



(12) **EUROPEAN PATENT APPLICATION**

(88) Date of publication A3:  
**01.07.2009 Bulletin 2009/27**

(51) Int Cl.:  
**H04R 9/02** (2006.01) **H04R 31/00** (2006.01)  
**H04R 9/04** (2006.01) **H04R 7/22** (2006.01)

(43) Date of publication A2:  
**06.05.2009 Bulletin 2009/19**

(21) Application number: **09153772.0**

(22) Date of filing: **19.04.2004**

(84) Designated Contracting States:  
**DE FR GB**

(30) Priority: **30.05.2003 JP 2003154744**  
**07.07.2003 JP 2003192968**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:  
**04252290.4 / 1 482 762**

(71) Applicants:  
• **Pioneer Corporation**  
**Tokyo 153-8654 (JP)**

• **Tohoku Pioneer Corporation**  
**Tendo-shi,**  
**Yamagata 994-8585 (JP)**

(72) Inventor: **MAEKAWA, Koji**  
**c/o Tohoku Pioneer Corporation**  
**Oaza Kunomoto Tendo-shi Yamagata 994-858 (JP)**

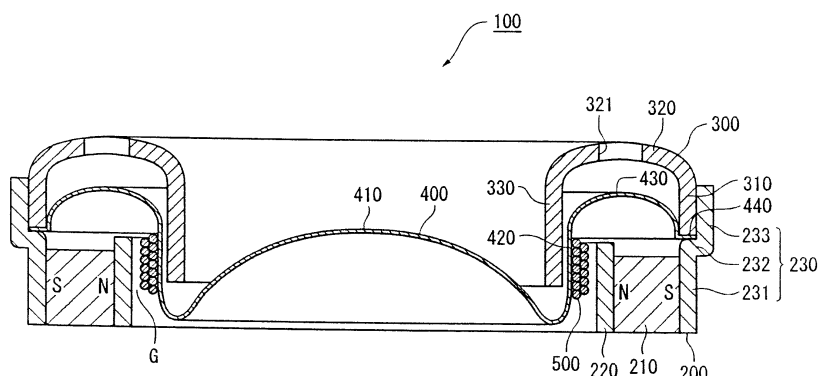
(74) Representative: **Haley, Stephen**  
**Gill Jennings & Every LLP**  
**Broadgate House**  
**7 Eldon Street**  
**London EC2M 7LH (GB)**

(54) **Speaker and method of manufacturing the same**

(57) A speaker (100, 700, 100A, 100B) includes a magnet main body (210, 810, 210A, 210B) and a yoke (220, 230, 820, 830, 220A, 220B, 230A, 230B) magnetically linked to a first magnetic pole of the magnet main body. The speaker also includes a diaphragm (400, 400A, 400B) having a vibratory section (410, 410A, 410B), an edge section (430, 430A, 430B), and a rising section (420, 420A, 420B) between the vibratory section and the edge section. A magnetic body (300, 900, 300A, 300B) of the speaker is magnetically linked to the yoke, facing the magnet main body and a voice coil (500, 500A,

500B) is wound around the rising section of the diaphragm. The magnetic body includes an inner shell (330, 330A, 330B), an outer shell (310, 310A, 310B) and a bridge section (320, 320A, 320B) between the inner shell and the outer shell to cover the edge section of the diaphragm. The inner shell of the magnetic body extends from the bridge section along the rising section and the vibratory section of the diaphragm within the inner shell. A magnetic gap (G) is formed between the inner shell of the magnetic body and the magnet main body and the rising section passes through the magnetic gap.

**FIG. 3**





## EUROPEAN SEARCH REPORT

Application Number  
EP 09 15 3772

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 4 317 965 A (TOYODA ET AL) 2 March 1982 (1982-03-02) * the whole document *	1-15	INV. H04R9/02
X	GB 2 147 174 A (TANNOY LTD) 1 May 1985 (1985-05-01) * figure 1 *	1-15	ADD. H04R31/00 H04R9/04 H04R7/22
A	JP 10 276490 A (SONY CORP) 13 October 1998 (1998-10-13) * paragraph [0069] - paragraph [0072]; figures 2,3 *	1-15	
A	JP 63 085991 U (-) 4 June 1988 (1988-06-04) * figure 1 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			H04R
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 20 May 2009	Examiner Brandt, Isabelle
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

5

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 3772

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

20-05-2009

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 4317965	A	02-03-1982	GB	2050755 A	07-01-1981
GB 2147174	A	01-05-1985	NONE		
JP 10276490	A	13-10-1998	NONE		
JP 63085991	U	04-06-1988	JP	6033759 Y2	31-08-1994

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82