(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
30 May 2002 (30.05.2002)

PCT

(10) International Publication Number
WO 02/43339 A2

(51) International Patent Classification[7]: H04L 25/00

(21) International Application Number: PCT/IB01/02201

(22) International Filing Date:
14 November 2001 (14.11.2001)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2000129797 22 November 2000 (22.11.2000) RU

(71) Applicant and
(72) Inventor: **ALESHIN, Eugene Sergeyevich** [RU/RU]; Ap.20, Irtishskaya St. 17, Khabarovsk, 680006 (RU).

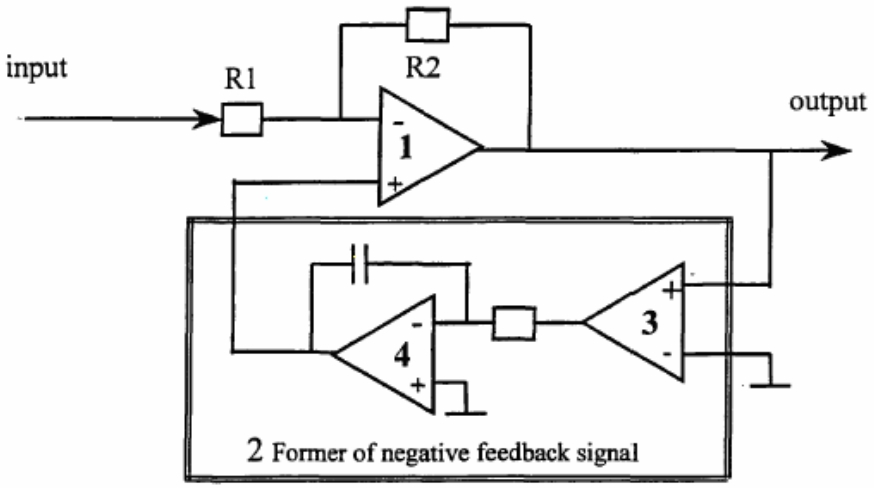
(81) Designated States *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *without international search report and to be republished upon receipt of that report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR SOUND CHANNEL UPGRADING



(57) Abstract: The invention concerns a technique of the signal transmission and can be used in the electric signal transmission in a sound channel. The aim of the invention is radical upgrading of the quality and authenticity of the electric signal transmission through a sound channel. The method ensures the non-distorted and authentic electric signal transmission through electronic devices of a sound channel by circuits having open-ended input, and the signal transmission with the frequency more than Ohz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry of electric signals.

WO 02/43339 A2

Method for sound channel upgrading

The invention concerns a method of signal transmission and can be used to transmit electric signals in a sound channel.

It is known a method to transmit and receive low-frequency analog signals consisting in that in transmitting a value of low-frequency analog signals is changed, n-impulses of which are transmitted, and in receiving it is necessary to make selections corresponding to n-impulses of a value changed of low-frequency analog signals to summarize them with weight factors [1] as it recited in Copyright of the USSR, No 656161, H 03 K 9/02; H 04 B 15/00//; 1997.

Deficiencies of this method are low quality and absence of authenticity in the electric signal transmission in a sound channel.

It is connected with real sound signals comprising not only periodic signals in the range of audible sound frequencies from 20Hz to 20kHz, but also signals of periodic and non-periodic nature (Fig.1) which are in the frequency range lower than 20Hz and may practically have spectrum from 0Hz (Fig.2).

The real sound signals of periodic nature having the frequency more than 0Hz have also the considerable asymmetry regarding to the axe of co-ordinates (Fig.3), and these signals correspond to signals received during performance of quick violin's passage.

Therefore, in transmitting these signals through circuits of a sound channel having close-ended input in which there are elements creating obstacles to a signal passage of the dc constant component [2], the signal distortion (Fig.4) and discharge of infrasonic components from the envelope of a sound signal take place (Fig.5).

This drives to a considerable change of prescribed operating conditions on the direct current in electronic devices and it is connected with that a change of spectrum of an initial signal as a result of multiplication of a signal of the envelope to an initial signal on non-linear sections of the transmit volt-ampere characteristic of electronic devices.

A man takes these distortions subjectively as a false sounding musical instruments and a voice [3]. Besides, the considerable reducing the dynamic range of electronic devices of a sound channel takes place as a result of initiation of peaks exceeding the amplitude of initial electric signals (Fig.4).

Signals of non-periodic nature correspond, par example to the sounds of percussion instruments (Fig.1) and have the constant spectrum from 0Hz (Fig.2). For non-distorted and authentic transmission of these signals under the proposed method it is necessary in electronic devices of a sound channel to use circuits only with open-ended input [2] in which there are not elements creating obstacles to the dc constant component passage of a signal.

"The technical data of hi-fi sound equipment according to the standard of DIN 45500 [A5.1, A5.3]" described in the publication [4], and also the biggest American standard of IHF-202A-78 described in the publication [5] at present time does not determine real possibilities for the high-qualified, non-distorted and authentic of electric signal transmission in a sound channel. Therefore, it is possible to say that the proposed method corrects the mistake committed by the world acoustic science about 100 years ago.

There are many facts and publications proving existence of the conceptual problem of absence of the quality and authenticity in recording, reproduction and sound signal transmission in a sound channel. For example, articles in the publications [6], [7], [8], [9] and etc.

The aim of the invention is radical upgrading the quality and authenticity of the electric signal transmission through a sound channel.

This aim is obtained by so that in the known method-prototype consisting in the electric signal transmission the non-distorted and authentic of electric signal transmission is ensured in addition by way of supplying all the circuits of electronic devices by conductive interstage coupling that is by circuits having open-ended input And the electric signal transmission of the periodic nature with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry of electric signals.

According to the claimed method any extending the bandwidth of a sound channel in the infrasonic field (that is lower than the standard value of 20Hz) always upgrades the quality and authenticity of the sound signal transmission and so that allows to obtain the aim of the invention and receive a positive technical result.

A ideal chance for upgrading the operating quality of a sound channel is the frequency range of electric signal transmission from 0Hz, that is from the dc (direct current), but realisation of this frequency range is connected with some difficulties to supply stabilisation of the operating conditions of electronic devices on the dc. At the same time to obtain a positive effect and

considerable upgrading the operating quality of a sound channel in many cases it is possible to consider enough the frequency range, for example from 0Hz. Here it is important to reduce dependence of the operating conditions of electronic devices in the direct current on a value of the asymmetry of initial electric signals.

The largest value of the asymmetry in sound signals is shown at a moment of initiation and attenuation of sound signals, when the amplitude of a signal is changed in time. Just by that reason an existing sound comprising electronic devices having close-ended input is not able to reproduce a real sound signal without distortions.

The Presence of features in the proposed method differing it from the prototype, namely: the electric signal transmission is realised through electronic devices of a sound channel from 0Hz by way of supplying electronic devices of a sound channel by circuits having open-ended input, and the signal transmission with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry of electric signals and that makes accordance of the proposed technical embodiment to the criterion "novelty".

To check the proposed technical embodiment to correspond to the criterion "essential distinctions" a comparison of its distinguish features was made with features of the known technical embodiments and this comparison showed that the totality of such features as: "... the electric signal transmission through electronic devices of a sound channel from 0Hz by way of supplying electronic devices of a sound channel by circuits having open-ended input, and the signal transmission with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry of electric signals" is absent in the known technical embodiments and that allows to draw a conclusion about accordance of proposed technical embodiment to the criterion "essential distinctions".

The accordance of the proposed technical embodiment to the criterion "positive effect" is made by so that in the method-prototype the electrical signal transmission through electronic devices of a sound channel from 0Hz is realised in addition by way of supplying electronic devices of a sound channel by circuits having open-ended input, and the signal transmission with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry in initial electric signals. Just this totality of the distinguish features used in the proposed method allows to upgrade the quality and authenticity of the electric signal transmission through a sound channel and that allows to draw a

conclusion about accordance of the proposed technical embodiment to the criterion "positive effect".

Fig.6 is represented by the most preferred structural diagram of a device and with its help it is possible to realise the proposed method.

The proposed method consists of the amplifier 1 with the negative feedback formed by the registers R1 and R2 having inverting and non-inverting inputs and also asymmetric output and the former 2 having the amplifier-limiter 3 and the integrator 4.

The method is realised as follows:
Electric signals are transmitted from input to output through the amplifier 1 by circuits having open-ended input, and the electric signal transmission of periodic nature with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in the amplifier 1 with the help of the former 2 by way of amplifying and limiting an output signal of the amplifier 1 on the amplitude by the amplifier 3 and by following transformation of a signal differing in the amplitude by duration into a signal differing in the amplitude with the help of the integrator 4. Formed by this way a signal of the dc negative feedback independent on the asymmetry of input signals of the amplifier 1 is transmitted from input of the integrator 4 of the former 2 to non-inverting input of the amplifier 1.

Sources used in making patent application

1. "Copyright of the USSR", No.656164, H 03 Л 9/02, 1997.
2. "Electric circuits theory" by I.N. Dobrotvorsky, p.10, 13, 317, Radio and communication, Moscow, 1989.
3. "Sound channel of the XXIst century and sensational exposure of demagogy about Hi-Fi, High-End and tube renaissance" by E.S. Aleshin (works of International Forum on the problems of science, technique and education), Academy of Earth Science, Moscow, 1999.
4. "Sound engineering reference book" by Paul Skritek, Mir (World), 1991.
5. "Which bandwidth is necessary for optimal sound transmission?" by G. Plenge, No.3, V.28, JAES, 1980.
6. The Russian magazine "IN/OUT", No.17-18, p.102, 1996, the article "What does appeal in this sound – absence of the purity?"
7. The Russian magazine "Salon Audio Video", No.6 (10), p.92, 1996, the article "In search of the Ideal".
8. The Russian magazine "Stereo & Video", No.7-8/III, p.90, 1996, the article "Audio Delirium".
9. The Russian magazine "Hi-Fi & Music", No.1 (15), p.53, 1997, the article "Experiments of Jimmy Huse".

Claims

1. Method for sound channel upgrading consisting in the electric signal transmission differing by so that its transmission is realised from 0Hz by way of supplying electronic devices of a sound channel by circuits having open-ended input.

2. Method for sound channel upgrading consisting in the electric signal transmission with the frequency more than 0Hz is realised by forming a signal of the dc negative feedback in electronic devices independent on the asymmetry of electric signals.

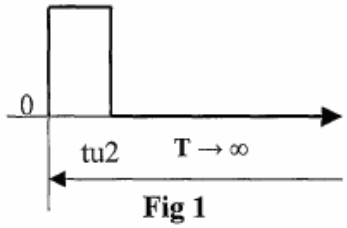


Fig 1

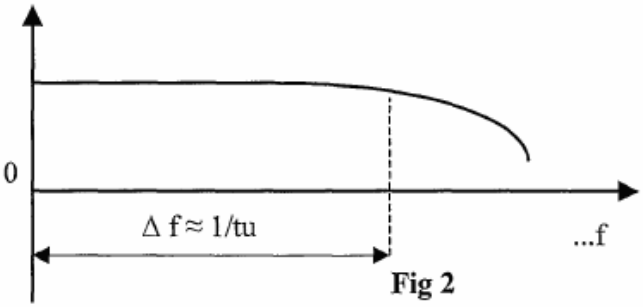


Fig 2

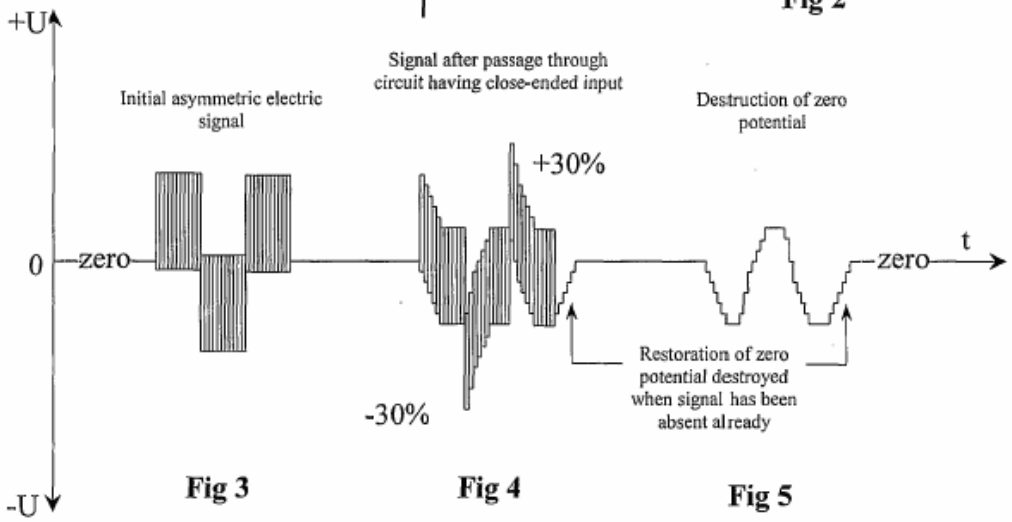


Fig 3

Fig 4

Fig 5

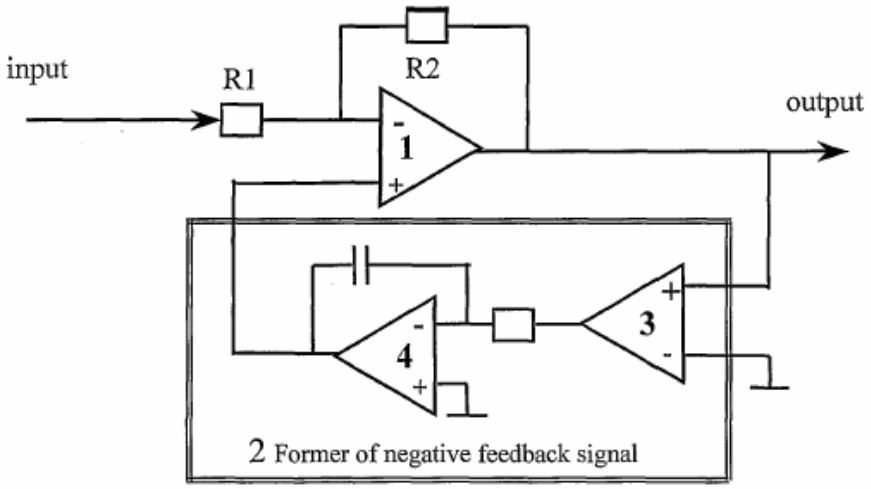


Fig 6