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(54) Device for controlling fluid supply, particularly for sanitary systems

(57) A device for controlling the supply of fluids, such as water and/or air, particularly for whirlpool baths (2) and shower cubicles (15a-15d), which comprises a unit (3) for processing the signal that arrives from an audio system, which can be activated selectively by the user, and is suitable to control and adjust the operation of supply devices (8, 10, 15a-15d) for the whirlpool bath (2) and/or shower cubicle (15a-15d).

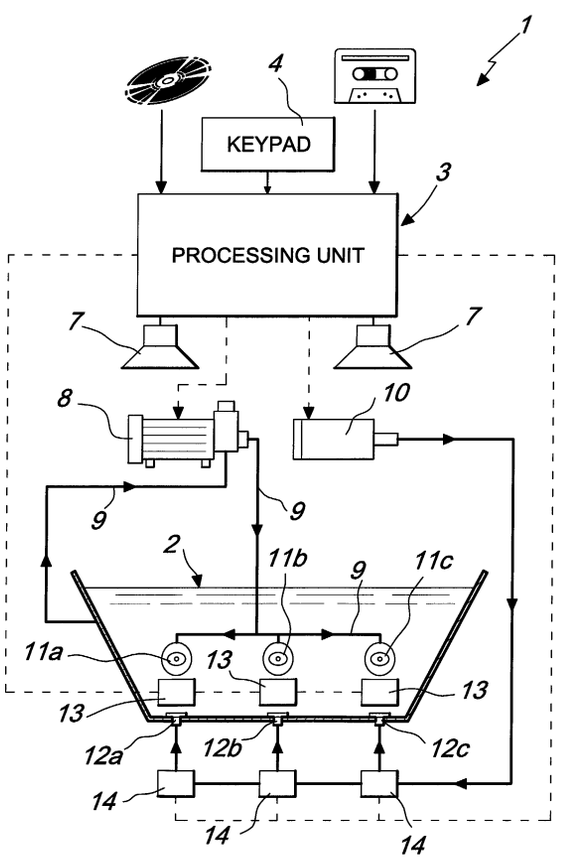


Fig. 5

EP 1 298 259 A2

Description

[0001] The present invention relates to a device for controlling the supply of fluids, such as water and air, that is particularly suitable for managing sanitary systems for body hygiene, such as for example shower cubicles, whirlpool baths, and larger tubs for two or more people commonly known as mini-spas.

[0002] Currently there is an increasingly frequent use of shower cubicles and bathtubs that have multiple water jets, distributed in different regions, which are suitable not only to wet the user but also to perform a massaging action on the body.

[0003] Likewise, it is also known to use, in bathtubs and in mini-spas, air jets arranged below the level of the water which exit from respective nozzles that are fed for example by a blower.

[0004] The use of sanitary systems for body hygiene, which have the devices described above is useful as regards a body relaxing action and as a muscle massaging action, especially after sports activity.

[0005] In order to be truly effective, the bath or shower must last for a certain period of time, and this can be boring for some users.

[0006] In particular, although it is known to produce whirlpool baths and shower cubicles that allow to vary the inflow of water or air, frequent use, as often occurs not only in the sports sector, in any case makes this remedy ineffective.

[0007] The aim of the present invention is therefore to solve the mentioned drawbacks, improving the performance and functionality of the cited known art and thus providing an invention that allows to obtain a whirlpool bath or shower cubicle that has a device suitable to achieve high physical and mental relaxation and an optimum muscle massaging and toning action.

[0008] Within this aim, an important object is to provide an invention that allows to use a whirlpool bath or shower cubicle in an amusing and mentally relaxing manner.

[0009] Accordingly, an object of the invention is to prevent the user from becoming bored and therefore tending to reduce the utilization time of the sanitary system.

[0010] Another object is to provide an invention that is structurally simple and has modest manufacturing costs.

[0011] This aim and these and other objects that will become better apparent hereinafter are achieved by a device for controlling the supply of fluids, particularly for sanitary systems, characterized in that it comprises a unit for processing the signal that arrives from an audio system, which can be activated selectively by the user, and is suitable to control and adjust the operation of supply devices for said sanitary systems.

[0012] Further characteristics and advantages of the invention will become better apparent from the detailed description of a particular embodiment, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a block diagram of the sound sources that can be used and the filters for the selected music type;

Figures 2 and 3 are two block diagrams of the operation of the device in combination with a shower cubicle;

Figures 4 and 5 are two block diagrams of the operation of the device in combination with a whirlpool bath.

[0013] With reference to the figures, the reference numeral 1 designates a device for controlling the supply of fluids, particularly water and/or air, for use in sanitary systems, such as for example shower cubicles, whirlpool baths, such as the one shown schematically and designated by the reference numeral 2 in Figure 5, and mini-spas.

[0014] The control device 1 is constituted by a processing unit, designated by the reference numeral 3, for processing a signal that arrives from an audio system, such as for example a known type of AM and/or FM radio receiver (designated in Figures 1, 2 and 4 as "AM/FM RADIO MODULE").

[0015] The radio system or AM/FM radio module can be integrated into the control device 1 or can be connected thereto by way of electrical cables of a known type.

[0016] Likewise, the audio signal in input to the processing unit may arrive from an external audio source, such as for example a stereo or radio system, or a television or electronic computer.

[0017] The input audio signal is preferably processed by passing through one or more audio filters of the passive type, suitable to select only certain particular bands of the signal.

[0018] Figures 6 to 11 show, merely by way of example, the operating diagrams for six audio filters that operate preferably in combination with a specific musical genre, such as pop, dance, rock, blues, jazz, and classical.

[0019] By activating a selection device, such as for example a keypad 4, the user determines which of the audio filters contained in the device 1 is crossed by the input signal, processing it.

[0020] Said keypad 4 can advantageously have a front panel, such as the one shown in Figures 2 and 4 and designated by the reference numeral 5, which comprises a plurality of buttons 6, each of which corresponds to a musical genre and is suitable to send the input signal through the associated audio filter.

[0021] As an alternative to the keypad 4, it is possible to use other known kinds of selection device, such as an infrared or wired remote control, or a touch screen.

[0022] The control of the audio filters and of the selection device, as well as the processing of the audio signal and its optional emission by means of one or more

loudspeakers 7, occur by means of a microprocessor (also designated as "CONTROL CPU" in the figures), which is integrated in or associated with said processing unit 3.

[0023] Said microprocessor is also designed to process the electrical signal in output from the filter, so as to obtain a control and/or adjustment signal for the operation of the devices for supplying the whirlpool bath 2 or shower cubicle.

[0024] As shown schematically in Figure 5, these supply devices usually comprise at least one hydraulic pump, designated by the reference numeral 8, which is suitable to circulate water inside a hydraulic circuit 9 for delivery and return from the whirlpool bath 2.

[0025] Advantageously, moreover, there is a supply device suitable to propel a gas, such as a blower 10, which operates so as to send pressurized air into the whirlpool bath 2.

[0026] Water and air are fed into the tub respectively by means of outlets and nozzles arranged laterally and/or below the tub, at a height from the bottom that is normally lower than the free surface of the water.

[0027] The example of Figure 5 illustrates three outlets 11a, 11b and 11c and three nozzles 12a, 12b and 12c, which are arranged in succession and equally spaced along the longitudinal axis of the tub.

[0028] The inflow of water and air to the outlets 11a, 11b and 11c and to the nozzles 12a, 12b and 12c is regulated by way of first and second electric valves, generally designated by the reference numerals 13 and 14, whose opening is controlled by the processing unit 3 as a function of the signal in output from the selected audio filter.

[0029] The processing unit 3 acts on the electric valves 13 and 14 so as to force their opening and closure in time to or synchronized with the music being played.

[0030] In particular, said opening and closure occur at a frequency that does not exceed approximately 1 hertz, since higher frequencies (for example 2 or 3 opening actions per second) do not improve the overall effect and at the same time are particularly detrimental to the good mechanical durability of the system.

[0031] Likewise, Figure 3 schematically illustrates the use of the invention in combination with a shower cubicle: the reference numerals 15a, 15b, 15c, 15d and 15e designate different types of jets, nozzles, outlets commonly used to dispense water.

[0032] The flow-rate of the water that exits from said jets, nozzles and outlets is regulated by electric valves for closing the inflow of water (so-called "on/off" valves) or also by electric valves of the proportional type, suitable to allow regulation of the output flow-rate of the water.

[0033] The operation of the electric valves is regulated by said processing unit 3 as a function of the music signal processed by the audio filter, so that the emission of water occurs in time to the music signal being played.

[0034] Advantageously, there can be a pump, not shown in Figure 3, which is suitable to keep under pressure the water upstream of the jets or nozzles or outlets: the operation of this pump also is advantageously controlled by the processing unit 3, as a function of the music signal that arrives from the radio system.

[0035] It can be convenient to synchronize the outflow of water and air from the nozzles and outlets of the whirlpool bath 2 and the shower cubicle so that said outflow is staggered as a function of position; in particular, it has been found that it can be convenient to activate the nozzles and outlets that are located proximate to the user's legs, then the ones located proximate to the hips and then the ones located proximate to the chest, so as to facilitate blood circulation.

[0036] Operation is therefore as follows: with reference to the above cited figures, the user can tune the radio system to a chosen music channel and listen to the music in output from the loudspeakers 7.

[0037] At the same time, the user can select on the keypad 4 the music genre being played and then activate the fluid supply control device 1, so that the audio signal is changed in the audio filter indicated by the keypad and then sent to the microprocessor.

[0038] Said processing unit converts the filtered music signal into a sequence of commands for each one of the electric valves for controlling the nozzles and the outlets for air and water discharge.

[0039] Accordingly, the body of the user is "massaged" by a stream of water and optionally air that is not constant and does not follow preset cycles but is synchronized directly with the music being played.

[0040] It has thus been found that the invention has achieved the intended aim and objects, a device for controlling the supply of fluids, particularly usable with a whirlpool bath or a shower cubicle, having been devised which allows an increase in performance and better functionality of the whirlpool technique with respect to the known art.

[0041] This device, by synchronizing the water and air jets with the tempo of the music, allows a powerful action producing physical and most of all mental relaxation, at the same time improving the body massage and toning action.

[0042] The invention allows to spend time in a whirlpool bath or in a shower cubicle in a very amusing and relaxing manner, since it has been found that the simultaneous perception of music by hearing and by touch increases considerably the overall feeling of well-being.

[0043] Moreover, the sequence of the introduction of fluids in the whirlpool bath or shower cubicle, by matching a chosen preset sequence, allows to improve blood circulation inside the human body.

[0044] The invention is of course susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0045] The materials used, as well as the dimensions that constitute the individual components of the invention, may of course be more pertinent according to re-

quirements.

[0046] The various means for performing certain different functions need not certainly coexist only in relation to the illustrated embodiment but can be present per se in many embodiments, even if they are not illustrated.

[0047] The disclosures in Italian Patent Application No. TV2001A000134 from which this application claims priority are incorporated herein by reference.

[0048] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for controlling fluid supply, particularly for sanitary systems, **characterized in that** it comprises a unit (3) for processing a signal that arrives from an audio system, which can be activated selectively by the user, and is adapted to control and adjust the operation of supply devices (8, 10, 15a-15d) for said sanitary systems (2).

2. The device according to claim 1, **characterized in that** said processing unit (3) controls activation and/or flow rate of a fluid, such as water and/or air, delivered by said supply devices (8, 10) for said sanitary systems, such as shower cubicles (15a-15d), whirlpool baths (2) or mini-spas.

3. The device according to claims 1 and 2, **characterized in that** said processing unit (3) comprises at least one audio filter adapted to modify a music signal in output from said audio system.

4. The device according to one or more of the preceding claims, **characterized in that** said audio system is advantageously constituted by a radio receiver system of a known type, of the amplitude-modulation and/or frequency-modulation type, which is integrated in said control device (1) or connected thereto by way of electrical cables of a known type.

5. The device according to one or more of the preceding claims, **characterized in that** said one or more audio filters are preferably of the passive type adapted to select certain particular bands of an audio signal in input, according to the type of said audio signal.

6. The device according to one or more of the preceding claims, **characterized in that** it comprises a selection device, such as a keypad (4), adapted to send the audio signal in input toward a chosen one of said one or more audio filters.

7. The device according to claims 1 and 6, **characterized in that** it comprises six audio filters, each of which is suitable to process a specific audio signal in input, which corresponds to a given musical genre.

8. The device according to one or more of the preceding claims, **characterized in that** said processing unit (3) comprises at least one microprocessor (CPU) adapted to control said audio filters and said selection device (4), and to process the audio signal in output from the chosen one of said one or more audio filters, and to optionally emit the signal by way of one or more loudspeakers (7) of a known type.

9. The device according to claims 1 and 8, **characterized in that** said microprocessor (CPU) processes the electrical signal in output from the chosen one of said one or more audio filters so as to obtain a control and/or adjustment signal for the operation of said supply devices (8, 10, 15a-15d) of said whirlpool bath, shower cubicle or mini-spa.

10. The device according to claims 1 and 9, **characterized in that** said supply devices preferably comprise at least one hydraulic pump (8) that is suitable to circulate water inside a hydraulic circuit (9) that comprises one or more water inflow means (11a-11c, 12a-12c), such as jets or outlets or nozzles.

11. The device according to one or more of the preceding claims, **characterized in that** in said whirlpool baths (2) and/or mini-spas there is advantageously a separate supply device, suitable to propel gases, such as a blower (10) which acts so as to send air under pressure into said whirlpool bath (2) or mini-spa.

12. The device according to one or more of the preceding claims, **characterized in that** it has one or more electric valves (13, 14) adapted to regulate the injection and/or inflow of water and/or air in said jets or outlets or nozzles (11a-11c, 12a-12c), the activation of said one or more electric valves (13, 14) being controlled by said processing unit (3) as a function of the signal in output from the preset one of said one or more audio filters.

13. The device according to one or more of the preceding claims, **characterized in that** said processing unit (3) controls flow-rate regulation of the outflow of water through said injection means (11a-11c, 12a-12c), as a function of the amplitude of the processed audio signal.

14. The device according to one or more of the preceding claims, **characterized in that** the outflow of water and/or air from said injection means (11a-11c, 12a-12c) is advantageously staggered as a function of the position of said injection means along said sanitary systems (2).

15. The device according to one or more of the preceding claims, **characterized in that** said audio signal in input to said processing unit (3) originates from an external audio source, such as a stereo or radio system, or a television set or an electronic computer.

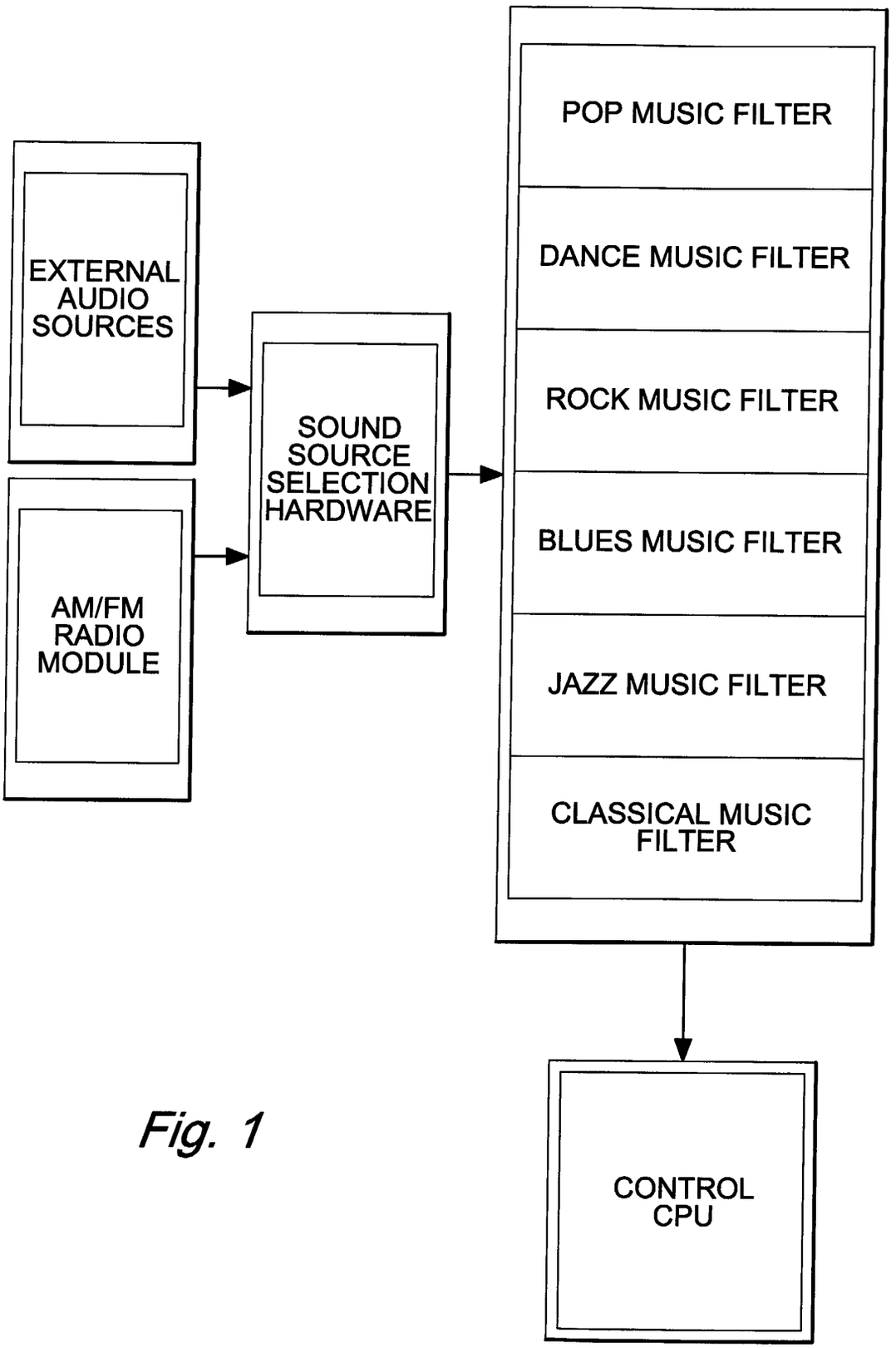

EXTERNAL AUDIO SOURCES
AM/FM RADIO MODULE
SOUND SOURCE SELECTION HARDWARE
POP MUSIC FILTER
DANCE MUSIC FILTER
ROCK MUSIC FILTER
BLUES MUSIC FILTER
JAZZ MUSIC FILTER
CLASSICAL MUSIC FILTER
CONTROL CPU

Fig. 1

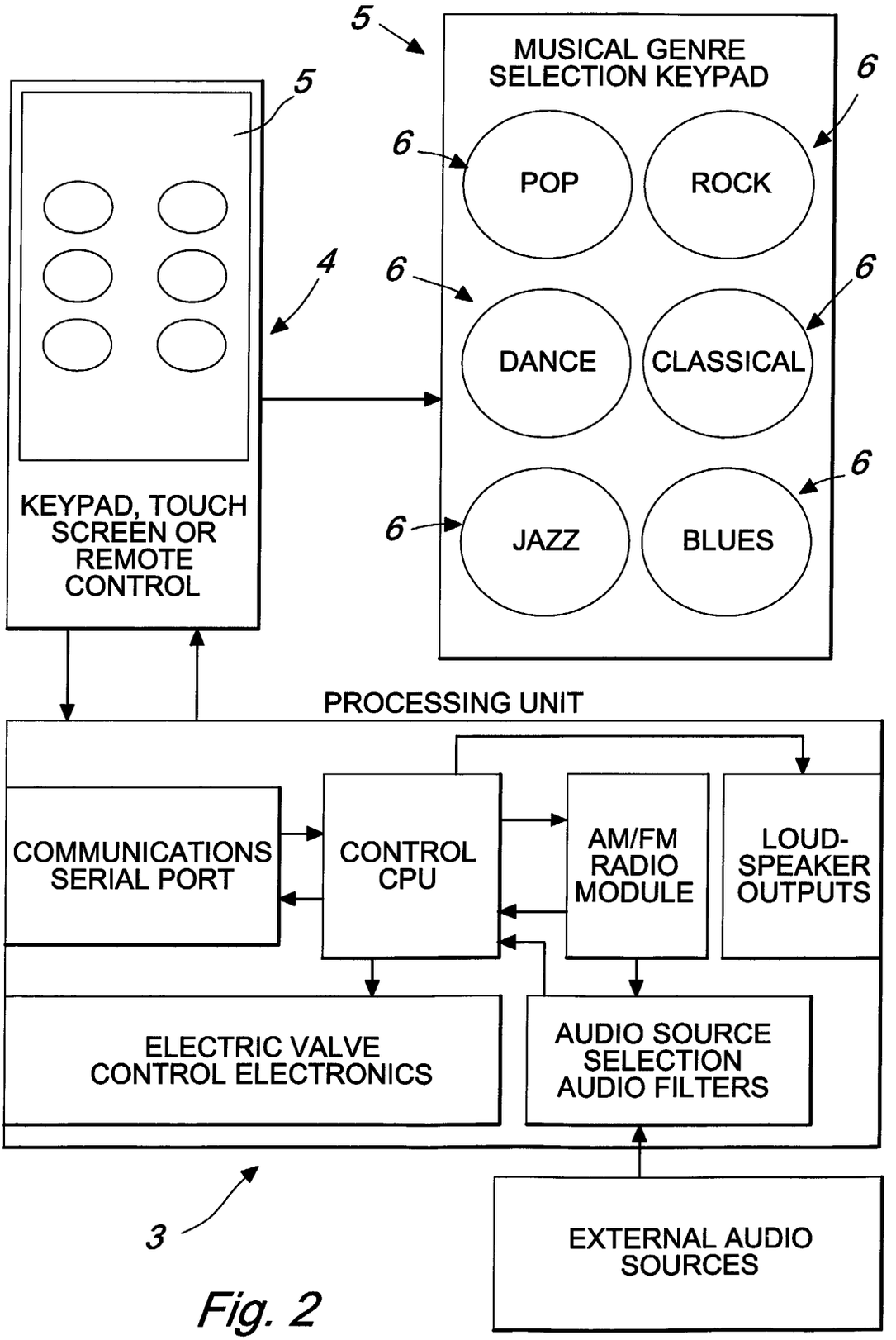

5
MUSICAL GENRE SELECTION KEYPAD
6
POP
ROCK
DANCE
CLASSICAL
JAZZ
BLUES
4
KEYPAD, TOUCH SCREEN OR REMOTE CONTROL
PROCESSING UNIT
COMMUNICATIONS SERIAL PORT
CONTROL CPU
AM/FM RADIO MODULE
LOUD-SPEAKER OUTPUTS
ELECTRIC VALVE CONTROL ELECTRONICS
AUDIO SOURCE SELECTION AUDIO FILTERS
3
EXTERNAL AUDIO SOURCES

Fig. 2

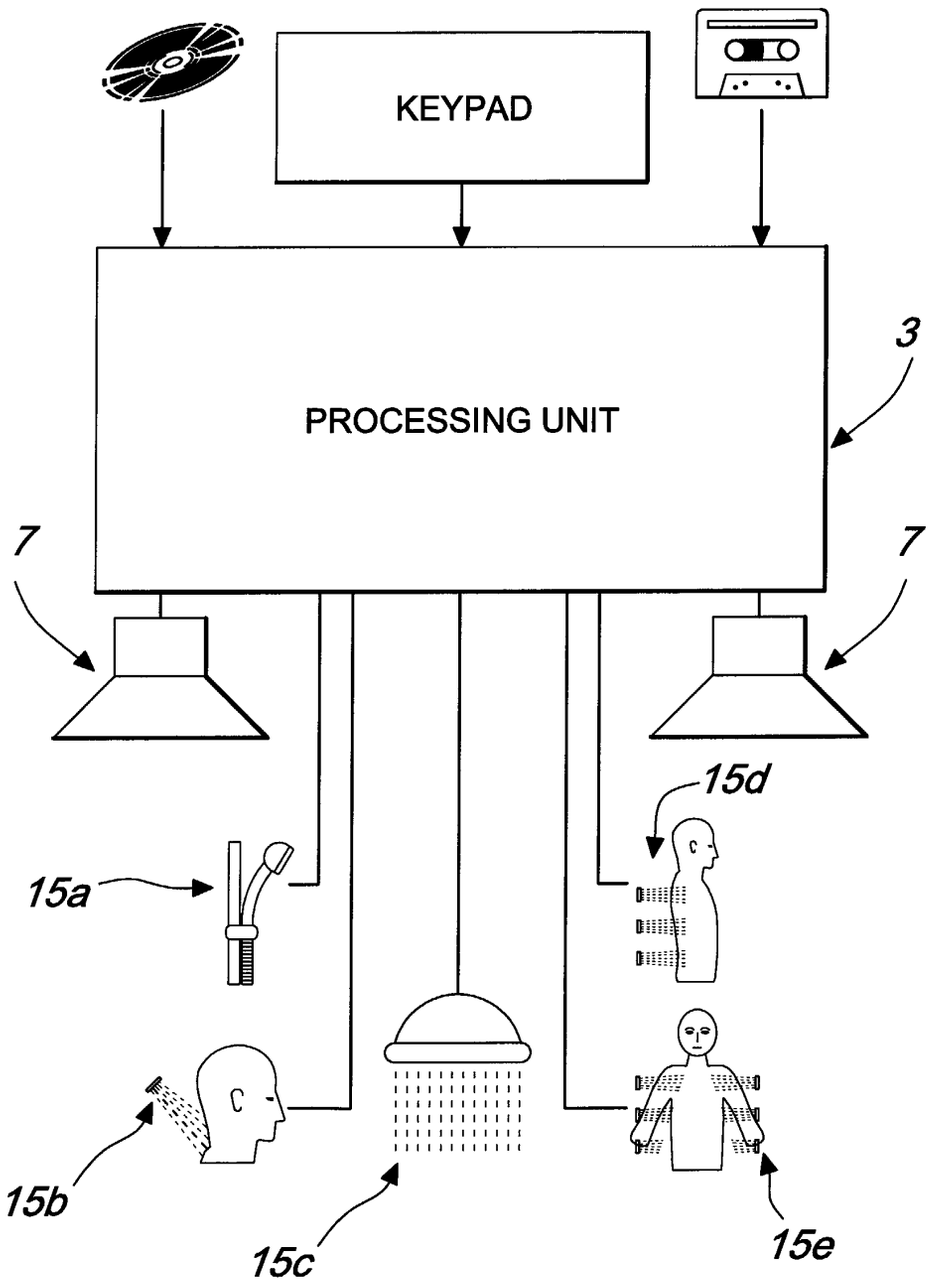


Fig. 3

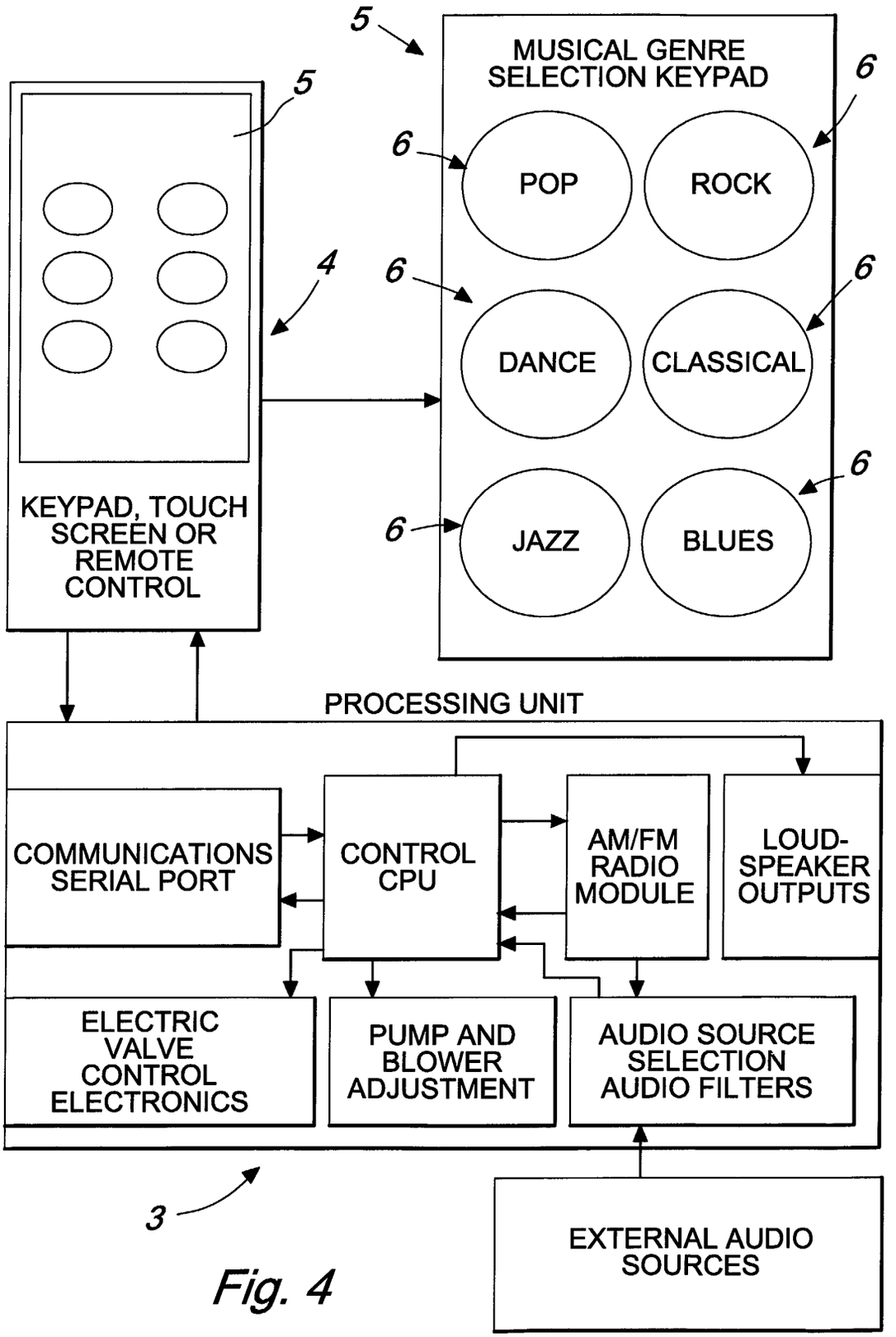

5
MUSICAL GENRE SELECTION KEYPAD
6
POP
ROCK
DANCE
CLASSICAL
JAZZ
BLUES
4
KEYPAD, TOUCH SCREEN OR REMOTE CONTROL
PROCESSING UNIT
COMMUNICATIONS SERIAL PORT
CONTROL CPU
AM/FM RADIO MODULE
LOUD-SPEAKER OUTPUTS
ELECTRIC VALVE CONTROL ELECTRONICS
PUMP AND BLOWER ADJUSTMENT
AUDIO SOURCE SELECTION AUDIO FILTERS
3
EXTERNAL AUDIO SOURCES

Fig. 4

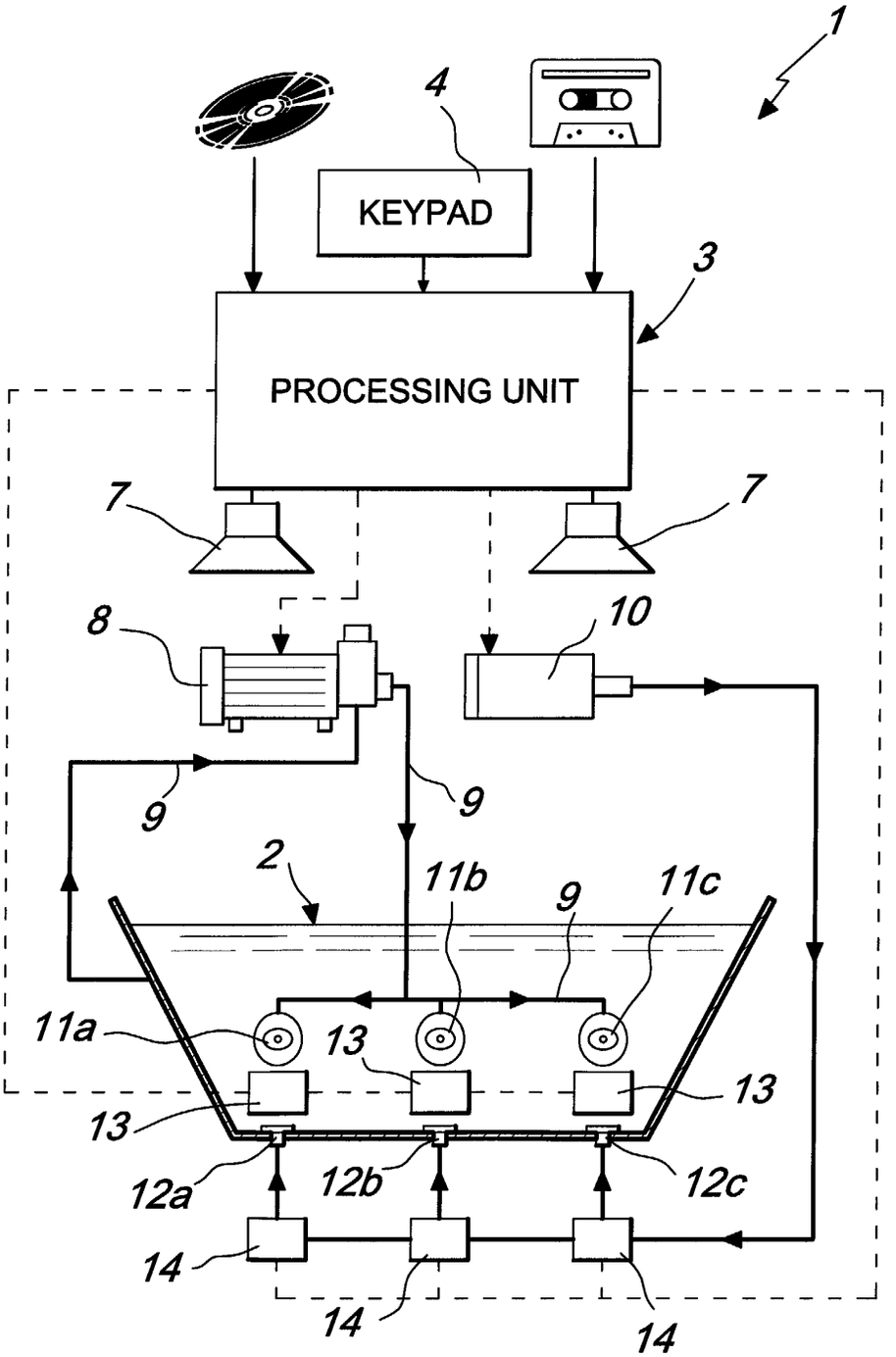

1
4
KEYPAD
3
PROCESSING UNIT
7
7
8
10
9
9
2
11b
9
11c
11a
13
13
13
12a
12b
12c
14
14
14

Fig. 5

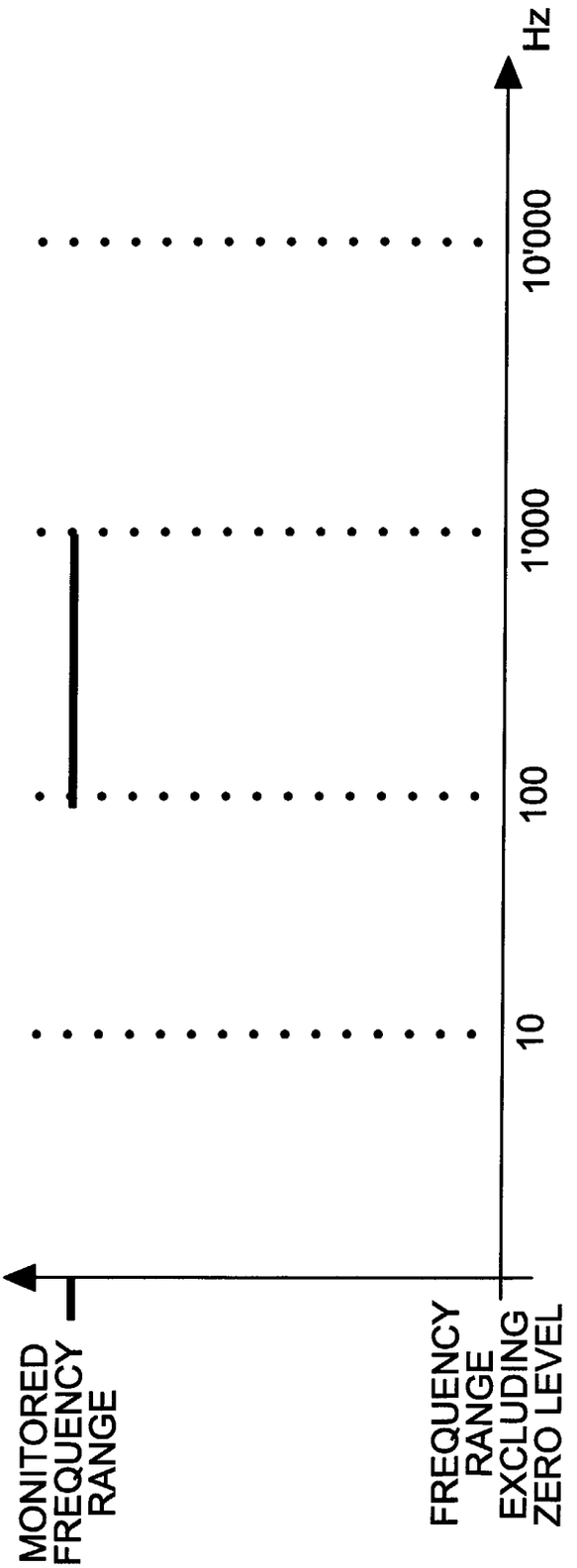
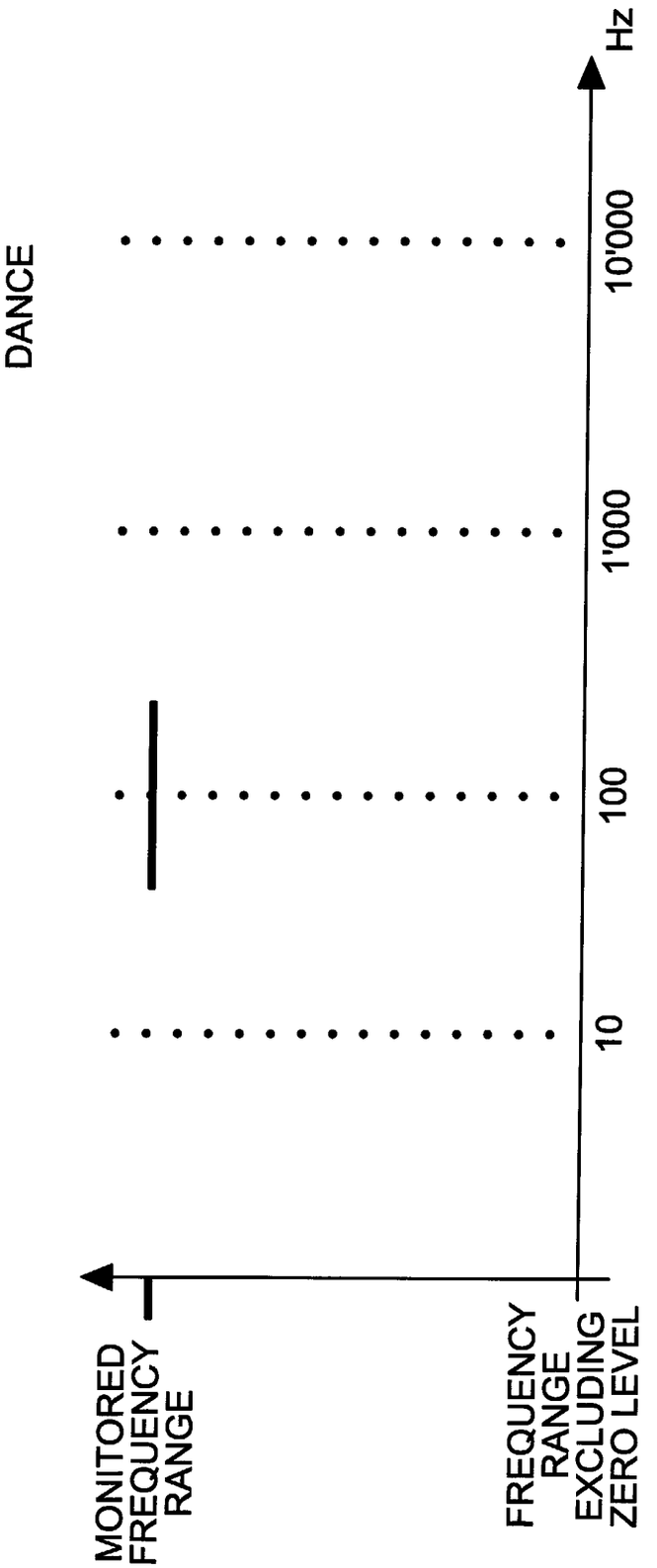

POP
Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 6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Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 7

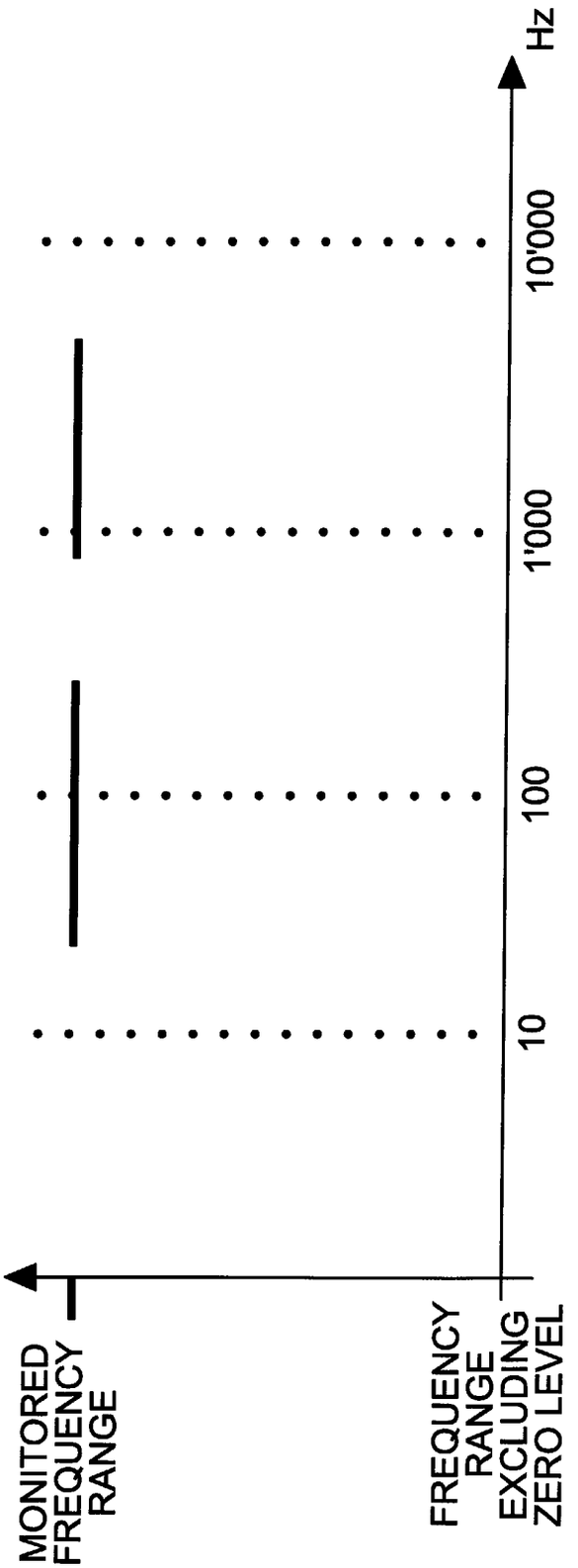
ROCK
Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 8

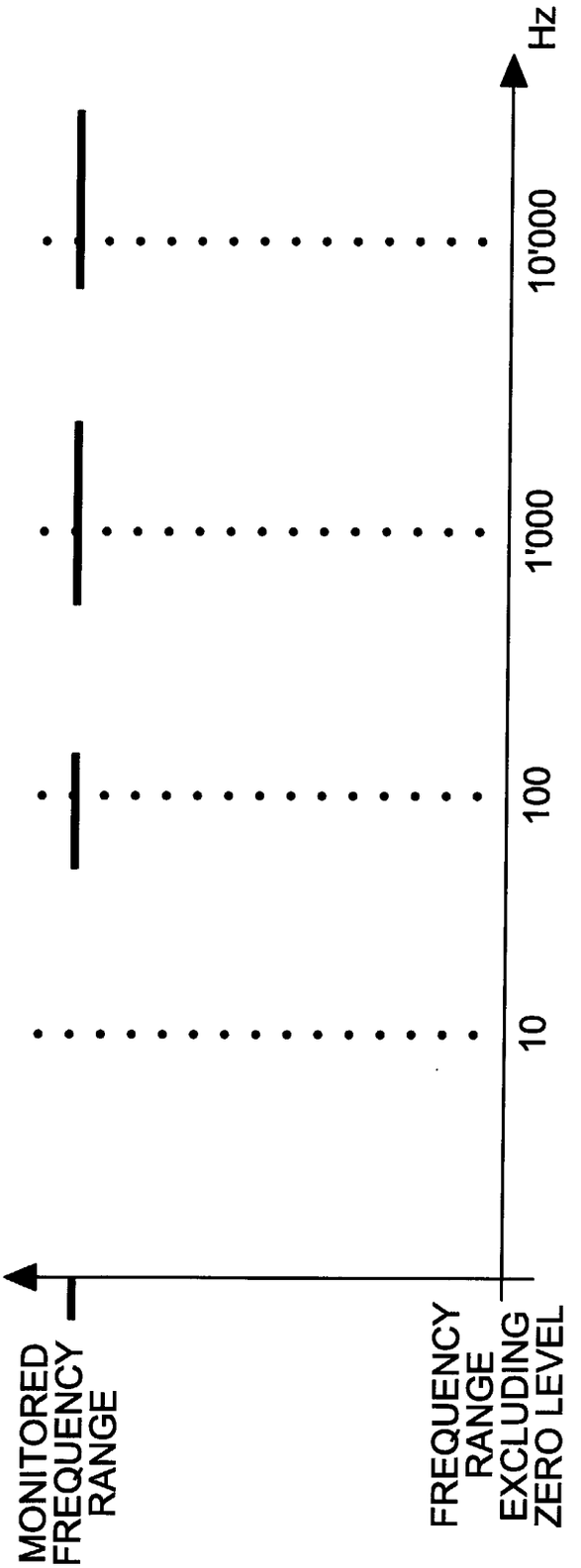
BLUES
Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 9

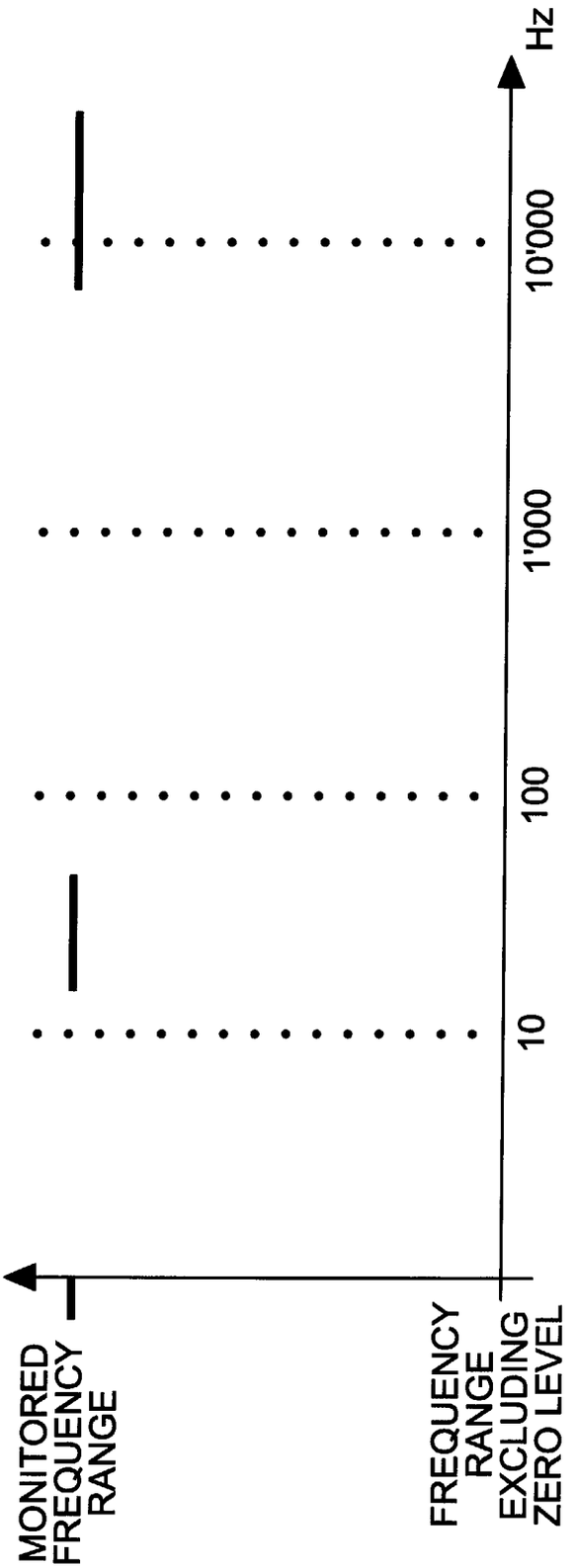
JAZZ
Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 10

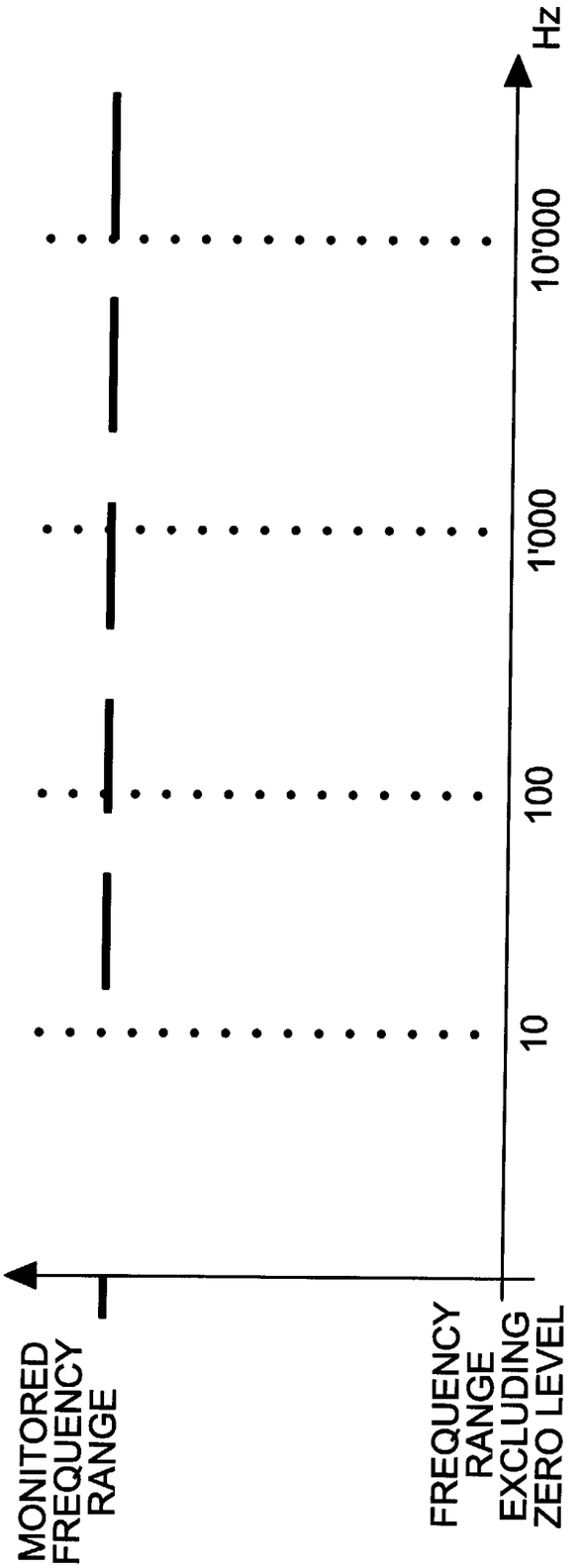
CLASSICAL
Hz
10'000
1'000
100
10
MONITORED FREQUENCY RANGE
FREQUENCY RANGE EXCLUDING ZERO LEVEL

Fig. 11