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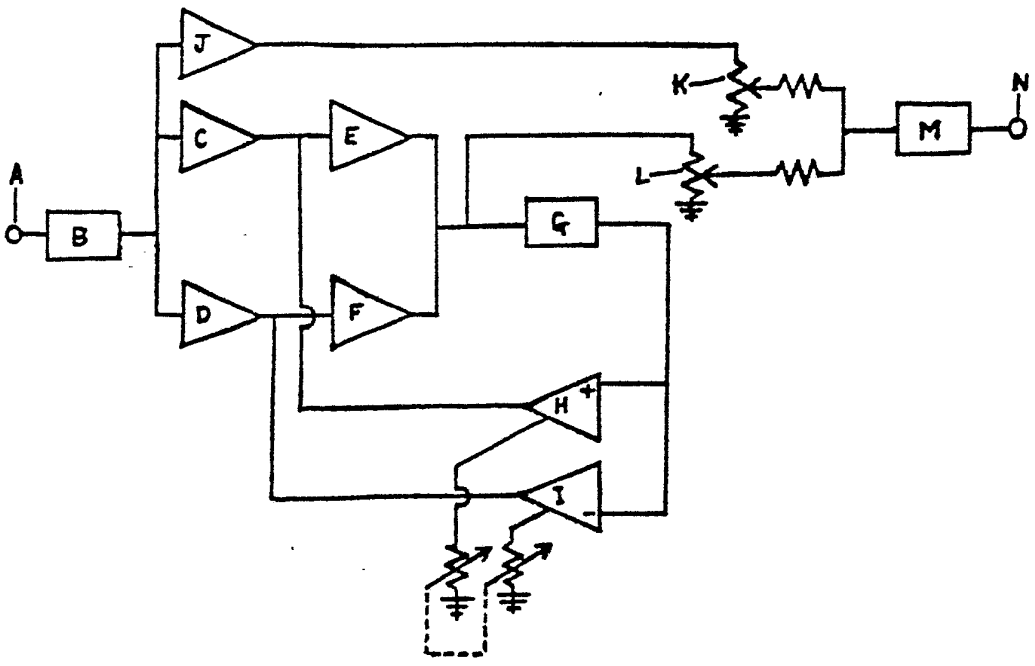
(54) Title: AUDIO REVERBERATION CIRCUIT



(57) Abstract

Audio reverberation circuits in which frequency spectrum colouration is cancelled by combining circuits of opposite colouration (EGH and FGI). Different channels having different time delays are matched in their phase shift characteristics.

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AUDIO REVERBERATION CIRCUIT.

The invention relates to audio reverberation circuits as used for treating audio signals to include the effect of a sound reverberating within an enclosure such as a room with reflective surfaces.

Frequency spectrum notching is produced when differently delayed versions of a signal are mixed together. The object of the invention is to remove this frequency spectrum notching

When two differently delayed versions of a signal are added, the frequency spectrum notches are at the same frequencies as the peaks would be if the two versions were subtracted.

According to the invention, frequency spectrum colouration is cancelled by combining the colouration of additive mixing with the opposite colouration of subtractive mixing. such a reverberator may consist of a flanger and a differential flanger (comple te specification no. 46155/79) connected in series or parallel and both having a common controlling means. A single time delay device may be used to provide both flanging and differential

flanging for parallel connection.

Alternatively, a reverberator with cancelled colouration may consist of a positive feedback time delay circuit combined with a negative feedback time delay circuit. Figure 1 shows a reverberation circuit in which both positive feedback and negative feedback circuits are connected around a single time delay device. Part A is the input. Part B is a low pass filter. Parts C, D, E, and F are buffers. Part G is a time delay device. Part H is an amplifier. Part I is an inverting amplifier. Parts H and I have common level control for identical output levels. This common level control determines the feedback level. Part J is a buffer. Part K is the level control for the undelayed signal. Part L is the level control for the reverberant signal. Part M is a low pass filter. Part N is the output.

means is also provided whereby such reverberation circuits are designed so that the difference between the times of arrival at the place of mixing of differently delayed signals is the same for all frequencies.

The claims defining the invention are as follows:

Claim 1. A reverberation circuit in which frequency spectrum colouration is cancelled by combining circuits of opposite colouration.

Claim 2. A reverberation circuit according to Claim 1 in which a flanger and a differential flanger are combined in series or parallel with common controlling means.

Claim 3. A reverberation circuit according to Claim 2 having switching to select the circuit configurations of Complete specification no. 46155/79.

Claim 4. A reverberation circuit according to Claim 1 in which a time delay circuit having positive feedback is combined in series or parallel with a time delay circuit having negative feedback.

Claim 5. A reverberation circuit according to claim 1 in which a flanger and a differential flanger are configured around a single time delay device.

Claim 6. A reverberation circuit according to Claim 1 in which positive feedback and negative feedback circuits are configured around a single time delay device.

Claim 7. A reverberation circuit according to Claim 1 in which the difference between the times of arrival of differently delayed signals at the place of mixing is the same for all frequencies.

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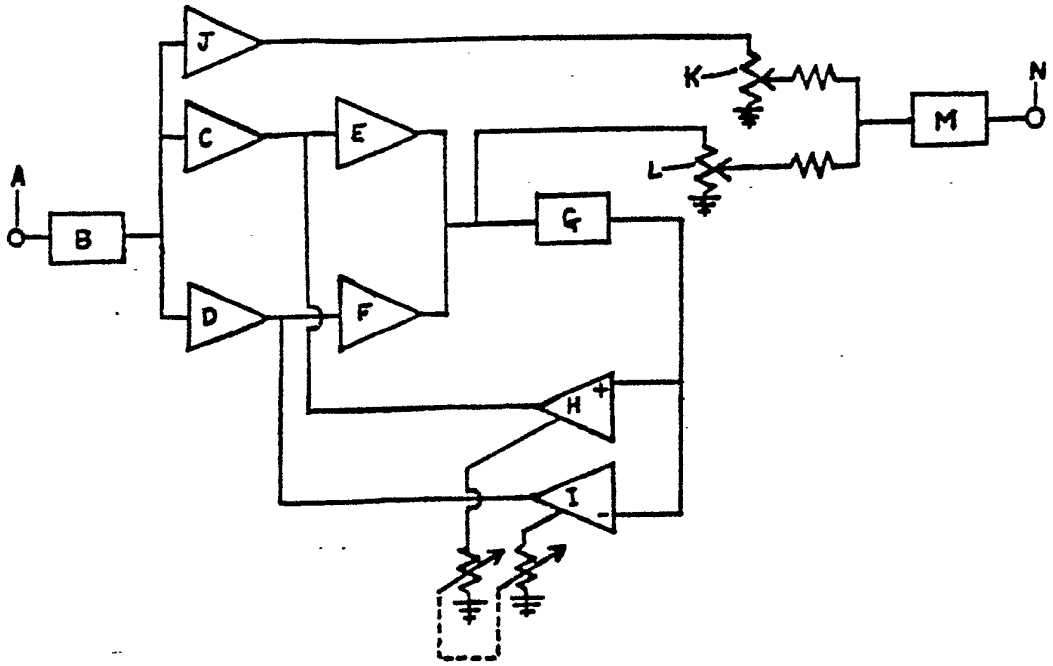

FIGURE 1

INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 81/00100

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl.[3] G10H 1/02

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC	G10H 1/02
US Cl.	328/55, 84/DIG/026

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [5]

AU: IPC as above; Australian Classification 01.1

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
X	AU, A, 46155/79, published 1979, October 25, Lawson	(1,7)
A	AU, B, 19477/62(274944) published 1965, January 7, Automatic Totalisators Ltd.	(1)
A	AU, B, 5164/61 (252529) published 1963, May 2, Philco Corporation	(1)
A	SU, A, 310289, published 1971, October 7, Bubnov (Derwent English Language Abstract - Soviet Inventions Illustrated, April 1972)	(1)
A	DE, A, 3015324, published 1981, March 26, Philips Gloeilampen. N.V. (Derwent English Language Abstract K6832 c/45)	(1)
A	DE, A, 3015357, published 1981, February 12. Philips Gloeilampenfabrieken N.V. (Derwent English Language Abstract K6831 c/45)	(1,4)
A	US, A, 1947621, published 1934, February 20,Schreiber	(1)
A	US, A, 3200199, published 1965, August 10, Bang	(1)
A	US, A, 3288931, published 1966, November 29, Bunger	(1)
A	US, A, 2493638, published 1950, January 3, Olson	(1)
A	US, A, 2872515, published 1959, February 3, Goldmark	(1)

* Special categories of cited documents: [15]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [2]
07 September 1981 (07.09.81)	15 SEPTEMBER 1981 (15-09-81)
International Searching Authority [1]	**Signature of Authorized Officer [20]**
Australian Patent Office	R.J. Sawyer

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