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Datasheet for the decision of 19 February 2021

Case Number: T 0202/18 - 3.5.03

Application Number: 06010757.0

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IPC: H04R3/02, G10L21/02, G10K11/178

Language of the proceedings: EN

Title of invention:
System and method for improving communication in a room

Applicant:
Harman Becker Automotive Systems GmbH

Headword:
Vehicle communication system/HARMAN

Relevant legal provisions:
EPC Art. 84, 116(1)
EPC R. 103(4)(c)
RPBA 2020 Art. 12(8)

Keyword:
Decision in written proceedings: cancellation of arranged oral proceedings following the appellant's announcement of non-attendance
Clarity - all requests (no)
Partial reimbursement of the appeal fee at 25% - (no): indication of non-attendance not submitted in due time

Decisions cited:
T 0003/90, T 0517/17

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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 0202/18 - 3.5.03

D E C I S I O N
of Technical Board of Appeal 3.5.03
of 19 February 2021

Appellant: (Applicant)	Harman Becker Automotive Systems GmbH Becker-Göring-Strasse 16 76307 Karlsbad (DE)
Representative:	Westphal, Mussgnug & Partner Patentanwälte mbB Werinherstrasse 79 81541 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 6 July 2017 refusing European patent application No. 06010757.0 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chair	K. Bengi-Akyürek
Members:	K. Peirs
	R. Romandini

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division refusing the present European patent application mainly for lack of inventive step (Article 56 EPC). The claim requests underlying the decision under appeal consisted of a main request as well as a first and a second auxiliary request.

II. In the statement of grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted according to the claims of one of the following requests:

- a **main request** (corresponding to the first auxiliary request underlying the decision under appeal);
- in the alternative, a **first auxiliary request** (corresponding to the second auxiliary request underlying the decision under appeal);
- as a further alternative, either one of a **second** and a **third auxiliary request** filed with the statement of grounds of appeal.

As a final auxiliary measure, oral proceedings were requested.

III. In a communication under Article 15(1) RPBA 2020, the board was of the provisional opinion that the appeal was likely to be dismissed in view of, *inter alia*, Article 84 EPC.

IV. In reaction to this communication, the appellant announced that they would not be attending the arranged oral proceedings. They did not submit any comments on

the substance of the board's communication.

V. Oral proceedings before the board were then cancelled.

VI. Claim 1 of the **main request** reads as follows:

"System for improving the acoustical communication between interlocutors in a room comprising

a first and a second interlocutor position where the interlocutors are to be located in the room;

at least one microphone (M) located in the vicinity of the first interlocutor position in the room for generating an electrical signal (y(n)) representative of an acoustical signal present at the first interlocutor position;

at least one loudspeaker (L; L_R) located in the room for converting electrical signals into acoustical signals;

a signal processing unit connected to the at least one microphone (M) and the at least one loudspeaker (L; L_R) and configured to amplify the electrical signal (y(n)) provided by the at last [sic] one microphone (M) and to supply the amplified microphone signal (x(n)) to the at least one loudspeaker (L; L_R), wherein the at least one loudspeaker (L; L_R) generates an undesired acoustical feedback signal in the vicinity of the first interlocutor position;

wherein the signal processing unit is further configured to delay the signal from the at least one microphone (M) to the at least one loudspeaker (L, L_R) with a delay time such that the acoustical signal arriving first at the second interlocutor position originates from the direction of the first interlocutor position; and

at least one additional loudspeaker (L_K) supplied with a noise cancellation signal from a noise processor

unit; said noise cancellation signal representing the phase-inverted feedback signal in the vicinity of said microphone."

VII. Claim 1 of the **first auxiliary request** includes all the features of claim 1 of the main request and further comprises the following phrase in the last part of claim 1 between the wording "from a noise processor unit" and "; said noise cancellation signal representing the phase-inverted feedback signal in the vicinity of said microphone":

"that is supplied with the electrical signal (y(n)) provided by the at last [sic] one microphone (M) and the delayed and amplified microphone signal (x(n))".

VIII. Claim 1 of the **second auxiliary request** includes all the features of claim 1 of the main request and further comprises the following phrase at the end:

"wherein the noise processor unit includes an adaptive filter supplied with the electrical signal (y(n)) provided by the at least one microphone (M); and

wherein the noise processor unit generates the noise cancellation signal by extracting, from the amplified and delayed signal (x(n)), the feedback signal in the vicinity of the at least one microphone (M) and inverting the phase."

IX. Claim 1 of the **third auxiliary request** includes all the features of claim 1 of the main request and further comprises the following phrase at the end:

"wherein the noise processor unit includes an adaptive filter supplied with the electrical

signal (y(n)) provided by the at least one microphone (M);

wherein the noise processor unit generates the noise cancellation signal by extracting, from the amplified and delayed signal (x(n)), the feedback signal in the vicinity of the at least one microphone (M) and inverting the phase,

wherein the electrical signal (y(n)) provided by the at least one microphone (M) and the amplified and delayed microphone signal (x(n)), are used to control the adaptation of the adaptive filter; and

wherein, for adaptation control, the amplified and delayed microphone signal (x(n)) is filtered by a filter having a transfer characteristic ($\hat{h}_{S1}$ (n)) corresponding to the impulse response from the additional loudspeaker (L_K) to the at least one microphone (M)."

Reasons for the Decision

1. *Decision in written proceedings*

1.1 Where oral proceedings are appointed upon a party's request and that party subsequently expresses its intention not to attend, such statement is generally considered to be equivalent to a withdrawal of the request for oral proceedings (see e.g. decision T 3/90, OJ 1992, 737, Reasons, point 1).

1.2 As the board does not consider holding oral proceedings to be expedient or necessary (cf. Article 116(1) EPC), oral proceedings were cancelled and a decision handed down in written proceedings (Article 12(8) RPBA 2020).

1.3 Given that the appellant's indication of non-attendance was not submitted within **one month** of notification of the board's communication under Article 15(1) RPBA 2020, the appeal fee cannot be partially reimbursed under Rule 103(4)(c) EPC (cf. condition (ii) in point 6.1 of T 517/17).

2. *The present application*

The application concerns a communication system in a vehicle. It addresses issues such as feedback and mismatch between the acoustic localisation of a passenger's voice by loudspeakers in the vehicle and the visual localisation of this passenger, giving rise to an unnatural impression of the respective conversation. Such mismatch may in particular occur when rear-seat passengers listen to a front-seat passenger via the communication system. Often, the communication system's loudspeakers producing the sound for the rear-seat passengers are located *behind* the rear-seat passengers, e.g. on the parcel shelf of the passenger compartment. As a result, the rear-seat passengers perceive the front-seat passenger's voice as reproduced by the communication system to be located *behind* them, whereas they see the front-seat passenger in *front* of them. The application combines active noise compensation methods with spatial-hearing effects to reduce these issues.

3. *Main request: claim 1 - features*

Claim 1 of the **main request** includes the following limiting features (as labelled by the board):

(a) System for improving the acoustical communication between interlocutors in a room comprising a first

and a second interlocutor position where the interlocutors are to be located in the room;

(b) at least one microphone located in the vicinity of the first interlocutor position in the room for generating an electrical signal representative of an acoustical signal present at the first interlocutor position;

(c) at least one loudspeaker located in the room for converting electrical signals into acoustical signals;

(d) a signal processing unit connected to the at least one microphone and the at least one loudspeaker and configured to amplify the electrical signal provided by the at least one microphone and to supply the amplified microphone signal to the at least one loudspeaker;

(e) wherein the at least one loudspeaker generates an undesired acoustical feedback signal in the vicinity of the first interlocutor position;

(f) wherein the signal processing unit is further configured to delay the signal from the at least one microphone to the at least one loudspeaker with a delay time such that the acoustical signal arriving first at the second interlocutor position originates from the direction of the first interlocutor position;

(g) at least one additional loudspeaker supplied with a noise-cancellation signal from a noise-processor unit; said noise-cancellation signal representing the phase-inverted feedback signal in the vicinity of said microphone.

4. *Main request: claim 1 - lack of clarity*

4.1 **Feature (f)** is unclear because of the statement "such that **the** acoustical signal **arriving first** at the second

interlocutor position **originates** from the direction of the first interlocutor position" (emphasis added).

In particular, the term "the acoustical signal [arriving first at the second interlocutor position]" in this statement has no proper antecedent. While the term "an acoustical signal" *does* occur with respect to the "at least one microphone" of feature (b), the acoustical signal there is only "present" at the first interlocutor position and does not "originate" from it.

Moreover, it is not indicated with respect to which other signal the acoustical signal should arrive first. Also, the source itself of the acoustical signal "arriving first" is not specified in claim 1. This acoustical signal is merely required to "originate from the direction of the first interlocutor position", i.e. the source could be at *any* point on a line between the second and the first interlocutor position. In fact, the term "arriving first" makes little sense in the context of the present application, given that the system of the invention mainly concerns a motor vehicle (see e.g. lines 6 to 10 of page 1 of the description as filed), where, in use, acoustical signals will inevitably be *continuously* present (e.g. wind or driving noise).

Finally, even if one could control which acoustical signals are present and somehow identify which one of those arrives first, it would still not be clear whether the acoustical signal should arrive first in an objectively verifiable sense (e.g. via an objective measurement) or whether it should be merely perceived as arriving first from a psycho-acoustic point of view.

4.2 Moreover, in **feature (g)**, the term "a noise-processor unit" is not part of the claimed system. It is not clear how this noise-processor unit can provide a noise-cancellation signal representing the phase-inverted feedback signal given that it has no working interrelationship with any of the features (a) to (f) of claim 1. In addition, there is no proper antecedent for the term "the phase-inverted feedback signal" used in feature (g).

4.3 The appellant did not comment on the above issues (cf. point IV above).

4.4 Thus, claim 1 of the main request is not allowable under Article 84 EPC.

5. *Auxiliary requests: claim 1 - clarity*

5.1 Claim 1 of the **first auxiliary request** differs from that of the main request in that

(h) the noise-processor unit is supplied with the electrical signal provided by the at least one microphone and the delayed and amplified microphone signal.

5.2 Claim 1 of the **second auxiliary request** differs from that of the main request in that

(i) the noise-processor unit includes an adaptive filter supplied with the electrical signal provided by the at least one microphone;
(j) the noise-processor unit generates the noise-cancellation signal by extracting, from the amplified and delayed signal, the feedback signal in the vicinity of the at least one microphone and

inverting the phase.

5.3 Claim 1 of the **third auxiliary request** differs from that of the second auxiliary request in that

(k) the electrical signal provided by the at least one microphone and the amplified and delayed microphone signal are used to control the adaptation of the adaptive filter;
and in that,

(l) for adaptation control, the amplified and delayed microphone signal is filtered by a filter having a transfer characteristic corresponding to the impulse response from the additional loudspeaker to the at least one microphone.

5.4 The deficiencies of claim 1 of the main request mentioned in point 4. above are not cured by the amendments in claim 1 of *any* of the auxiliary requests.

5.5 Hence, claim 1 of none of the first to third auxiliary requests complies with Article 84 EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chair:

B. Brückner K. Bengi-Akyürek

Decision electronically authenticated