

**Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)**

This International Searching Authority found multiple inventions in this international application, as follows:

1. Claims: 1-9, 13-15

Preferred embodiments of a loudspeaker arrangement comprising a woofer and one or more MEMS tweeter(s), relating to the relative arrangement of the tweeter(s) to the woofer, a housing with a cover element and a cavity, and the woofer, as well as a use in headphones, particularly on-ear headphones. This solves the problem of producing 3D surround sound with spatial localisation of acoustic events.

2. Claims: 10-12

A loudspeaker arrangement comprising a plurality of MEMS tweeters, a woofer and a control unit, with which at least the tweeters can be operated in a normal mode and/or in a surround sound mode. This solves the problem of allowing the user to choose between a 3D-type sound experience coming from all directions, and a direction-based perception of sound events.

1.  As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2.  As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of additional fees.
3.  As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4.  No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.: **1-9, 13-15**

**Remark on Protest**

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/EP2018/072035

**A. CLASSIFICATION OF SUBJECT MATTER****H04R 1/10**(2006.01)i; **H04R 1/26**(2006.01)i; **H04R 5/033**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H04R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2009141879 A (SONY CORP) 25 June 2009 (2009-06-25) abstract paragraph [0055] - paragraph [0093]; figures 8, 10, 14-16	1-9, 13-15
Y	WO 2015178760 A1 (UNIV KEBANGSAAN MALAYSIA [MY]) 26 November 2015 (2015-11-26) abstract page 9, line 22 - page 10, line 12; figure 1b	1-9, 13-15
A	EP 1071309 B1 (KOENIG FLORIAN MEINHARD [DE]) 08 September 2004 (2004-09-08) cited in the application abstract paragraph [0015] - paragraph [0019]; claim 1; figure 1	1-9, 13-15

 Further documents are listed in the continuation of Box C. See patent family annex.

\* Special categories of cited documents:

“A” document defining the general state of the art which is not considered to be of particular relevance

“E” earlier application or patent but published on or after the international filing date

“L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

“O” document referring to an oral disclosure, use, exhibition or other means

“P” document published prior to the international filing date but later than the priority date claimed

“T” later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

“X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

“Y” document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

“&” document member of the same patent family

Date of the actual completion of the international search

15 October 2018

Date of mailing of the international search report

21 December 2018

Name and mailing address of the ISA/EP

European Patent Office  
p.b. 5818, Patentlaan 2, 2280 HV Rijswijk  
Netherlands

Telephone No. (+31-70)340-2040

Facsimile No. (+31-70)340-3016

Authorized officer

Gerken, Stephan

Telephone No.

**INTERNATIONAL SEARCH REPORT**  
**Information on patent family members**

International application No.

**PCT/EP2018/072035**

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
JP	2009141879	A	25 June 2009	NONE			
WO	2015178760	A1	26 November 2015	NONE			
EP	1071309	B1	08 September 2004	AT	275808	T	15 September 2004
				EP	1071309	A2	24 January 2001
				JP	4854837	B2	18 January 2012
				JP	2001095086	A	06 April 2001
				US	6658121	B1	02 December 2003