articles 123(2) and 83 EPC. However, the respective objections are not persuasive and do, therefore, not stand against the maintenance of the patent.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chair:



D. Meyfarth

P. Fontenay

Decision electronically authenticated