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(71) Applicant *(for all designated States except US)*: **BRÜEL & KJÆR** [DK/DK]; Sound & Vibration Measurement A/S, Skodsborgvej 307, DK-2850 Naerum (DK).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **GEIGER, Klaus** [DE/DE]; Nelkenstrasse 23, D-73540 Heubach (DE). **GLANDIER, Christian** [DE/DE]; Rosenstrasse 59, D-73733 Esslingen (DE). **HELBER, Rolf** [DE/DE]; Buchenweg 40, D-73614 Schorndorf (DE).

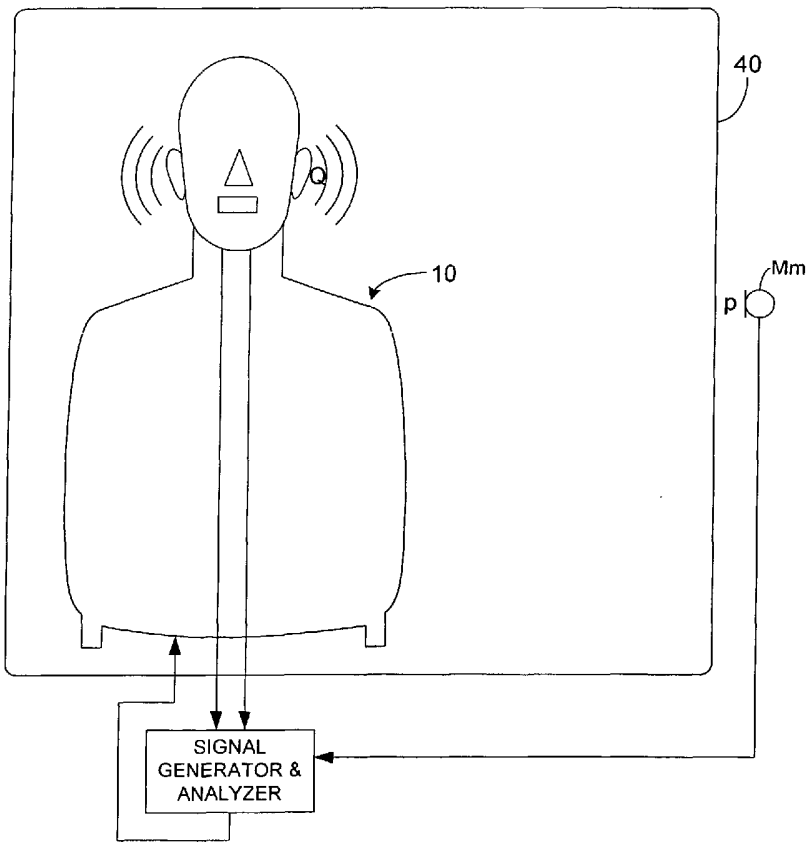
(74) Agent: **ZACCO DENMARK A/S**; Hans Bekkevolds Alle 7, DK-2900 Hellerup (DK).

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(54) Title: A METHOD AND DEVICE FOR DETERMINING ACOUSTICAL TRANSFER IMPEDANCE



(57) Abstract: The method comprises generating an acoustical volume velocity Q in the listening position, measuring a response quantity p, such as sound or vibration, at a suspected source position resulting from the volume velocity Q, and determining the acoustical transfer impedance Z_t as the response quantity p divided by the acoustical volume velocity Q, Z_t=p/Q. According to the invention the acoustical volume velocity Q is generated using a simulator (10) simulating acoustic properties of at least a head of a human being, the simulator comprising a simulated human ear (14, 15) with an orifice in the simulated head and a sound source (30) for outputting the acoustical volume velocity Q through the orifice. The output volume velocity Q from the orifice of an ear is estimated from measurements with two microphones inside the corresponding ear canal.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04R G09F G01R H04S

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 practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 003, no. 061 (E-113), 26 May 1979 (1979-05-26) -& JP 54 039601 A (HITACHI LTD), 27 March 1979 (1979-03-27) abstract	1,6,8, 10,11
A	US 4 631 962 A (GENUIT KLAUS) 30 December 1986 (1986-12-30) cited in the application column 1, line 5 -column 2, line 40 column 4, line 32 -column 7, line 24 column 7, line 37 - line 63 column 8, line 17 - line 38	2,3,6-11

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 373 622 A (DRIVER ALAN) 25 September 2002 (2002-09-25) page 1, line 3 - line 4 page 2, line 14 - line 28 ---	2,7,8
A	PATENT ABSTRACTS OF JAPAN vol. 1996, no. 02, 29 February 1996 (1996-02-29) -& JP 07 264632 A (KAGEISA NORO), 13 October 1995 (1995-10-13) cited in the application abstract -----	2,3,6,11

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/DK2004/000269

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 54039601 A	27-03-1979	NONE	
US 4631962 A	30-12-1986	DE 3509376 A1	07-11-1985
		AT 67367 T	15-09-1991
		AU 574625 B2	07-07-1988
		AU 4042985 A	03-10-1985
		BR 8501371 A	26-11-1985
		CA 1227558 A1	29-09-1987
		DE 3584022 D1	17-10-1991
		DK 134385 A ,B,	28-09-1985
		EP 0156333 A2	02-10-1985
		JP 61007000 A	13-01-1986
		ZA 8502303 A	27-11-1985
GB 2373622 A	25-09-2002	NONE	
JP 07264632 A	13-10-1995	NONE	