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(54) **Acoustic reproducing apparatus**

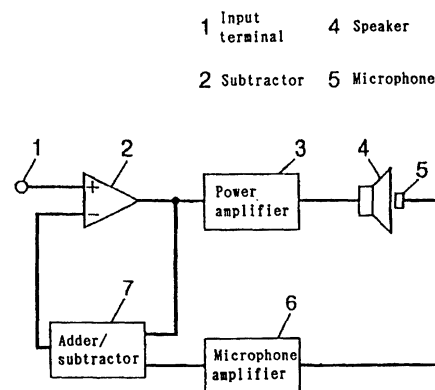
(57) The invention presents means for applying negative feedback more powerfully and stably than before over a frequency range as wide as possible, in the constitution for detecting a reproduced sound of a speaker used in various acoustic appliances by a microphone, and applying a negative feedback to an input signal of the speaker by the detected signal, and correcting the reproduced signal by improving the reproduction frequency characteristic and other characteristic of the speaker.

A fundamental constitution of an acoustic reproducing apparatus of the invention comprises a subtractor having an input terminal, a power amplifier for amplifying the output signal of this subtractor, a speaker for reproducing the output signal of the power amplifier, a microphone for detecting the acoustic output signal radiated from the speaker, a microphone amplifier for amplifying the acoustic output signal detected by the microphone, and an adder/subtractor for adding or subtracting the output signal of the microphone amplifier and the input signal of the power amplifier, wherein the output signal of the adder/subtractor is connected to the subtractor to compose a negative feedback circuit.

Or, in an acoustic reproducing circuit using a speaker box incorporating a passive radiator, a microphone is disposed in the front side of the magnetic circuit of the speaker for reproducing the output signal of the power amplifier or speaker rear enclosed acoustic space, or in the enclosed acoustic space with the passive radiator of the speaker front side, and the output signal of the microphone is added or subtracted with the input signal of the power amplifier in the adder/subtractor in the fundamental constitution above, and the signal is subtract-

ed from the input signal in the subtractor, thereby composing a negative feedback circuit.

Fig. 1



EP 0 658 064 A3



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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.6)
X A	GB 2 147 166 A (POTTER GRAHAM) 1 May 1985 (1985-05-01) * page 1, lines 21-44 * * page 1, lines 58-74 * * page 1, line 124 - page 2, line 99 *	1-20, 23-30 21,22, 31-45	H04R3/00
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 128 (E-1333), 18 March 1993 (1993-03-18) -& JP 04 302300 A (AIWA CO LTD), 26 October 1992 (1992-10-26)	1-8	
Y A	* abstract; figures 1,3,4 *	9-20, 38-45 21,22	
Y	PATENT ABSTRACTS OF JAPAN vol. 010, no. 133 (E-404), 17 May 1986 (1986-05-17) -& JP 60 263598 A (MATSUSHITA DENKI SANGYO KK), 27 December 1985 (1985-12-27) * abstract; figures 1,2,5,6 *	9-20	
Y	PATENT ABSTRACTS OF JAPAN vol. 014, no. 541 (E-1007), 29 November 1990 (1990-11-29) -& JP 02 230897 A (NIPPON TELEGR & TELEPH CORP <NTT>), 13 September 1990 (1990-09-13) * abstract; figures 1,2 *	38-45	H04R H03G G10K
A	GB 2 211 685 A (THOMAS IAN GRENVILLE) 5 July 1989 (1989-07-05) * page 1, line 22 - page 2, line 16 * * page 2, line 21 - page 5, line 19 *	1-45	
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 9 July 2004	Examiner Zanti, P
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ON EUROPEAN PATENT APPLICATION NO.**

EP 94 11 9350

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The members are as contained in the European Patent Office EDP file on
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09-07-2004

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2147166	A	01-05-1985	NONE	
JP 04302300	A	26-10-1992	NONE	
JP 60263598	A	27-12-1985	JP 1875757 C	07-10-1994
			JP 5086718 B	14-12-1993
			US 4747132 A	24-05-1988
JP 02230897	A	13-09-1990	JP 2717139 B2	18-02-1998
GB 2211685	A	05-07-1989	NONE	

EPO FORM P0459

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