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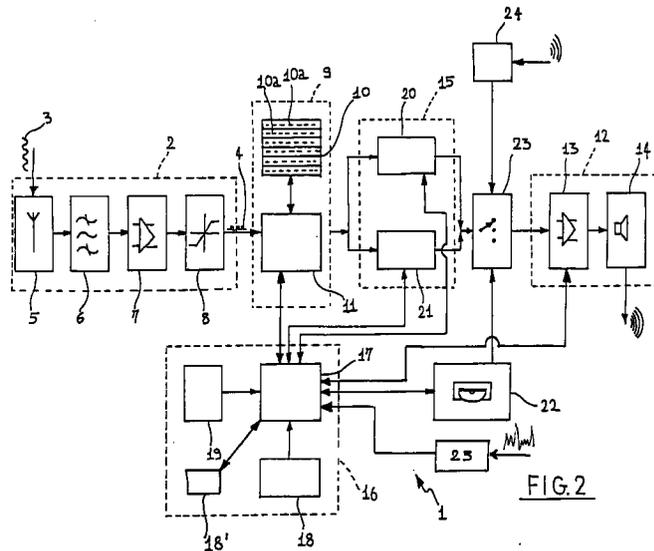
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(54) A circuit device for reproduction of sound broadcasting signals comprising supplementary code signals

(57) The present invention relates to a circuit device for audio reproduction of coded radio signals comprising a receiving unit (2) arranged to pick up radio signals (3) and send them to a recognition unit (9) which selects those of the signals (3) with which predetermined iden-

tification codes are associated. The selected signals are stored in storage means (15) and can be sent to audio playback means (12) at predetermined times and according to previously ordered sequences.



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Description

The present invention relates to a circuit device for audio reproduction of coded radio signals.

In particular, the circuit device in reference enables reception of previously coded radio signals containing advertising messages for example, recording of said signals and broadcasting of same in the premises in which the device is installed according to a predetermined arrangement and predetermined times.

It is known that inside and outside points-of sale such as supermarkets, shops and the like, a radio broadcasting system is very often arranged for transmission to customers of the different programs and commercial messages that are transmitted by the broadcasting station which is each time tuned in.

In this manner an agreeable sound environment is offered and, at the same time, an attempt is made to propose a certain number of advertising messages to customers, tending to promote given goods.

The above described radio broadcasting devices however have many limitations from an operating point of view and surely do not succeed in conveniently meeting the present requirements in terms of marketing and advertising promotion.

It is in fact to point out that, by the use of a conventional radio broadcasting system, it is practically impossible to select, among all advertising messages transmitted by the broadcasting station, those messages that are similar to the products dealt with inside the point of sale. In addition, conventional broadcasting devices do not enable advertising messages to be proposed following predetermined sequences and times, neither do they enable optional repetition of those messages that are considered more interesting than others.

In other words, by the use of normal broadcasting systems, one is tightly bound to the programs of the broadcasting station which is selected each time and is unable to combine messages from a broadcasting station with those from other sources.

In an attempt to eliminate the above drawbacks, at a number of points of sale audio playback systems have been installed which use magnetic cassette recorders transmitting predetermined sequences of advertising messages and a background of music pieces.

However, it is apparent that in this case too several drawbacks are present: actually, the programming sequence is very rigid and, in particular with reference to advertising messages, contents of same cannot be updated depending on requirements.

Under this situation, the fundamental aim of the present invention is to substantially obviate all the above mentioned drawbacks and limitations, by providing a circuit device capable of receiving the radio signals transmitted from one or more broadcasting stations and selecting those of them that have appropriate codes for the purpose of subsequently broadcasting them, following previously programmed time sequences, inside the

premises of the point of sale where the device is installed.

Another aim of the present invention is to provide a circuit device capable of also broadcasting, inside the premises of the point of sale, signals from an auxiliary source together with said advertising messages; they may be for example music pieces recorded on a tape or a compact disc.

A further aim of the invention is to provide a circuit device that, while having a great operating versatility, can at the same time be easily installed and also is very reliable and of very simple structure.

The foregoing and further aims, that will become more apparent in the progress of the present description, are substantially achieved by a circuit device for audio reproduction of coded radio signals, characterized in that it comprises: a receiving unit arranged to pick up radio signals and convert them into corresponding electric input signals; a recognition unit operating downstream of said receiving unit and capable of selecting those of said electrical input signals with which predetermined identification codes are associated; and audio playback means connected in circuit downstream of said recognition unit and capable of converting the selected signals into corresponding audio signals to be broadcast in the premises where the circuit device is installed.

Further features and advantages will be best understood from the detailed description of a preferred embodiment of a circuit device for audio reproduction of coded radio signals in accordance with the present invention, taken hereinafter with reference to the accompanying drawings, given by way of non-limiting example, in which:

- Fig. 1 is a block diagram schematically showing the circuit device of the present invention;
- Fig. 2 is a more detailed view of the circuit device shown in Fig. 1.

With reference to the accompanying drawings, a circuit device for audio reproduction of coded radio signals in accordance with the invention has been generally identified by reference numeral 1.

The device 1 comprises a receiving unit 2 arranged to pick up radio signals 3 emitted from one or more radio broadcasting stations both by earth and via satellite and to convert these signals into corresponding electric input signals 4. For the purpose, the receiving unit 2 comprises an antenna 5 picking up signals 3 and sending them to a preselection filter 6. Located downstream of filter 6 is at least one amplification unit 7 and then one demodulation unit 8 outputting said electric signals 4. Downstream of the receiving unit 2 and connected in circuit therewith there is a recognition unit 9 which advantageously is capable of selecting those of the different electric input signals 4 with which predetermined identification codes are associated. More particularly,

the recognition unit 9 comprises a memory register 10 into which a plurality of identification codes 10a corresponding to the signals to be selected is stored. The recognition unit 9 further comprises a comparator circuit 11 capable of comparing the identification codes associated with the electric input signals 4 with each of the identification codes 10a stored in the memory register 10, so as to exclusively select those of the electric input signals 4 with which an identification code included in the codes stored in register 10 is associated. It is to note that generally the radio broadcasting station by earth or via satellite transmits on several channels. For example, provision may be made for five music channels and two channels on which commercial messages are transmitted. The receiving unit 2 and recognition unit 9 are capable of separating the music channels (which generally are used to generate an audio background) from the commercial channels to enable the same to be broadcast live again or recorded on appropriate media, as better clarified in the following.

Audio playback means 12 is also arranged downstream of the recognition unit 9 and it converts the signals from the recognition unit into corresponding audio signals to be broadcast in the premises where the circuit device is installed. Preferably, the audio playback means 12 comprises at least one amplification stage 13 and transducer means 14 such as loudspeakers, for conversion of the selected signals into corresponding audio signals that are broadcast in the premises where the circuit device 1 is installed.

Advantageously, the device 1 further comprises storage means 15 interposed in circuit between the recognition unit 9 and said audio playback means 12. The storage means is designed to store the electric signals selected by the recognition unit 9 so as to enable the same to be played back at subsequent times and following the order which is judged as the most appropriate.

The storage means can be designed in such a manner as to carry out a separate recording of each of the audio input channels. The device 1 is also provided with a control unit 16 or CPU (central processing unit), operatively connected to the recognition unit 9 and means 15, and intended for managing transmission of the signals stored in said storage means to the audio playback means 12, following previously established sequences and at predetermined time intervals.

In the embodiment shown the control unit 16 comprises a processing block or CPU 17 and a non volatile memory block 18, of the ROM or EPROM type for example, connected in circuit with the processing block 17. Stored in the memory block 18 are the initialization and control parameters of the whole circuit device 1 which advantageously enable automatic restarting of the device in case of a sudden and unforeseen electric power cutoff.

The control unit 16 further comprises a timer circuit 19 operatively connected with the processing block 17 which supplies the circuit 19 with a time base for con-

veniently managing times for transmission of the different signals from one component to another in the device 1.

On the other hand, with reference to the storage means 15, it is to point out that it comprises at least first and second recorders 20 and 21, of the magnetic tape type for example, which are both simultaneously connected with the control unit 16 and the recognition unit 9. In this manner, it is for example possible to carry out storage in the first recorder 20 of a selected signal arrived via radio within a given time interval and send one or more selected signals previously stored to the audio playback means 12, within the same time interval, by means of the second recorder 21. It is to note however that the storage means 15 can consist of components different from the above described ones, such as RAM memory banks, memories on optical media or others.

In an original manner, the circuit device further comprises an auxiliary signal-generating unit 22, consisting for example of a compact disc player, and a sorter block 23, interposed in circuit between the storage means 15 and audio playback means 12. More particularly, the sorter block 23 has a first operating condition in which it is intended for connecting the audio playback means 12 with the storage means 15, and a second operating condition, in which it is intended for connecting the audio playback means 12 with the auxiliary signal-generating unit 22.

Advantageously, the control unit 16 is preferably connected with at least the above mentioned sorter block to cause the automatic passage of same between said first and second operating conditions. It is to note that the sorter block can also consist of a drive routine for the CPU 16. In this case it will be possible to meet any type of requirement. More particularly, the CPU 16, depending on the control program, will be able to cause sending to means 12 of any signal combination both coming from the auxiliary unit 22 and the storage means, as well as from other possible sources.

Finally, as shown in Fig. 2, a microphone 24 or similar transducer device may be provided to enable live interventions to be carried out. This microphone is connected in circuit with the sorter block 23 which, in this case, will have a third operating condition corresponding to activation of said microphone 24, in which the sorter block carries out the electrical connection between the microphone itself and the audio playback means 12.

It is finally to note that the CPU 16 will be also capable of carrying out a constant control on the correct operation of the different parts of the device 1. In particular, the CPU 16 controls the operating parameters of the different circuits by storing date, hour and duration of possible anomalies in appropriate memory banks 18'.

Finally, the device 1 is also provided with calibration means capable of adjusting the volume of the outgoing signals of the audio playback means 12 depending on

the detected noise in the environment where the device 1 is installed. In particular, the calibration means comprises at least one audio sensor 25 (actually, several sensors suitably arranged may be provided) and a control circuitry operatively interposed between sensor 25 and the audio playback means 12. In the case herein shown the control circuitry is embodied by the control unit 16 itself.

Operation of the circuit device 1 described above mainly as regards structure, is as follows.

First of all, it is to point out that in the areas where the circuit device is installed radio broadcasting stations are to be previously selected that will radiate a given number of times per day a series of signals, commercial messages for example, preceded by an identification code or an electronic access key enabling linking with the circuit device installed in the different points of sale.

In other words, the above mentioned radio broadcasting stations will have to transmit signals that, on occurrence of advertising messages, will be provided with special identification codes capable of being recognized by the device 1.

A more detailed operating description of the device is now given. It is to note first of all that the receiving unit 2 picks up, by means of antenna 5, the signals transmitted from the different broadcasting stations, filters them, amplifies them and then demodulates them so as to obtain corresponding electric input signals 4. Signals 4 then come to the comparator circuit 11 that will verify whether the identification codes 10a included in the register 10 are associated with these electric signals. In this case, upon command of the CPU 17, the selected electric signals are stored in at least one of the tape recorders 20, 21.

When, based on instructions contained in the non volatile memory block 18, an advertising message is to be broadcast inside or outside the point of sale, the CPU 17 operates one of the two recorders 20, 21 that will send the message to the audio playback means 12.

It is to note that during operation, in the time intervals between the different advertising messages, the CPU can suitably control the sorter block and compact disc to cause signals to be sent from the compact disc to the audio playback means 12, so that said advertising messages can be alternated with musical interludes or other, for example. Finally, during live interventions the sorter block is provided to connect the audio playback means with the input microphone.

The invention achieves important advantages.

First of all it is to point out that the circuit device 1 enables broadcasting to environments where it is installed, of a sequence of advertising messages previously recorded, optionally alternated with musical pieces, and also offers the possibility of live interventions, by the use of a very simple and reliable circuitry.

In addition, the circuit device 1, due to recognition of the identification code, enables selection of those of the different inputted advertising messages that are

more consistent with the goods dealt with by the point of sale in which the device is installed.

Furthermore, by suitably programming the memory block 18, not only the advertising messages can be varied with ease, but also the sequences with which these messages are proposed, the duration of each of them and that of the musical background interludes can be modified.

In other words, the circuit device 1 enables the greatest elasticity and adaptability to all marketing requirements, by greatly strengthening the incisiveness of the promotional action while at the same time giving the customers an appropriate sound environment represented by the background of music which, in this case, is given by the compact disc player.

It is also to note that the circuit device 1 ensures a constant updating of the advertising messages in that they are drawn and selected in real time from those emitted from radio broadcasting stations.

Obviously, many modifications and variations may be made to the present invention, all of them falling within the scope of the inventive idea characterizing it.

In particular, the circuit device 1 can be also used in different sectors than those described above in detail and in particular each time it is necessary to select coded radio messages, memorize them and transmit them again in the form of sound waves following predetermined sequences and optionally alternated with signals of other type.

Claims

1. A circuit device for audio reproduction of coded radio signals, characterized in that it comprises:
 - a receiving unit (2) arranged to pick up radio signals (3) and convert them into corresponding electric input signals;
 - a recognition unit (9) operating downstream of said receiving unit and capable of selecting those of said electrical input signals (4) with which predetermined identification codes are associated; and
 - audio playback means (12) connected in circuit downstream of said recognition unit (9) and capable of converting the selected signals into corresponding audio signals to be broadcast in the premises where the circuit device is installed.
2. A circuit device according to claim 1, characterized in that it further comprises:
 - storage means (15) interposed in circuit between the recognition unit (9) and the audio playback means (12) and arranged to store the electric signals selected by the recognition unit itself; and

- a control unit (16) intended for managing transmission of the selected signals from said storage means to said audio playback means, following a previously ordered sequence and at predetermined time intervals.
3. A circuit device according to claim 2, characterized in that said control unit (16) comprises a processing block (17) and a non volatile memory block (18), connected in circuit with said processing block, in which initializing and control parameters of the circuit device are stored.
4. A circuit device according to claim 3, characterized in that said control unit (16) further comprises a timer circuit (19) operatively connected with the processing block (17) to supply said block (17) with a time base.
5. A circuit device according to claim 1, characterized in that said recognition unit (9) comprises:
- a memory register (10) into which a plurality of identification codes (10a) is stored which correspond to the signals to be selected; and
 - a comparator circuit (11) capable of comparing the identification codes associated with the electric input signals (4) with each of the identification codes (10a) stored in said memory register (10) to exclusively select those input signals with which an identification code included in those stored in the memory register is associated.
6. A circuit device according to claim 2, characterized in that said storage means (15) comprises at least one first and one second recorder (21) both simultaneously connected with said control unit (16) and recognition unit (9).
7. A circuit device according to claim 1, characterized in that said audio playback means (12) comprises at least one amplification stage (13) and transducer means (14) for converting electric signals into corresponding sound signals.
8. A circuit device according to claim 2, characterized in that it further comprises:
- an auxiliary signal-generating unit (22);
 - a sorter block (23) interposed in circuit between the storage means (15) and the audio playback means (12), which block, in a first operating condition, connects the audio playback means (12) to said storage means and, in a second condition, connects the audio playback means (12) with said auxiliary signal-generating unit.
9. A circuit device according to claim 8, characterized in that said auxiliary signal-generating unit (22) comprises a compact disc player.
10. A circuit device according to claim 8, characterized in that said control unit (16) is operatively connected with said sorter block (23) to cause an automatic switching between said first and second operating conditions.
11. A circuit device according to claim 1, characterized in that it comprises calibration means (25, 16) capable of adjusting the volume of the outcoming audio signals of the audio playback means (12) depending on the noise detected in the environment in which the device itself is installed.

FIG.1

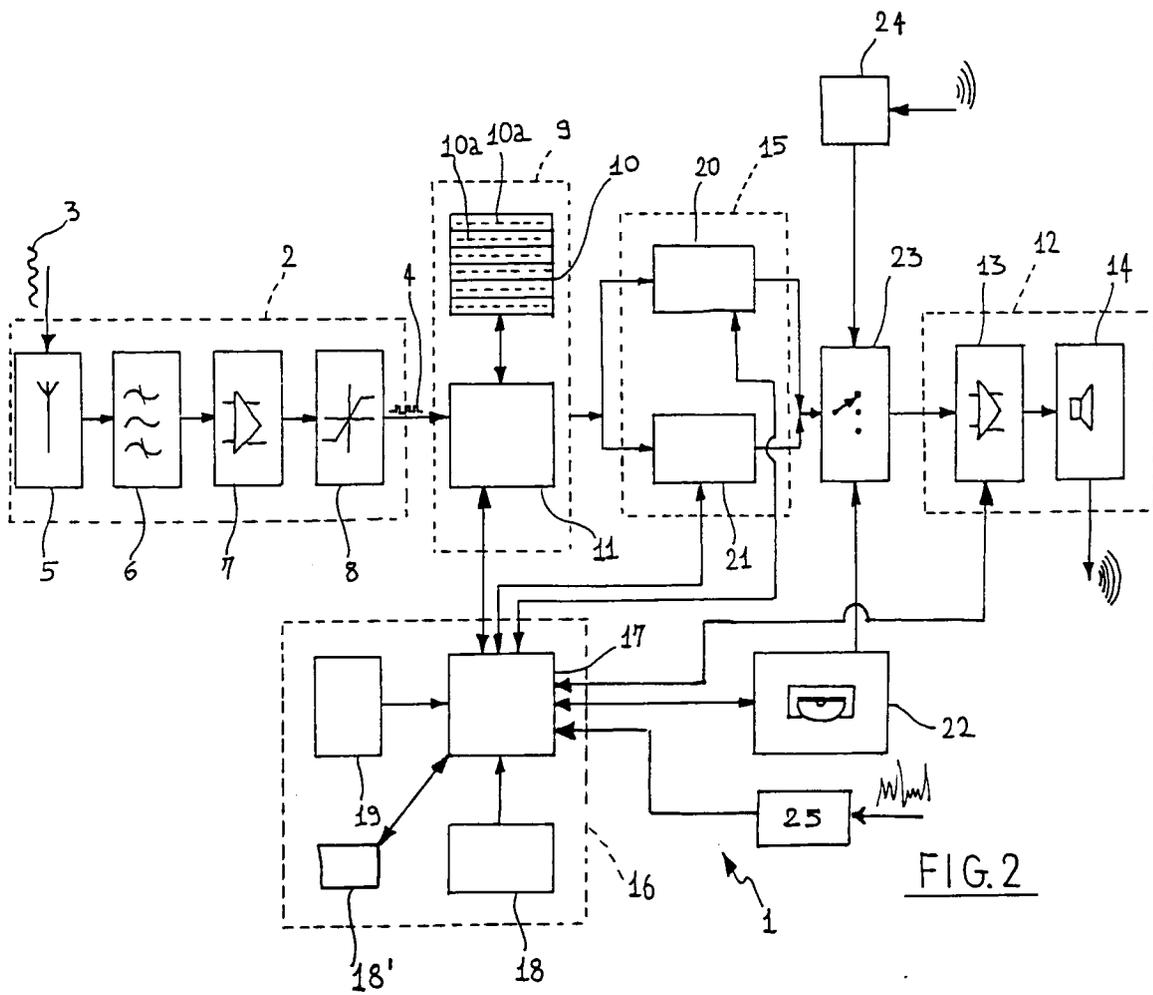
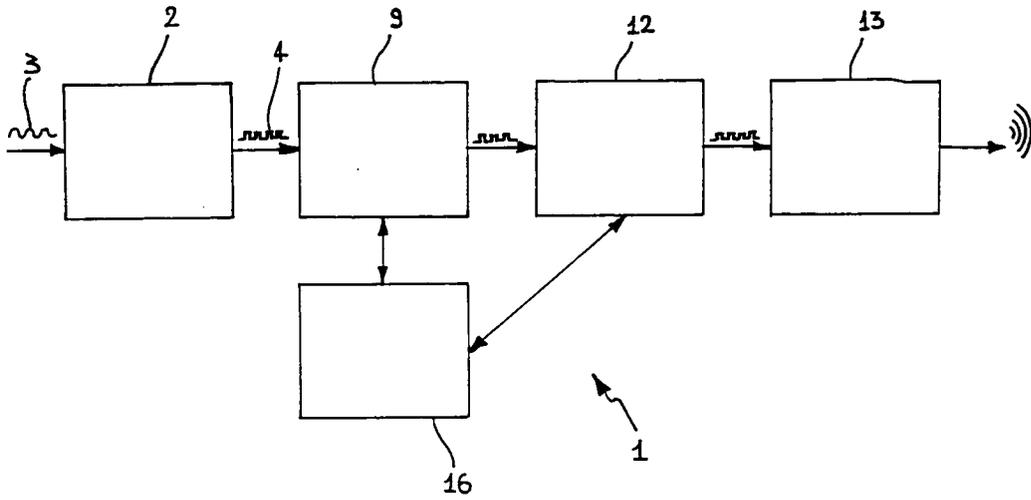


FIG.2



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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0486

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)
1 X	DE 41 18 970 A (SPINDLER, HEINRICH) * column 1, line 1 - column 2, line 13; claims 1,4; figures 1,2 * ---	1	H04H1/00
4 A	DE 39 39 484 C (WEHRMEYER) * column 1, line 1 - column 5, line 36; claim 1 * ---	1	
1 A	DE 40 20 690 A (ELITZSCH, HANS-LOTHAR) * column 1, line 1 - column 3, line 8; claim 1; figures 1,2 * ---	1	
1 A	DE 44 08 930 A (STABO ELEKTRONIK GMBH & CO KG) * column 1, line 1 - column 3, line 42; claim 1; figure 1 * -----	8,9	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			H04H
Place of search	Date of completion of the search	Examiner	
THE HAGUE	26 March 1997	De Haan, A.J.	
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