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Datasheet for the decision of 21 November 2016

Case Number: T 2560/11 - 3.4.01

Application Number: 07016779.6

Publication Number: 2031418

IPC: G01S13/75, H04S7/00, H04S3/00

Language of the proceedings: EN

Title of invention:
Tracking system using RFID (radio frequency identification) technology

Applicant:
Harman Becker Automotive Systems GmbH

Headword:

Relevant legal provisions:
EPC 1973 Art. 84, 56
EPC Art. 123(2)

Keyword:
Inventive step - (yes)

Decisions cited:

Catchword:

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Case Number: T 2560/11 - 3.4.01

D E C I S I O N
of Technical Board of Appeal 3.4.01
of 21 November 2016

Appellant: (Applicant)	Harman Becker Automotive Systems GmbH Becker-Göring-Strasse 16 76307 Karlsbad (DE)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 25 July 2011 refusing European patent application No. 07016779.6 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	G. Assi
Members:	P. Fontenay
	D. Rogers

Summary of Facts and Submissions

I. The appeal lies from the decision of the examining division to refuse European patent application No. 07 016 779.6.

II. In the "R*easons*" for the decision, the examining division held that the subject-matter of claim 1 of the sole request then pending did not fulfil the requirements of Article 56 EPC 1973 in view of document US-A-5 424 747 (D2) and well known RFID transponders as, for instance, disclosed in XP007912697 (D5: "*The RFID Tag Antenna: Orientation Sensitivity (REV. 1.0)*", Internet Citation, 1 October 2005 pages 2pp.). The examining division further held that the subject-matter of claim 1 was not inventive in view of XP007912672 (D4: Robjohns H, "*Beyerdynamic Headzone Pro. Surround Sound Headphone System*", Internet Citation, Sound in Sound, March 2007, pages 1-4) and D2.

III. On 20 September 2011, the appellant (applicant) filed a notice of appeal. The prescribed appeal fee was paid on the same date.

The statement setting out the grounds of appeal was filed on 28 November 2011.

IV. With the statement of grounds, the appellant requested that the decision under appeal be set aside and a patent be granted on the basis of a new set of claims according to a main request or, in the alternative, a set of claims according to an auxiliary request, as submitted with the grounds of appeal.

The auxiliary request further differed from the main request in that it included an amended page 8 of the description.

V. In accordance with the appellant's request, a summons to attend oral proceedings was issued.

VI. In a communication of the Board pursuant to Article 15(1) RPBA issued on 4 August 2016, the appellant was informed of the provisional opinion of the Board with regard to the requests then pending.

The attention of the appellant was drawn to various shortcomings regarding the requirement for clarity under Article 84 EPC 1973. In this respect, it was in particular noted that claim 1, which referred to a tracking system for determining the orientation of headphones, included features relating to the use of the claimed system. Concretely, the Board held that the indication that the first and second RFID transponders, which defined parts of the tracking system, were fixed on headphones created ambiguities as to the actually claimed subject-matter.

The appellant was further informed of the preliminary view of the Board regarding the issue of inventive step under Article 56 EPC 1973. In this respect, the Board expressed its doubts regarding the relevance of document D2 as closest prior art. The Board however concurred with both the appellant and the examining division in their finding that document D4 constituted a valid starting prior art in order to decide on the inventive merits of the claimed invention.

VII. In a letter of reply dated 21 October 2016, the appellant presented new first, second and third

auxiliary requests in response to the comments of the Board with regard to clarity.

VIII. At the oral proceedings before the Board on 21 November 2016 the appellant's final request was that the decision under appeal be set aside and that a patent be granted with claims 1-33 of a new main request corresponding to the former first auxiliary request filed under cover of the letter dated 21 October 2016.

IX. Claim 1 of the appellant's request reads:

"*1. A tracking system for determining orientation of headphones (30, 450) for simulating surround sound reproduction of audio data with respect to a predetermined reference frame,*
characterized by
a first RFID transponder for being fixed on said headphones (30, 450) and having a first antenna (40a) with a predetermined directivity;
a second RFID transponder for being fixed on said headphones (30, 450) and having a second antenna (40b) with a predetermined directivity, wherein the orientation of said second antenna (40b) is different from the orientation of said first antenna (40a);
a RFID reader (10) for being located at a fixed position with respect to said reference frame, for emitting a signal (20) to the transponders and detecting a level of a response (50a) from said first transponder and a level of a response (50b) from said second transponder; and
a processing unit (430) being connected to said RFID reader (10), for determining an orientation parameter (α) of said headphones (30, 450) based on comparing the level of the response (50a) from the first RFID

transponder and the level of the response (50b) from the second RFID transponder."

Claims 2 to 13 depend on claim 1. Claim 14 refers to a vehicle entertainment and information system. It also depends on claim 1 since it incorporates, as one of its constituting elements, a tracking system according to claim 1. Claims 15 and 16 depend on claim 14.

Independent claim 17 reads:

"*17. A method of determining the orientation with respect to a predetermined reference frame of headphones (30, 450) for simulating surround sound reproduction of audio data,*
characterized in that
said headphones (30, 450) having fixed thereto a first RFID transponder including a first antenna (40a) with a predetermined directivity and a second RFID transponder including a second antenna (40b) with a predetermined directivity, wherein the orientation of said second antenna (40b) is different from the orientation of said first antenna (40a), and the method comprising the steps of:
emitting a signal (20) from an RFID reader (10) to the RFID transponders from a fixed position with respect to said reference frame;
detecting a level of a response (50a) from said first RFID transponder and a level of a response (50b) from said second RFID transponder, and
determining an orientation parameter (α) of said headphones (30, 450) based on comparing the level of the response (50a) from the first RFID transponder and the level of the response (50b) from the second RFID transponder."

Claims 18 to 33 depend on independent claim 17.

Reasons for the Decision

1. *Admissibility*

The appeal meets the requirements of Articles 106 to 108 EPC and Rule 99 EPC. It is thus admissible.

2. *Clarity - Article 84 EPC 1973*

The wording of claim 1 has been amended. It now defines that the RFID transponders are "*for being fixed*" on the headphones. Similarly, the RFID reader is "*for being located*" at a fixed position with respect to the reference frame. In former versions of claim 1, the transponders and reader were defined, respectively, as being fixed on the headphones and located at a fixed position. The claim's wording did not, however, suggest that the headphones were part of the claimed subject-matter.

As a result of the amendments in the claim, the claimed subject-matter is unambiguously limited to a tracking system. Hence the objection initially raised by the Board, according to which the claimed system contained features regarding its use or possibly addressed a combination of a tracking system with the headphones, is overcome.

3. *Added subject-matter - Article 123(2) EPC*

Claim 1 results from a combination of original claims 1, 2, 3 and 23. Independent claim 17 results from a combination of original claims 27, 28, 29 and 49.

The dependent claims appear to reproduce the wording of the dependent claims of the original application.

4. Inventive step - Article 56 EPC 1973

4.1 Document D2 relates to a system for determining the position and orientation of a vehicle (cf. abstract). In D2, the vehicle is equipped with two antennas having different orientations and directivities. Each antenna reacts to an interrogation signal emitted by a radar by re-emitting a signal at a predetermined frequency, different from the frequency generated by the other antenna. The orientation and position of the vehicle is determined by measuring *inter alia* the ratio of the amplitudes of the two signals generated by the antennas and received by the radar system.

In the impugned decision (cf. section 2.2, iii-a), the examining division rejected the applicant's view according to which D2 did not qualify as closest prior art. The examining division considered, namely, that document D2 shared a common purpose with the claimed invention, that is, the determination of the orientation of a mobile object. It was stressed, in this respect, that the claimed tracking system was merely adapted to detect the orientation of headphones since said headphones did not constitute a part of the system.

The Board however concurs with the appellant in that document D2 does not constitute a valid starting point in order to assess the inventive merits of the claimed invention.

Claim 1 relates to a tracking system for determining orientation of headphones. Although the claimed system

does not comprise, as such, the headphones whose orientation is to be determined, their mention in the claim cannot be simply ignored. Since the purpose of the claimed tracking system is explicitly recited in claim 1, it has to be taken into account when deciding on the presence of an inventive step. In this respect, the indication of purpose should not only be considered when defining the objective problem to be solved by the invention by reference to the closest prior art but also when deciding on the preliminary selection of said closest prior art.

In the present context, the claimed invention is intended to be used with technologies providing reproduction of audio data in surround sound quality (cf. paragraphs [0001] to [0009] in the published application). More specifically, the present invention addresses shortcoming resulting from the reception of simulated surround sound via headphones, that is, if the head of a person turns while listening to simulated conventional surround sound via headphones, the simulated sound field turns together with the head, which will not be the case with surround sound in a room when the head is turned.

In the Board's judgement, the skilled person in the field of surround sound technologies would not consider a document relating to the orientation and position of a vehicle as a springboard for further developments, unless said document contains a clear hint that its teaching could also be employed in the technical field in question. To decide otherwise would be contrary to the objective nature of the problem-solution approach developed by the boards of appeal.

4.2 Document D4 discloses a surround sound headphone system that comprises processing means and a pair of headphones. Headtracker technology provides the ability to turn the head while the virtual sound sources appear to stay in the correct spatial positions. This is achieved by means of ultrasonic transducers mounted on the headphones. These transducers are part of the headtracking function whose purpose is to transmit the required information as to the orientation of the headphones to the processing system.

Document D4 relates, thus, to the same field as the present invention. Moreover, the system disclosed in D4 shares a common purpose with the claimed system, namely to allow a user to hear surround sound on headphones. The Board therefore concurs with the appellant and the examining division (see decision under appeal, Reasons, 2.1.2) that document D4 illustrates the closest prior art.

4.3 The subject-matter of claim 1 differs from the tracking system disclosed in document D4 by the features recited in the characterising portion of claim 1. Essentially, the claimed subject-matter differs from the system of D4 in that the information concerning the orientation parameters of the headphones relies on RFID technologies and on the transmission of signals between RFID transponders and an RFID reader instead of relying on ultrasound communication technologies. A further difference between the claimed subject-matter and the system of D4 resides in the fact that the orientation parameters are obtained from a comparison between the levels of the responses generated by the first and second RFID transponders. This results from the transponders being equipped with antennas of different directivities.

According to conventional tracking systems, for example of the kind using ultrasounds, the orientation is determined on the basis of transmission time measurements, i.e. on data relating to the time required for a signal to be transmitted from senders to a reader located at a predetermined position (cf. published application, paragraphs [0013] to [0016]). Such measurements require time synchronisation between emitters and receivers.

4.4 The claimed system does not require major hardware efforts since time synchronisation is not needed. It follows that the costs involved are also reduced (cf. paragraph [0018] of the published application).

4.5 The skilled person is certainly aware that communication between a reader and a responder may be achieved by the means of various different physical fields. For example, wireless communication may be achieved by appropriate modulation of pressure waves (infrasound, sounds, ultrasounds) or electric, magnetic, or electromagnetic waves.

However, the skilled person is also aware that these known techniques are not equivalent. It is indeed well known that the velocity of transmission of a signal depends on its nature and on the properties of the medium in which it propagates. The same applies to the absorption of a signal and accordingly of the maximum distance which may separate the reader from the responders.

In the context of the system disclosed in D4, the mere replacement of the ultrasonic transducers by an antenna emitting electromagnetic waves is not straightforward.

The speed of electromagnetic signals in the air is such that it makes it almost impossible for conventional circuits to distinguish between propagation times of signals transmitted over distances varying by only a few centimeters. Hence, the claimed invention extends beyond the mere replacement of ultrasosonic communicating means by well-known equivalents.

In order to arrive at the claimed subject-matter, the skilled person would therefore not only have to consider replacing an ultrasonic communication means by an electromagnetic communication means but also to abandon the principle of measuring and comparing times of propagation of signals emitted between sender and receiver and replace it by a system relying on a comparison of signal amplitudes.

4.6 As already stated, Document D2 relates to a radar system used in determining the position and orientation of a vehicle. The principle relied upon in D2 to obtain the information regarding the orientation of the vehicle is, in its principle, similar to the solution proposed according to the present invention. The response signals genereted by the two antennas located in the vehicle whose orientation is to be determined are transmitted in accordance with transmission patterns whose aims differ relative to one another (cf. column 2, lines 53-67; Figure 1). The orientation of the vehicle is then obtained from calculation of the ratio of the amplitudes of the two response signals received by the radar (cf. column 3, lines 35-64).

In the Board's judgement, however, the skilled person would not have considered the solution provided in D2 because D2 relates to large-scale systems not suitable, as such, for being implemented in a head tracking

system. Moreover, there is no hint in D2 to replace the frequency modulated signals reemitted by the antennas in the vehicle by RFID transponders. For these reasons, the Board does not share the approach of by the examining division.

Document D5 contains general information regarding RFID tags. There is no suggestion in D5 that such tags could be used, more specifically, for the determination of the orientation of moving objects. There is accordingly no teaching to be found in D5 to combine two tags with different directivities in order to derive from the ratio of the two received signals information regarding the orientation of said two tags and of the object on which they are fixed.

4.7 Consequently, the system of claim 1 does not result in an obvious manner from the prior art. The subject-matter of claim 1 is thus inventive (Article 56 EPC 1973).

The same finding applies *mutatis mutandis* to the subject-matter of claim 17 as to the method.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to grant a patent in the following version:

Description:
Pages 2, 3, 4, 5 and 11-20 as originally filed,
Pages 1, 1a, 6-10 filed under cover of a letter dated 30 March 2010,

Claims:
Claims 1-33 of the Main Request (former First Auxiliary Request, filed under cover of a letter dated 21 October 2016),

Drawings:
Figures 1-8 as originally filed.

The Registrar: The Chairman:

R. Schumacher G. Assi

Decision electronically authenticated