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(54) **Method and means for counteracting undesired sound utterances of a group**

(57) Method and system for counteracting undesired sound utterances of a group (12). The system comprises means (2,8,9) for detecting any occurrence of such undesired utterance and means (8,11) for modifying the relevant utterance and for sending it to said group. The

means for modifying the relevant utterance may be fit to scramble it and/or to delay it, e.g. with a delay time which depends on characteristics of said utterance and preferably comprising a variable time component. e.g. a random time component.

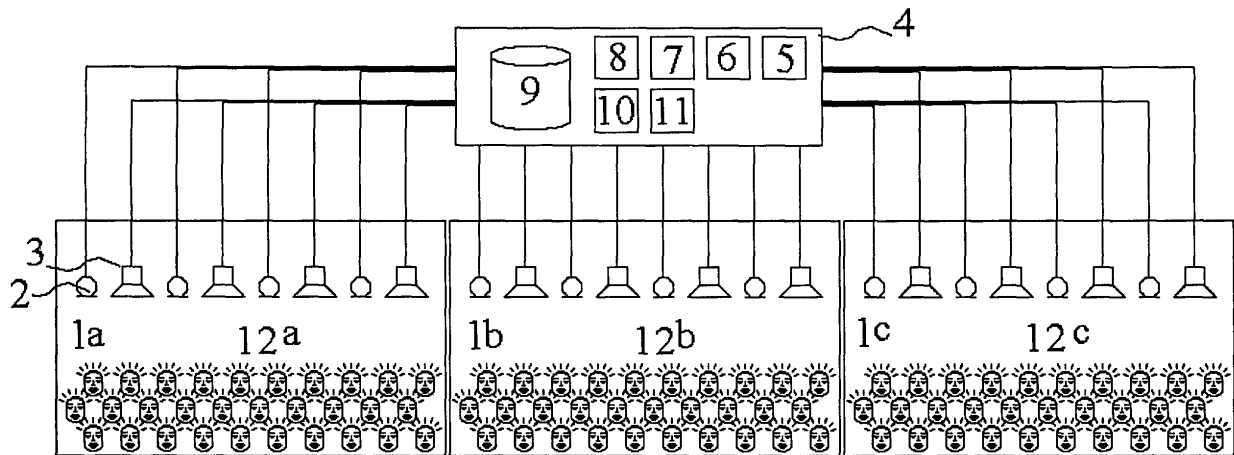


FIG. 1

Description

FIELD OF THE INVENTION

5 **[0001]** The invention comprises a method and/or means for counteracting undesired sound utterances of a group, hereinafter indicated as (offensive) chanting. Such chanting often occurs during sport events, especially during football matches. Examples of such (not-offensive) chant can e.g. be found at <http://red11.org/mufc/songs.htm>.

BACKGROUND OF THE INVENTION

10 **[0002]** From e.g. GB2368958 a method and system are known for counteracting undesired sound utterances of a group. It is disclosed there to fight such undesired utterances by masking, damping and/or suppressing them by means of outputting—via e.g. loudspeakers- a constant tone, music or sounds, having e.g. a calming effect to the chanting group.

15 **[0003]** Disadvantageous of the known method and system is that the relevant utterances are counteracted by outputting sound which in fact is superposed to the utterances to be fought, resulting in an increase of the total sound level.

SUMMARY OF THE INVENTION

20 **[0004]** It has been found that undesired utterances can be fought more effectively by means of counteracting sound which is semantically and/or perceptively related to the utterances to be fought. One aspect is that the relevant utterances will be suppressed more effectively, while another aspect is that the total sound volume will be experienced to be lower compared with the prior art method.

25 **[0005]** To that end it is proposed here to detect any occurrence of such undesired, e.g. offensive utterance, to modify the relevant utterance and to send it back to the originating group. The modification preferably is performed in the semantic and/or perceptive domain, resulting in a "feedback" sound which results in de-synchronization of an (initiating) choral action like chanting.

[0006] Modification of the relevant utterance may comprise that it is scrambled and is fed-back to the chanting group in its scrambled form, thus confusing and de-synchronizing attempts to start such an undesired choral action.

30 **[0007]** Modification of the relevant utterance may comprise that it is delayed, e.g. thus that the especially potential "group synchronizing" elements of a starting chant (e.g. keywords, beat etc.) are diffused, resulting in fading out such group synchronization. Preferably, the relevant utterance is delayed with a delay time which depends on characteristics, like e.g. beat etc., of the relevant utterance.

[0008] The de-synchronizing effect may still be improved when the delay time comprises a variable time component, e.g. by means of a random delay time component.

35 **[0009]** Below two systems will be shown and discussed, which are fit for performing the method as outlined here.

FIGURES

[0010]

40 Figure 1 shows schematically a first exemplary embodiment of a system which is fit for performing the method as presented above.

Figure 2 shows schematically a second exemplary embodiment of a system which is fit for performing the method as presented above.

45 Figure 3 is a first illustration of the process as presented above.

Figure 4 is a second illustration of the process as presented above.

Figure 5 is an illustration of a prior-art process.






50 **[0011]** Figure 1 shows the stands 1 of a (e.g. football) stadium, divided into three sections a, b, and c. Each section is provided with a couple of microphones 2 and loudspeakers 3. Each of those microphones 2 and loudspeakers 3 are—individually or group (e.g. section) wise- connected with a control unit 4, which comprises microphone amplifiers 5, microphone selectors 6, A/D converters 7, a digital processor 8, a database 9 comprising digitalized sound samples, D/A converters 10 and loudspeaker amplifiers 11. The database 9 comprises several fragments of e.g. previously recorded and/or analyzed- sounds which are deemed to be representative for undesired sounds, chants, choral reading etc. uttered by the visitors 12a, 12,b and 12c of the stadium during e.g. a football match. Instead of sound fragments, the database 9 may comprise parameters which have be found to be characteristic for the relevant undesired utterances.

55 **[0012]** The system works as follows. During the (e.g.) football match the microphones 2 pick up all utterances of the public 12 in the stands 1, converting those utterances into analog signals, which are—individually or per group of

microphones (selectable by the microphone selectors 6- amplified by the microphone amplifiers 5, converted into streaming digital audio signals by the A/D converters 7 and input into the processor 8.

[0013] Processor 8 analyses the streaming audio by comparing it with the (characteristics of) the various audio fragments in database 9. As long as the streaming audio does not match one of the fragments or characteristics in the database 9, the streaming audio may or may not be fed back to the loudspeakers 3 via the D/A converters 10 and the loudspeaker amplifiers 11 without affecting the output sound. However, as soon as the streaming audio does match one of the fragments or characteristics in the database 9, the streaming audio is fed back to the loudspeakers 3, via the D/A converters 10 and the loudspeaker amplifiers 11, after the signal is scrambled and/or delayed, either, preferably, in the digitalized form, in a digital scramble or delay module, e.g. incorporated in the digital processor 8, or in the analog domain, e.g. in a scrambling and/or delay unit within the loudspeaker amplifiers 11.

[0014] The table below illustrates some examples of undesired sound utterances of a group, which may be recorded at earlier (football) matches and saved in database 9. All sounds made by the supporters are compared with the various sound samples in database 9. If the relevant matching software indicates a rather great degree of similarity between the sound stream originated by the supporters and one of the sound samples, the sound stream is fed back to the supporters after being scrambled and/or delayed, to the end to tangle those supporter groups in trying to set up an undesired chant.

Size(bytes)	Sound File
790,361	Sound sample 01 
162,168	Sound sample 02 
387,030	Sound sample 03 
473,130	Sound sample 04 
680,856	Sound sample 05 
	Etc.

[0015] Figure 2 shows a less sophisticated system, in which persons 13 are used to detect undesired utterances instead of processors, software etc. Also in this case, the stands 1 of a (e.g. football) stadium, are divided into three sections a, b, and c. Each section is provided with a couple of microphones 2 and loudspeakers 3. Each of those microphones 2 and loudspeakers 3 are -individually or group (e.g. section) wise-connected with a control unit 4, which comprises microphone amplifiers 5, microphone selectors 6 etc. Instead of a plurality of many microphones and microphone selectors, portable microphones may be used, as e.g. suggested in the prior art (GB2368958).

[0016] During the (e.g.) football match the microphones 2 pick up all utterances of the public 12 in the stands 1. All sounds uttered by the public 12 are fed to supervisory persons 13. As long as the sound does not comprise fragments or characteristics which indicate the initiation of an undesired, e.g. offensive chant, the sound may or may not be fed back to the public, however, unmodified. However, as soon as the "streaming audio" -at the supervisory persons' judgment- comprise elements which indicate the initiation of an undesired, e.g. offensive chant, the audio is -set to do so by the relevant superintendent(s) 12 by means of their control units 14, connected with the control unit 4- fed back to the public 12 via the loudspeakers 3 after being scrambled and/or delayed e.g. in a scrambling and/or delay unit within the loudspeaker amplifiers 11, to tangle those supporter groups, trying to set up an undesired chant and thus to suppress the initiation of such undesired chants.

[0017] Figures 3 and 4 give an illustration of the process as presented above: in figure 3 delaying the incoming audio stream and feeding it back in case of the detection of an initiation of undesired chanting etc., and in figure 4 block wise scrambling the incoming audio stream. Below, reference may be made to the relevant modules in figures 1 and/or 2.

[0018] For the sake of clarity and delimitation, figure 5 illustrates a prior-art process known as "anti-sound", which is essentially another kind of process compared with the novel process as presented above.

[0019] Figure 3 shows part of the streaming audio as input by means of the microphones 2 (row a). By means of the

processor 8 or a supervisor 13 it is detected that an undesired chant, illustrated by signal a, is going on to start. As discussed above, from that point the signal is -at least during a time- delayed and/or scrambled in another way, which is illustrated in figures 3 (delaying) and 4 (scrambling). To the end to tangle effectively, the supporters' action to start an undesired chant, the delay time dt may be derived from the (mean) beat time bt of the chant signal, which beat time may be calculated (by signal/sound analyzing) by processor 8. As a delay time dt e.g. the half of the beat time may be chosen. Instead, however, or additionally, a variable, e.g. random, delay time dt may be used. The delayed sound (row b) is fed back to the stand via the loudspeakers 3, where it is mixed with the supporters' utterances (rows c and d). As, in that way, the undesired utterances of the supporters 12 mixed with their own delayed utterances, their intention to start their chant is counteracted and disturbed. After a time, when the counter-action has reached its goal, outputting the delayed signal (row c) to the supporters may be stopped.

[0020] Figure 4 shows the same part of the streaming audio as input by means of the microphones 2 (row a). By means of the processor 8 or a supervisor 13 it is detected that an undesired chant, illustrated by signal a, is going on to start. From that point the signal is scrambled, e.g. in the way illustrated in figure 4. Processor 8 may devise the sound signal in parts (I, II, III, IV, V, VI), shown in row b, and those parts may be mutually changed in order. In figure 4 this is simply done by exchanging (see row c) the sound parts I and II, III and IV, and V and VII respectively. The thus modified sound stream is fed back to the stand via the loudspeakers 3, where it is mixed with the supporters' utterances (rows d and e). As, in that way, the undesired utterances of the supporters 12 mixed with their own scrambled utterances, their intention to start their chant is anti-synchronized and thus disturbed. Also here, after a time, when the counter-action has reached its goal, outputting the scrambled signal (row c) to the supporters may be stopped.

[0021] Finally, for the sake of clarity and delimitation, figure 5 illustrates a prior-art "anti-sound" process, which, however, is essentially different from the present novel process as discussed above. In a anti-sound process the polarity of a sound signal, shown in row a, (note the polarity signs + and -), e.g. input by means of microphones, is turned in phase, thus generating an output signal which is in anti-phase with the input signal, as illustrated in row b (note the opposite polarity signs - and +). When exposing the sound source (e.g. football supporters) to the phase shifted signal, the resultant sound should be -at least theoretically- very low. However, in practice, this prior art process of anti-sound only may work under very strict conditions, e.g. without differences in acoustical reflection paths, etc.

[0022] Comparing figure 5 with figures 3 and 4, the differences will be clear. As illustrated in figures 3 and 4, undesired sound is fought by means of a counteracting sound which is semantically and/or perceptively related (e.g. by its "beat" of other semantic and/or perceptive characteristic). To that end any occurrence of such undesired utterance is modified in the semantic and/or perceptive domain (e.g. by beat based delay), resulting in a feedback sound which results in de-synchronization of an (initiating) choral action like chanting.

Claims

1. Method for counteracting undesired sound utterances of a group, comprising steps of:
 - detect any occurrence of such undesired utterance;
 - modify the relevant utterance and send it to said group.
2. Method according to claim 1, said modifying the relevant utterance comprising that it is scrambled.
3. Method according to claim 1 or 2, said modifying the relevant utterance comprising that it is delayed.
4. Method according to claim 3, the relevant utterance is delayed with a delay time which depends on characteristics of the relevant utterance.
5. Method according to claim 4, the delay time comprising a variable time component.
6. Method according to claim 5, the variable time component comprising a random time component.
7. System for counteracting undesired sound utterances of a group (12), comprising means (2,8,9) for detecting any occurrence of such undesired utterance and means (8,11) for modifying the relevant utterance and for sending it to said group.
8. System according to claim 7, said means for modifying the relevant utterance being fit to scramble it.
9. System according to claim 7, said means for modifying the relevant utterance being fit to delay it.

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10. System according to claim 9, the means for delaying the relevant utterance being fit for delaying it with a delay time which depends on characteristics of said utterance.

5 **11.** System according to claim 10, the means for delaying the relevant utterance being fit for delaying it with a delay time comprising a variable time component.

12. System according to claim 11, the means for delaying the relevant utterance with a delay time comprising a random time component.

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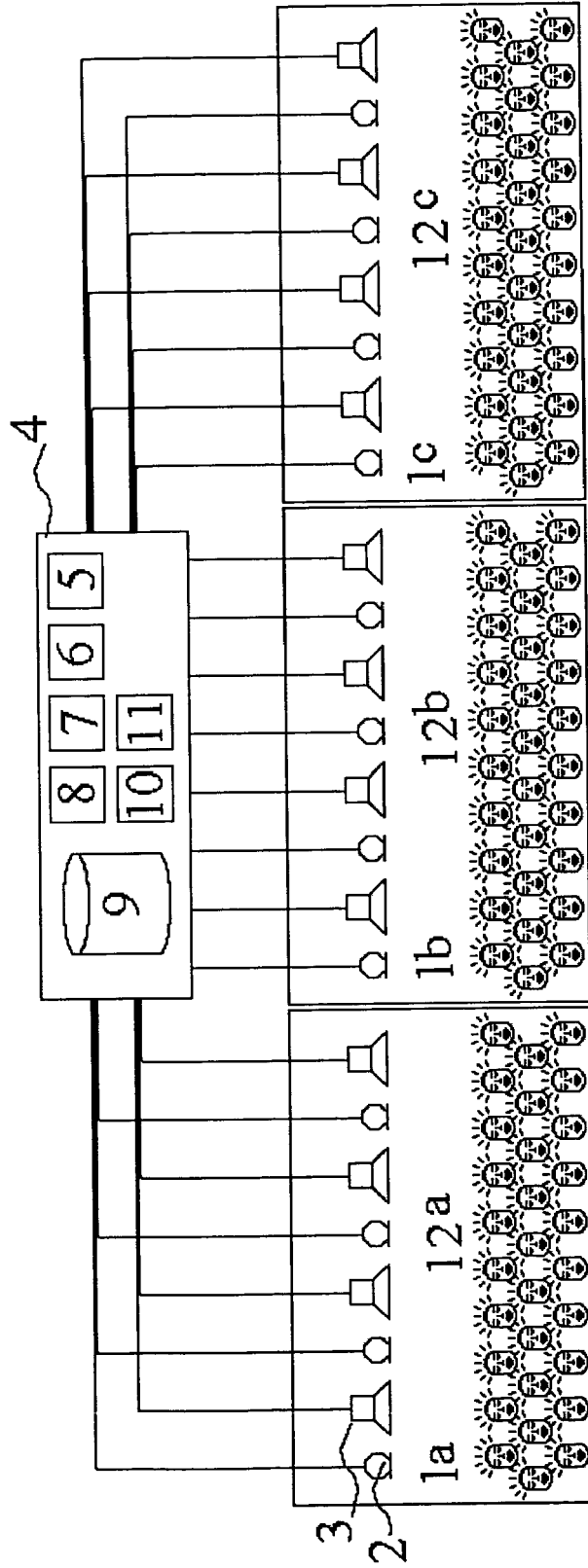


FIG. 1

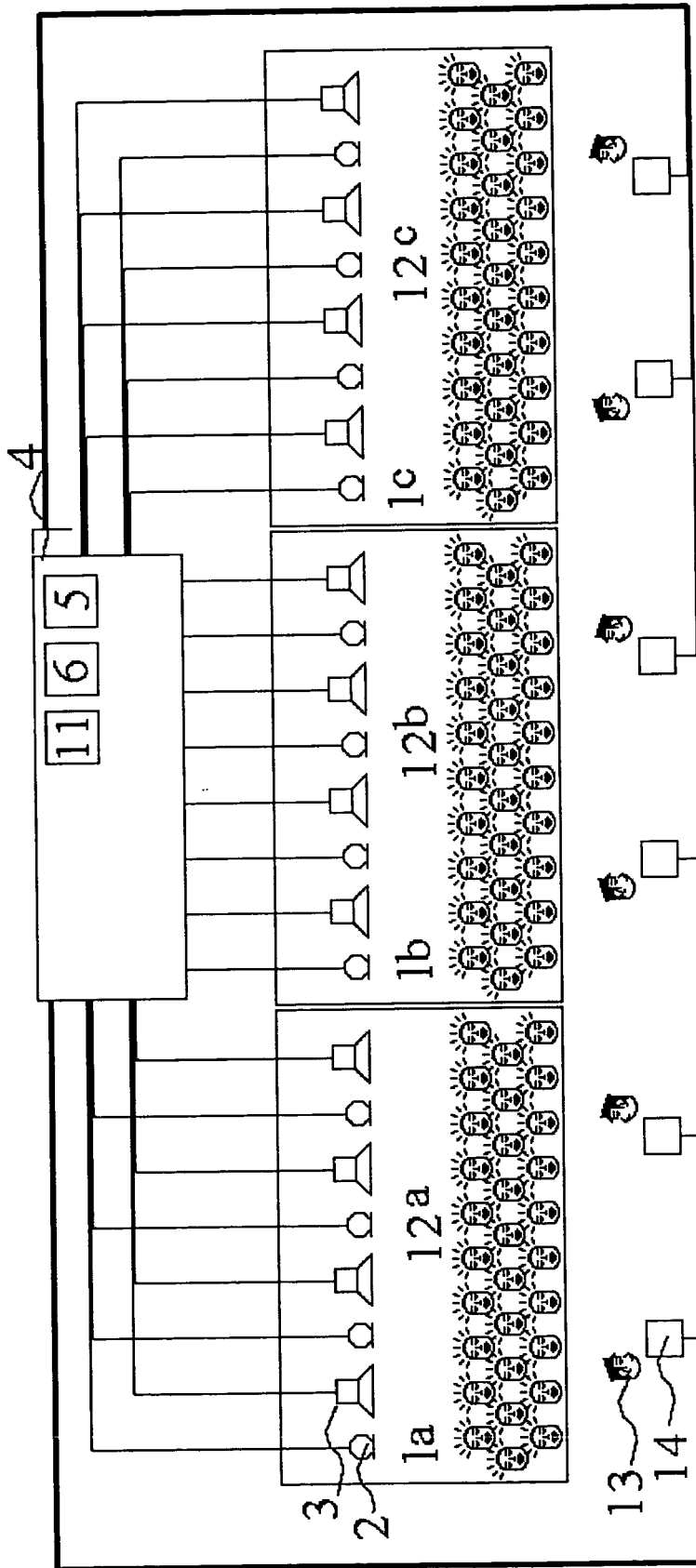


FIG. 2

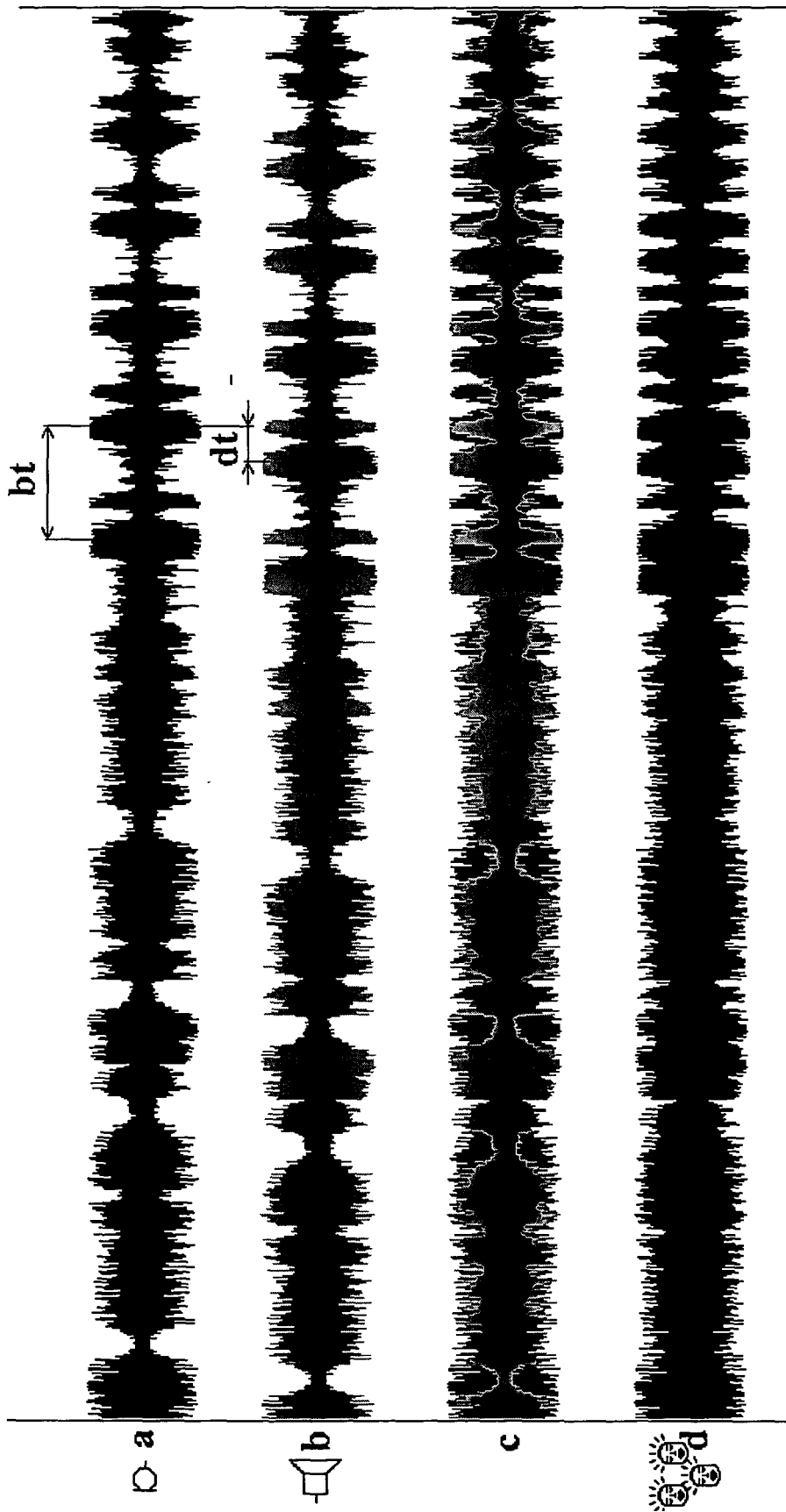


FIG. 3



FIG. 4

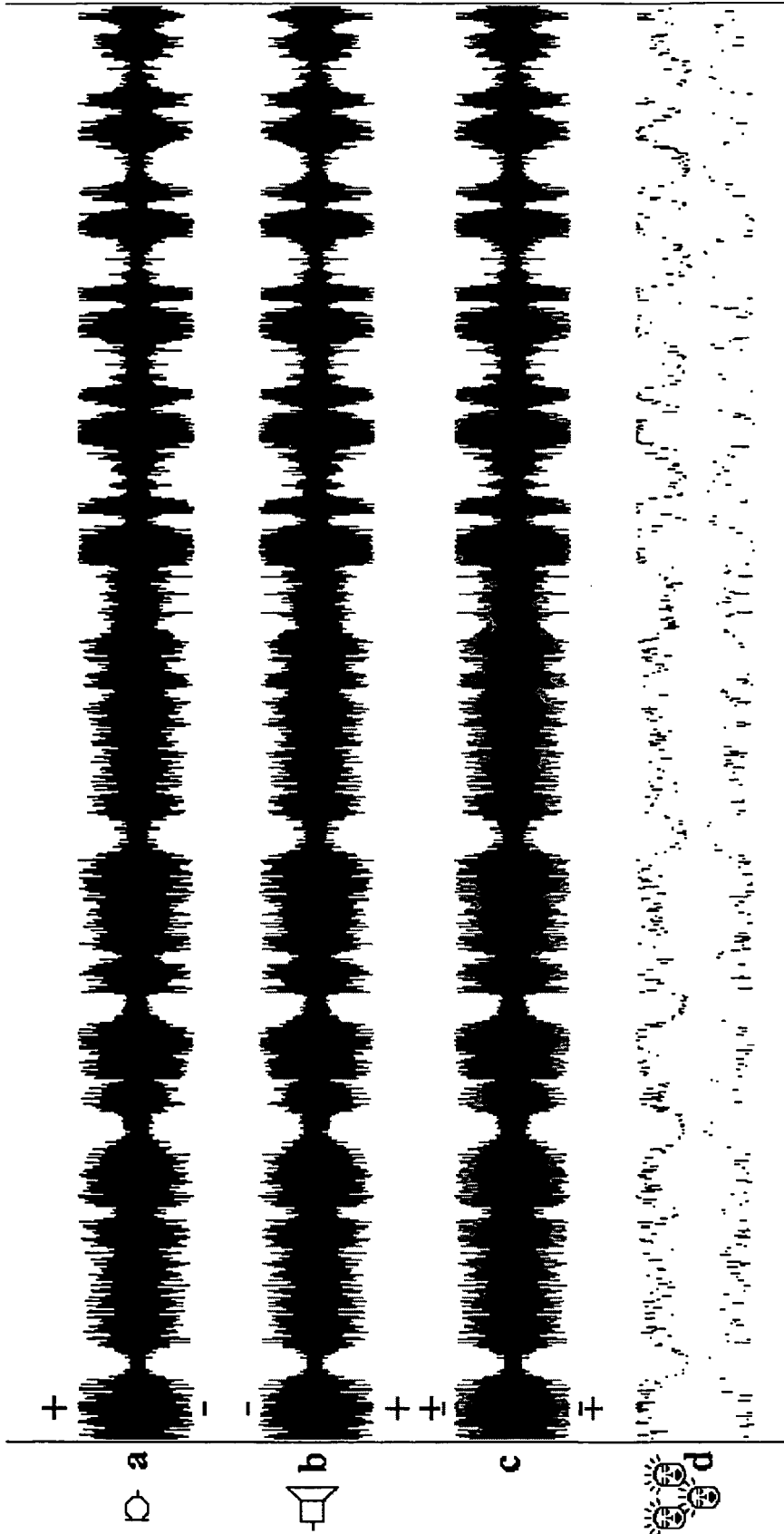


FIG. 5



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,D	GB 2 368 958 A (ROBERT MCROBB * CALDER) 15 May 2002 (2002-05-15) * abstract * * page 4, line 27 - page 5, line 3 * -----	1,3,7,9	G10K11/175
A	US 3 879 578 A (WILDI ET AL) 22 April 1975 (1975-04-22) * column 3, line 44 - column 4, line 10 * -----	2,3,8,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			G10K
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		8 March 2005	Anderson, A
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X : particularly relevant if taken alone		T : theory or principle underlying the invention	
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P : intermediate document		& : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 04 07 7555

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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08-03-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2368958	A	15-05-2002	NONE
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US 3879578	A	22-04-1975	CA 988036 A1 27-04-1976
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82