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(54) Piezoelectric audio device and method for sound production

(57) An arrangement (1) to improve the sound quality of a piezoelectric element actuating element (AE). A sensing element (ME) is attached to the piezoelectric element to supply an electric response to movement of the element when the plate vibrates producing a sound. The response is electrically filtered in order to compensate said mechanical resonance frequency band for stabilisation of said first signal. The filtered response is inverting summed by a summation node (SN) with the audio signal to be reproduced in order to compensate the otherwise exaggerated amplitude at these resonance frequencies.

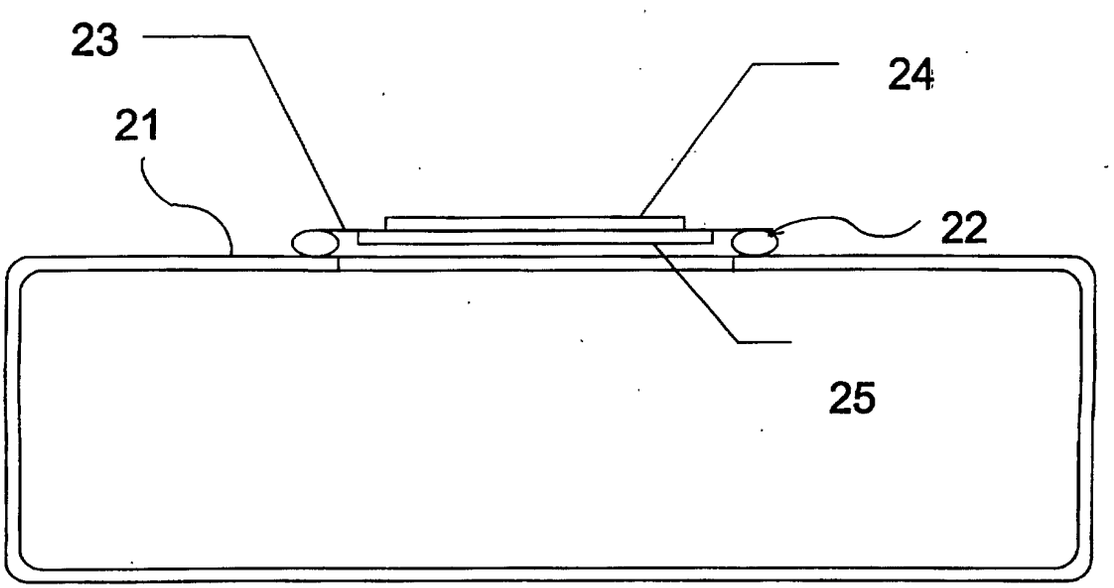

Fig. 2

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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 6906

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	US 4 709 360 A (SIMS CLAUDE ET AL) 24 November 1987 (1987-11-24)	1-4	H04R17/00
Y	Acoustic transducer for hydrophones for sensing and generating sonic waves. It includes a piezo transducer and a sensor, which signal is filtered and negative feed back to the piezo disk. * column 1, line 33 - line 44 * * column 1, line 56 - line 63 * * column 3, line 3 - line 41 * * column 3, line 47 - line 52 * * column 8, line 49 - line 59 * * column 9, line 5 - line 21 * * figures 13-17 *	5-7	

Y	FR 2 755 813 A (ALSTHOM CGE ALCATEL) 15 May 1998 (1998-05-15) Telecommunication device containing an earpiece, which contains a piezoelectric disk. * abstract *	5,6	
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Y	US 5 488 954 A (SLEVA MICHAEL Z ET AL) 6 February 1996 (1996-02-06) Ultrasonic transducer which contains a piezoelectric layer. * abstract *	7	H04R H01L B06B G10K G01H G01P

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	10 August 2004	Fachado Romano, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
O : non-written disclosure
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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

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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 6906

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 2 860 183 A (WILLARD CONRAD IVAN) 11 November 1958 (1958-11-11) Sound reproducing system containing an amplifier, a speaker (no piezo), a sensor (can be piezo) and phase shifting and amplitude filtering means on the feed back loop. * column 2, line 13 * * column 2, line 22 - line 30 * * column 2, line 49 - line 69 * * column 4, line 18 - line 32 * * column 4, line 44 - line 49 * * column 4, line 56 - line 60 * * figures 1,5 * -----	1-4,6	
A	GB 1 031 145 A (PHILIPS ELECTRONIC ASSOCIATED) 25 May 1966 (1966-05-25) Sound reproducing system containing an amplifier, a speaker (no piezo), a sensor (can be piezo) and amplitude filtering means on the feed back loop. * page 1, line 9 - line 21 * * page 1, line 27 - line 28 * * page 2, line 68 - line 80 * * page 2, line 103 - line 106 * * page 2, line 125 - page 3, line 12 * * figures 1,5,6 * -----	1-4	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	PATENT ABSTRACTS OF JAPAN vol. 0090, no. 75 (E-306), 4 April 1985 (1985-04-04) -& JP 59 209000 A (SHIGERU TSUTSUMI), 27 November 1984 (1984-11-27) Audiphone or earpiece which contains piezoelectric disks. * abstract * -----	5	

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 10 6906

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10-08-2004

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