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(54) Title: A METHOD OF MODIFYING NOISE EMITTED IN PREMISES, IN PARTICULAR A HAIRDRESSING SALON

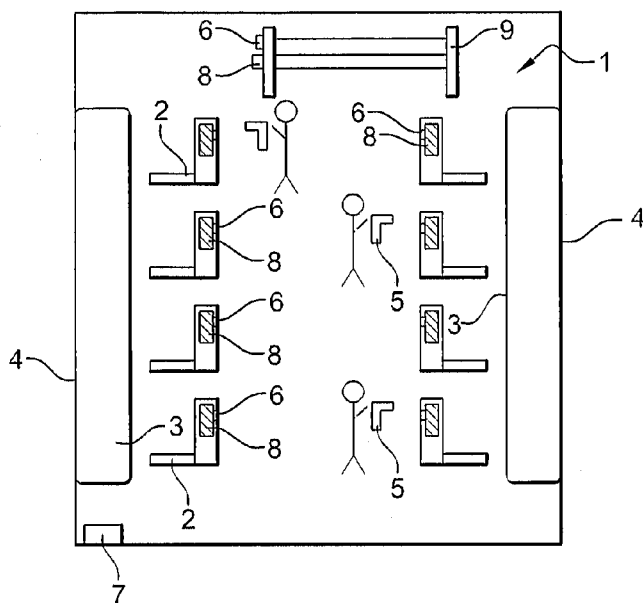


Fig. 1

(57) Abstract: The invention relates to a method of modifying noise emitted in premises (1) by at least one cosmetic- or skin-treatment appliance (5) present in the premises, in which method the noise emitted by the treatment appliance (5) is modified by means of an active control system (6, 7, 8) for controlling noise, at least a portion of the active control system being placed in the premises (1).



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A METHOD OF MODIFYING NOISE EMITTED IN PREMISES, IN PARTICULAR A HAIRDRESSING SALON

The present invention provides a method of modifying noise emitted in premises by at least one cosmetic- or skin-treatment appliance.

5 By way of example, the appliance could be a hair dryer, a hand dryer, or any appliance in which a fan cools a component that gives off heat, e.g. appliances such as those delivering pulsed light.

Such treatment appliances may be used in premises of various dimensions, e.g. a hairdressing salon, a beauty parlor, or a spa, and the noise emitted by all of the appliances
10 operating simultaneously may reach a sound level that is high and uncomfortable for people. By way of example, the noise emitted may hinder conversations between clients and professionals.

US application No. 2008/0236684 teaches reducing the noise in a hairdressing salon by using a compressor placed outside the premises, and a network of pipes
15 delivering compressed air to hand-pieces that replace normal hair dryers. In numerous hairdressing salons, that solution is difficult to install.

In addition, efforts have been made to reduce the operating noise of hair dryers by using soundproofing materials. However, although noise is reduced, that may be to the detriment of cost and/or air flow rate.

20 Thus, to the knowledge of the Applicant, no truly satisfactory solution has yet been found.

Active control systems for controlling noise are also disclosed in applications FR 2 692 709, FR 2 704 084, and FR 2 703 553. No application in the field of cosmetics is envisaged therein.

25 JP 06-209818 discloses a device with an active control system configured to reduce the overall noise of the device. In such a device, the active control system comprises microphones set at an air outlet.

US 5 546 467 discloses an appliance with an active control system at least in part offset from the body of the appliance. The communication between parts of the active
30 control system is achieved with the power line carrier (PLC) technology, which involves specific emitters and receivers. Such an active control system acts on several appliances. JP 08-299050 discloses an active control system for controlling the noise of an appliance that involves statistical processing. Such an active control system may be time-consuming and make it difficult or impossible to control the noise emitted by the appliance in a
35 nearly-instantaneous way.

US 2006/064180 discloses an active control system for controlling the noise in an aircraft.

Exemplary embodiments of the invention propose a solution that makes it possible to reduce the noise in hairdressing salons and other premises that use cosmetic- or skin-treatment appliances. In exemplary embodiments, the invention achieves this by means of a method of modifying noise emitted in premises by at least one cosmetic- or skin-treatment appliance present in the premises, wherein the noise emitted by the treatment appliance is modified by means of an active control system for controlling noise, at least a portion of the active control system being placed in the premises.

By way of example, the noise emitted by the treatment appliance may be attenuate of thereby improving the auditory comfort of the people present in the premises.

By way of example, the cosmetic- or skin-treatment appliance is configured to deliver a flow of air and/or of liquid, e.g. including a motor and an element that is coupled to the motor to be driven thereby. By way of example, the appliance is a hair dryer. In a variant, the flow of air and/or of liquid may be used to cool the cosmetic- or skin-treatment appliance while it is in operation, e.g. a source of light, of radiofrequency, or of ultrasound.

By way of example, the treatment appliance includes a hand-piece that may optionally incorporate the above-mentioned motor.

By way of example, the noise emitted by the treatment appliance is modified by using the active control system to emit sound waves that are configured to interact with the sound waves emitted by the appliance, in particular so as to reduce its intensity and/or modify its frequency.

The active noise control system may be configured to act on specific spectral lines of the noise emitted by the appliance. The noise may be reduced selectively. With such an active noise control system, the overall noise generated by the appliance may not be treated by the active noise control system. The active noise control system may not implement the negative feedback method.

The appliance may include a blower. The blower may rotate around an axis that is parallel to the longitudinal axis of the body of the appliance.

The active noise control system may be configured to control the operation of the appliance. The active control system is for instance configured to control the speed of the blower, for example via a control motor module, or the temperature of the air at an air outlet of the appliance, for example via a temperature control module. The active control system may regulate the speed of the blower and/or the temperature and/or other parameters of the appliance.

The active noise control system may comprise a plurality of sound sources that are distributed in the premises.

By way of example, at least one sound source of the active noise control system is carried by the treatment appliance, thereby making it possible for the sound waves that are configured to interact with the sound waves emitted by the treatment appliance, themselves to be emitted as close as possible to said appliance.

5 By way of example, the premises is a hairdressing salon or a beauty parlor containing a plurality of seats, and, by way of example, at least one sound source of the active noise control system is carried by a seat, e.g. being incorporated in the back of the seat, thereby making it possible to modify the noise perceived by the client sitting in the seat.

10 The premises may also contain one or more worktops and one or more massage beds or tables, and, by way of example, at least one sound source of the active noise control system is carried by a bed or by a worktop.

At least one sound source may be disposed on a panel of the premises. The term "panel" should be understood to encompass the walls of the premises, partitions disposed
15 in the premises, the ceiling, and even the floor. The sound source(s), e.g. disposed on the floor or on the walls, may thus be of larger size than any sound source(s) carried by the treatment appliances or by the seats, and may thus be more powerful, in particular at low frequencies.

As a vibrating member for generating sound waves, at least one sound source may
20 use a surface in contact therewith, in particular a plane surface, e.g. a window, a mirror, or any other panel, e.g. being of the GIGABOX® type sold by the British supplier GIGABIZ Ltd, or of the SOUNDPOD AUDIO TRANSDUCER® type sold by the supplier PRO DISPLAY.

The active control system may be used not only to reduce the noise coming
25 directly from the appliance, but also the noise reflected by a panel of the premises, e.g. a mirror with a client placed in front of it. The active control system may cause the mirror to vibrate, so as to reduce the reverberation towards the person.

At least one sound source of the active noise control system may be secured to an accessory, e.g. a garment, carried or worn by a person present in the premises, which
30 person may be a client or a professional.

The active noise control system may include a plurality of microphones, at least some of which are carried by the same support as the sound source that emits sound waves that are generated from a signal coming from said microphones, the microphones being paired for example with respective sound sources, and being placed in the premises
35 at the same locations as said sound sources.

The active noise control system may include at least one processor that determines the sound waves that need to be emitted by the sound source(s). The processor

may perform noise reduction control as well as monitor parameters of operation of the appliance. These other parameters, such as speed of the blower, for example, may be controlled for purposes of reducing the noise. For example, the speed may be regulated to lower mechanical resonance and corresponding vibrations at some frequencies.

5 By providing the active control system information related to the electrical signal supplied to the motor, the active control system determines one or more frequencies, which are for example harmonics of the frequency of the electrical signal supplied to the motor, on which the active noise reduction treatment may be focused. This may enable focusing noise active reduction on narrow bands instead of wide spectrum and may
10 render noise reduction more efficient. The active noise control system may be configured so that the temperature of the body of the appliance is not greater than 40°C and/or so that the temperature at an air outlet lies between 110 and 140°C. The temperature rise may occur over less than 1 minute, in particular less than 30 seconds.

The motor may be a brushless motor. The use of a brushless motor may facilitate
15 monitoring electronically the operation of the motor, and for example taking advantage of the knowledge of the phase applied to the motor to control an output phase of the active control system.

By way of example, the processor is disposed remote from the sound source(s) and from the microphone(s).

20 The microphone may be located near the motor, near the blower and/or near an air inlet of the appliance. The microphone may be located in such a manner that the distance between the microphone and the motor or between the microphone and the air inlet is less than the distance between the microphone and the air outlet of the appliance.

At such a location on the appliance, the noise detected may be a narrow-band
25 noise and the active control system may be configured to treat this narrow-band noise. At such location, the noise is less likely to be polluted by the rush of the air exiting the appliance. The frequency of the narrow-band noise may lie between 100Hz and 10 kHz, lying in particular between 200 Hz and 3kHz. A location of the microphone close to the motor, blower or air inlet may facilitate reducing the noise emitted by the appliance and
30 heard by the person using the appliance. In addition, at an air outlet of the appliance, the temperature may be high and the components of the active control system may not be suitable for withstanding such high temperatures for extended periods.

The active control system may include a plurality of sound sources and
35 microphones. Several sound sources and/or microphones are preferable to perform an omnidirectional noise control.

Preferably, all the components of the active control system, e.g. the sound source(s), the digital processor(s) and the microphone(s) are fastened, optionally in removable manner, on the appliance which is preferably handheld. The active control system may be configured to control the noise emitted by only the appliance on which it is fastened.

The active control system may be specific to the noise signature of a particular of appliance.

The active control system is for instance configured to play digital music.

The appliance may include several interfaces, like a keyboard or a screen and the active control system may be configured to control theses interfaces. The power of a processor of the active control system running a noise reduction software on the appliance may be enough to operate various user interfaces and/or other modules.

Data may be stored to treat narrow-band noises. Parameters of digital filters directed to treating such narrow band noises may be stored in a memory of the digital processor or accessible by the digital processor and may be loaded when filtering algorithms are initialized.

The active noise control system may include a sensor configured to measure a phase of the noise to be reduced. Such a sensor is for instance located near the blower.

The digital processor may be configured so that a user may modify at least one parameter of the digital filter while using the appliance, so that the way the noise is heard by a user is modified, for example reduced and/or rendered more pleasant.

The digital processor may be configured to apply a discrete Fourier transform (DFT) to the noise and to focus the treatment on high-power spectral lines of the noise thus transformed.

The filtering algorithm may be modified as a function of a template that may be deduced from the average noise increased by an amount of 6 to 10 dB or by a maximal number of peaks determined during an initialization phase.

The digital processor may automatically determine the parameters of the filter to be applied.

The digital processor may be configured to select the frequency lines to be reduced by means of a selection of harmonics of a frequency of operation of the motor detected on the motor or determined based on the electric signal provided to the motor. In a variant, the frequency lines to be reduced may be determined by the electronic system controlling the motor of the appliance.

The digital processor may be configured to send an amplitude and a phase to the power stage(s) powering the sound source(s) to generate the noise aimed at cancelling the undesirable noise.

The digital processor may be configured so that control of the noise is achieved in a nearly simultaneous manner, and in particular suitable for narrow-band noise, the frequency of the noise lying for instance between 200Hz and 3kHz. The digital processor may receive from the microphone(s) an error signal enabling the control to be carried out in a real time manner.

By way of example, the processor communicates with at least one microphone and one sound source via a wire or wireless connection. The processor may possibly be disposed off the premises.

The processor may be configured to determine the sound waves that need to be emitted by at least one sound source, as a function of the position in the premises of the treatment appliance(s) and of the person or people likely to hear the noise emitted by the appliance(s). Taking said positions into account makes it possible to calculate the amplitudes and the phases most suitable for reducing the noise perceived at a particular location in the premises.

The processor may be configured to process the emitted noise selectively, as a function of the frequency of said emitted noise. In such selective processing, only the noise emitted at predefined isolated frequencies or in predefined frequency bands is modified, the predefined frequencies being selected automatically or by an operator, for example.

By way of example, such selective processing by the active noise control system avoids disrupting the playing of piped music in the premises or avoids affecting conversations between people present in the premises, by avoiding processing the frequencies corresponding to piped music or people's voices.

The overall weight of the appliance, including the active control system may be less than 1kg, in particular less than 0,5kg, better less than 0,4kg.

The weight of the appliance, being in particular a hair-dryer, may be compensated so that the appliance may be handled by a user to reduce or minimize fatigue.

The electric power of the appliance may be about 1600W.

Other exemplary embodiments of the invention also provide an equipment, in particular for implementing the above-mentioned method, including at least a portion of an active noise control system, arranged to modify a noise emitted by a cosmetic- or skin-treatment appliance, the equipment and the appliance being present in the same premises.

The active noise control system may be as described above.

By way of example, the cosmetic- or skin-treatment appliance is a hair dryer.

By way of example, the premises are a hairdressing salon or a beauty parlor.

By way of example, the premises contain a plurality of seats, and the equipment carrying at least a portion of the active noise control system is at least one of said seats.

By way of example, the premises contain a plurality of worktops, and the equipment carrying at least a portion of the active noise control system is at least one of said worktops.

By way of example, the premises contain one or more massage beds, and the equipment carrying at least a portion of the active noise control system is at least one of said beds.

The invention can be better understood on reading the following detailed description of non-limiting embodiments thereof, and on examining the accompanying drawings, in which:

- Figures 1 to 4 show different examples of active control system layouts in implementations of the invention;
- Figure 5 shows components of an active control system,
- Figure 6 is a schematic view of an appliance provided with an active noise control system according to some exemplary embodiments of the invention,
- Figure 7 and 8 show measurements related to treatment by the active noise control system according to some exemplary embodiments of the invention, and
- Figure 9 is a diagram showing how, according to an exemplary embodiment of the invention, the digital processor operates.

Figure 1 shows premises 1 within which an exemplary method of on exemplary embodiment of the invention is implemented.

By way of example, the premises 1 is a hairdressing salon, a spa, or a beauty parlor, and in the example shown, is of rectangular shape, but naturally the invention is not limited to any precise shape of premises.

As in the example described, the premises 1 may include a plurality of seats 2, e.g. disposed in two rows.

A worktop 3 may be placed in front of each row of seats, along a wall 4. By way of example, each worktop 3 is surmounted by a mirror, not shown.

The premises 1 may also include one or more beds 9, e.g. massage beds.

Professionals may perform a cosmetic or skin treatment on clients who are sitting on the seats 2, or on a client who is lying on the bed 9, by means of treatment appliances 5, such as hair dryers, that include respective electric motors coupled to blowers.

Where appropriate, several types of appliance 5 may be used, e.g. hair dryers and appliances in which a fan cools a component that gives off heat.

The premises 1 may also house at least some components of an active control system for controlling noise.

As shown in Figure 5, an active noise control system implements: a microphone 6 that is configured to pick up sound waves S1 and convert them into an electrical signal; a processor 7 that analyzes the signal received from the microphone 6; and a sound source 8 that generates sound waves S2 after processing by the processor 7.

As shown in Figure 6, the active control system may also include an amplifier 24 and a sensor 26 located near the blower 11, such a sensor being for instance a tachometer to detect a rotation speed of the blower.

By way of example, the sound source 8 includes an amplifier stage and an electromechanical transducer. The term "electromechanical transducer" should be understood to mean any component that makes it possible to generate sound waves when it is electrically powered.

By way of example, the processor 7 comprises a digital signal processor (DSP). By computation, the processor 7 is capable of determining the sound waves that need to be emitted by the sound source 8 in order to reduce the noise from at least one of the appliances, as perceived by a person situated in the premises 1.

By way of example, the sound waves S2 are emitted in phase opposition relative to the sound waves S1 picked up by a microphone 6 positioned at the same location as the sound source 8.

By way of example, the noise resulting from superposing the sound waves S1 and S2 presents an intensity that is at least 10 decibels (dB) lower than the intensity of the noise in the absence of an active control system.

Where appropriate, in addition to emitting the sound waves S2, the sound source 8 plays music.

Communication, firstly between the microphone 6 and the processor 7, and secondly between the processor 7 and the sound source 8, may be via wireless connections, but any mode of transmission is possible. For example, the microphone 6 may be connected to the processor 7 via an infrared connection, via a radio connection, or via a power line carrier (PLC), and the processor 7 may be connected to the sound source 8 via a connection of the same type as the connection between the microphone 6 and the processor 7, or of some other type.

The method of exemplary embodiments of the invention may implement as many microphones 6 as processors 7 and sound sources 8, but a single processor 7 may also receive signals from a plurality of microphones 6, e.g. disposed at a plurality of different locations in the premises 1, and/or it may transmit signals to a plurality of sound sources 8. Each sound source 8 may be paired with a microphone 6 and may be placed at the

same location as the microphone 6, whereas the processor 7 may be located remotely from the microphone 6 and from the sound source 8, possibly off the premises 1.

The active control system may comprise a plurality of independent modules that are disposed in the premises 1, each module comprising a microphone 6, a processor 7,
5 and a sound source 8. Each module may possibly use a surface of the premises that is in contact therewith for diffusing the sound waves.

At an initialization step 100, an operation mode of the appliance may be selected. During this step, communication may take place between the processor 7 and another electronic device 50 that may be miniaturized, for example a user interface.

10 The selection of the mode of noise reduction may be based on an input on the user interface.

At step 101, the digital processor 7 determines the temperature of the air to be blown by the appliance, in particular at the air outlet of the device. This temperature may result from the operation mode of the appliance that has been selected by a user. The user
15 interface 50 may comprise switch to enable control of temperature, for instance. During step 101, the digital processor 7 may communicate with a heater module 51. The temperature control may be carried out at numerous other steps (not shown), in an interactive manner, to maintain the temperature at a given set value.

At step 102, the digital processor 7 determines the speed of the motor 10 of the
20 appliance. During step 102, the digital processor may communicate with a control module 52 of the motor. The digital processor may control the module 52 so that the motor operates at a given speed. The digital processor 7 may receive information from the module 52 allowing the processor to know the actual speed of rotation and regulate such speed or a given set value.

25 The processor may also use frequency information from the motor or module 52 to synchronize a noise treatment with the motor, for example to focus treatment on harmonious of this frequency.

At step 103, the digital processor interacts with microphone(s) 6 and implements digital filtering of the noise received by the microphone(s) 6 and spectral analysis of said
30 noise.

At step 104, the digital processor 7 determines which frequencies are going to be treated, based for example on amplitude of such frequencies.

Such frequency determination may be based on a Fourier transform analysis to determine the spectral lines of the noise.

35 At step 105, digital processor 7 implements digital treatment of said frequencies. The treatment may be focused on spectral lines related to a frequency of rotation of the

motor, based on the control information for the motor and/or information received from the module 52.

5 The noise lines to be processed may correspond to a noise signature of the appliance. A template may be applied during the digital treatment, such template being generated for example by increasing an average noise by a given amount, such as 6dB to 10dB, for example.

When referring to Figure 8, one can see that the amplitude of the noise exceeds a template for some frequencies. The noise reduction treatment may be applied only to those frequencies, to lower amplitude to a value below the template.

10 At step 106, analog signals to be sent to the sound source(s) are synthesized by the digital processor, to counteract the noise to be reduced.

On Figure 9, steps 105 and 106 are shown as separate steps, but they may be performed together when desired.

15 As shown in Figure 9, the digital treatment of step 105 and the synthesization of step 106 may be carried out as a function of information related to the control of the motor. For example, the frequency of operation of the motor may be used to determine frequencies at which noise cancellation should operate. For example, noise cancellation lines may include harmonies of the frequency of the motor.

20 Figure 7 shows the amplitude of the noise with the active control system respectively on and off.

Figure 1 shows a first example of a layout for an active noise control system in the premises 1. In this example, at least one microphone 6 and at least one sound source 8 are carried by a piece and/or pieces of equipment in the premises, namely the bed 9 and/or each seat 2. By way of example, the microphone 6 and the sound source 8 are 25 incorporated in the back of the seat 2 and/or in one or more armrests of the seat 2. By way of example, the processor 7 is separate from the seat and may communicate with the microphone 6 and with the sound source 8 via any suitable connection.

30 In the example in Figure 2, each treatment appliance 5 includes a microphone 6 and a sound source 8. By way of example, the microphone 6 and the sound source 8 are carried by the shell of the appliance. The processor 7 may also be fastened on the treatment appliance 5. In a variant, the processor 7 is housed in a housing that is connected via an electric cable to the motor of the appliance 5, the housing including electric pins enabling it to be plugged into an electricity outlet.

35 In the example in Figure 3, microphones 6 and sound sources 8 are disposed in different corners of the premises, the microphones 6 and the sound sources 8 interacting with a processor 7 that is also disposed in one of the corners of the premises, for example.

The sound sources 8 may comprise loudspeakers of $\varnothing$ diameter that is relatively large, e.g. greater than 20 centimeters (cm), or they may use a surface of the premises for emitting sound waves.

5 In the example in Figure 4, the active control system comprises microphones 6 and sound sources 8 that are incorporated in the seats 2, microphones 6 and sound sources 8 that are disposed in the four corners of the premises 1, and microphones 6 and sound sources 8 that are carried by the treatment appliances 5. By way of example, the processor 7 is disposed off the premises 1.

10 In other variants (not shown), the microphones 6 and the sound sources 8 are disposed on an accessory or a garment carried or worn by the clients or by the professionals during the treatment.

In still other variants, sound sources 8 and microphones 6 are disposed on the worktop 3 or under said worktop. A sound source 8 may be disposed on the worktop or behind a mirror, and vibration is thus transmitted to the worktop or to the mirror.

15 In another variant, the active noise control system comprises a plurality of modules, each comprising a microphone 6, a processor 7, and a sound source 8, and the modules may be independent, e.g. being fastened to the seats 2 and/or to the bed 9, being disposed on the walls and/or in the corners of the premises, and/or being carried by the treatment appliances 5, in manners similar to those described in Figures 1 to 4. Each
20 module may seek to attenuate the noise that it receives, independently of the other modules.

Furthermore, at least some of the microphones 6, of the processor 7, and of the sound sources 8 may be fastened in removable manner on a support, e.g. on the treatment appliance 5, on an accessory carried or worn by a client or by a professional, or on the
25 seat 2.

The invention is not limited to the examples described above. Where appropriate, the active control system may be configured to attenuate only the noise that corresponds to the treatment appliances, at one or more predefined frequencies.

30 The expression "comprising a" should be understood as "comprising at least one", unless specified to the contrary.

CLAIMS

1. A method of modifying noise emitted in premises (1) by at least one cosmetic- or skin-treatment appliance (5) present in the premises, wherein the noise emitted by the treatment appliance (5) is modified by means of an active control system (6, 7, 8) for controlling noise, at least a portion of the active control system being placed in the premises (1).
5
2. A method according to the preceding claim, wherein the treatment appliance (5) is configured to deliver a flow of air and/or of liquid, and includes a motor and an element that is coupled to the motor to be driven thereby.
10
3. A method according to the preceding claim, wherein the noise emitted by the treatment appliance is modified by using the active control system to emit sound waves that are configured to interact with the sound waves emitted by the motor and/or the coupled element, so as to modify the noise emitted by the appliance, in particular so as to reduce its intensity and/or modify its frequency.
15
4. A method according to any preceding claim, wherein the active noise control system comprises a plurality of sound sources (8) that are distributed in the premises (1).
20
5. A method according to any preceding claim, wherein at least one sound source (8) of the active noise control system is carried by the treatment appliance (5).
6. A method according to any preceding claim, wherein the premises (1) contain a plurality of seats (2), and wherein at least one sound source (8) of the active noise control system is fastened to a seat (2).
25
7. A method according to any preceding claim, wherein at least one sound source (8) of the active noise control system is secured to an accessory carried or worn by a person present in the premises.
30
8. A method according to any preceding claim, wherein at least one sound source (8) of the active noise control system is disposed on a panel (4) of the premises.
9. A method according to any one of claims 1 to 8, wherein the active noise control system includes at least one microphone that is carried by the same support as the
35

sound source (8) that emits sound waves that are generated from a signal coming from said microphone.

- 5 10. A method according to any one of claims 1 to 9, wherein the active control system includes a processor (7) that communicates with at least one microphone (6) and/or one sound source (8) via a wireless connection.
- 10 11. A method according to any one of claims 1 to 10, wherein the active control system includes a processor (7) that is configured to determine the sound waves (S2) that need to be emitted by at least one sound source (8), as a function of the position in the premises (1) of the appliance(s) (5) and/or of the position of one or more people likely to hear the noise emitted by the appliance(s).
- 15 12. A method according to claim 10 or claim 11, wherein the electric motor is driven by an electronic motor module (52), and wherein the active control system determines one or more spectral lines for applying noise reduction thereto based on information related to operation of the motor module (52).
- 20 13. A method according to according to any one of claims 10 to 12, wherein the active control system determines high-power spectral lines of the noise emitted by the appliance and focuses noise reduction on at least one of these high-power spectral lines.
- 25 14. A method according to claim 13, wherein the high-power spectral lines are determined after applying a discrete Fourier Transform to the noise.
- 30 15. A method according to any one of claims 1 to 14, the active control system including a sound source that uses a surface that is in contact therewith for generating sound waves.
- 35 16. A method according to any one of claims 1 to 15, the active control system being configured to process the emitted noise selectively, as a function of the frequency of the emitted noise.

17. Equipment (2, 3, 9) including at least a portion of an active noise control system (6, 7, 8), arranged to modify a noise emitted by a cosmetic- or skin-treatment appliance (5), the equipment and the treatment appliance being present in the same premises (1).

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18. Equipment according to claim 17, the premises (1) containing a plurality of seats (2), and the equipment carrying at least a portion of the active noise control system (6, 7, 8) being at least one of said seats (2); or the premises containing a plurality of worktops (3), and the equipment carrying at least a portion of the active noise control system (6, 7, 8) being at least one of said worktops; or the premises containing one or more massage beds (9), and the equipment carrying at least a portion of the active noise control system (6, 7, 8) being at least one of said beds (9).

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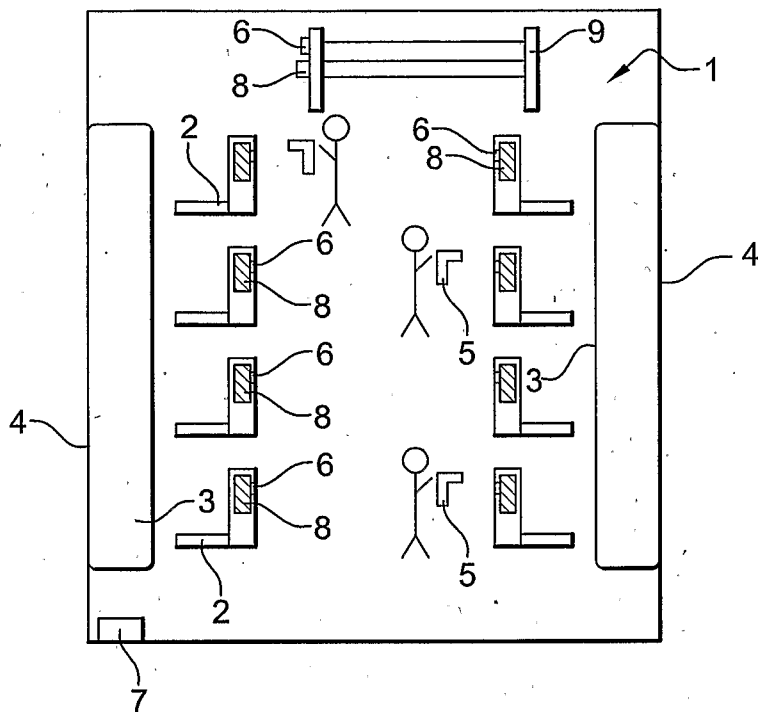


Fig. 1

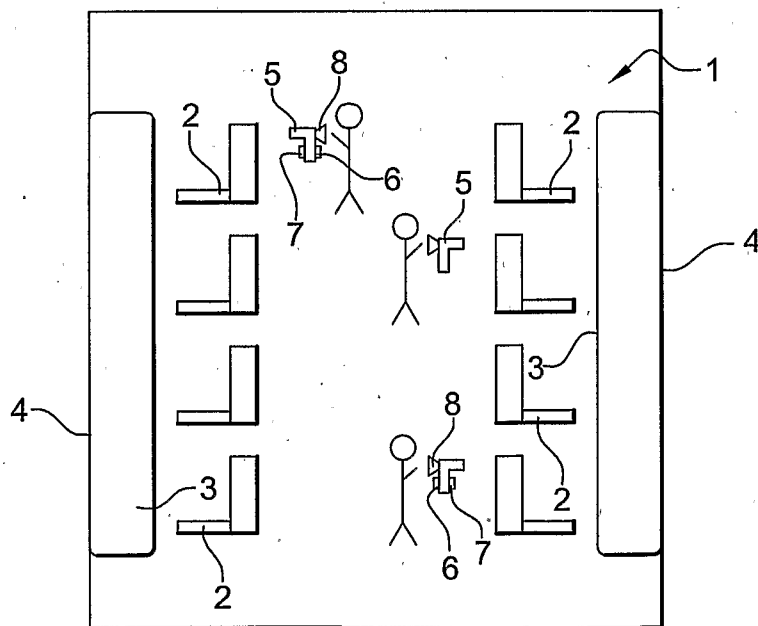


Fig. 2

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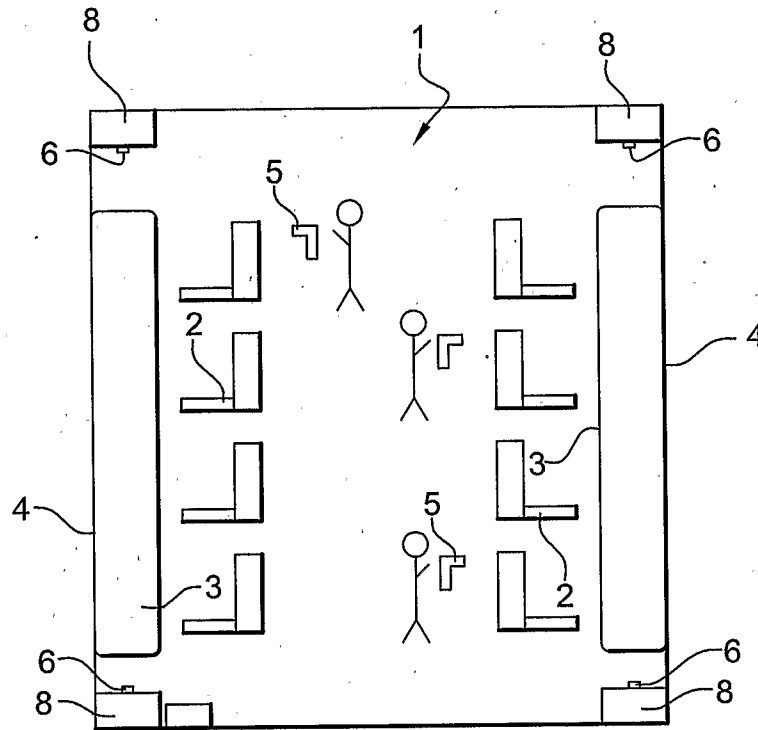


Fig. 3

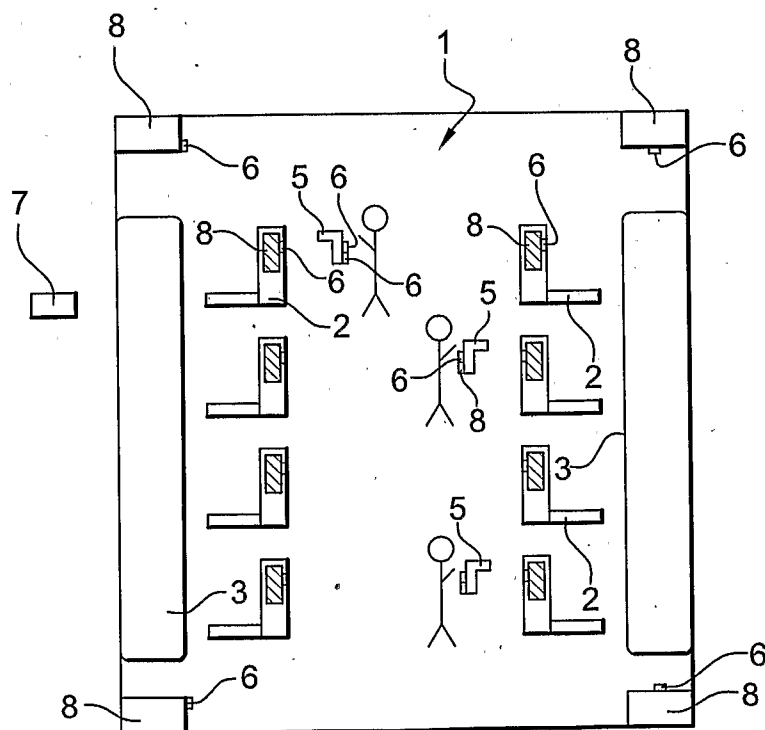


Fig. 4

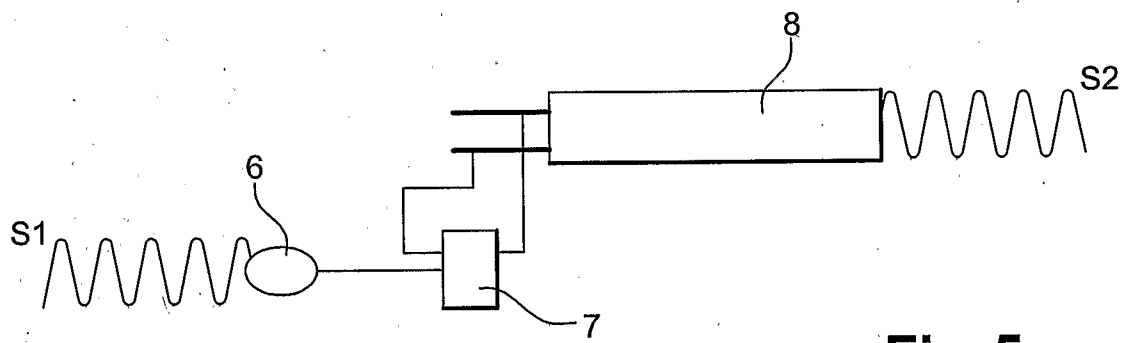


Fig. 5

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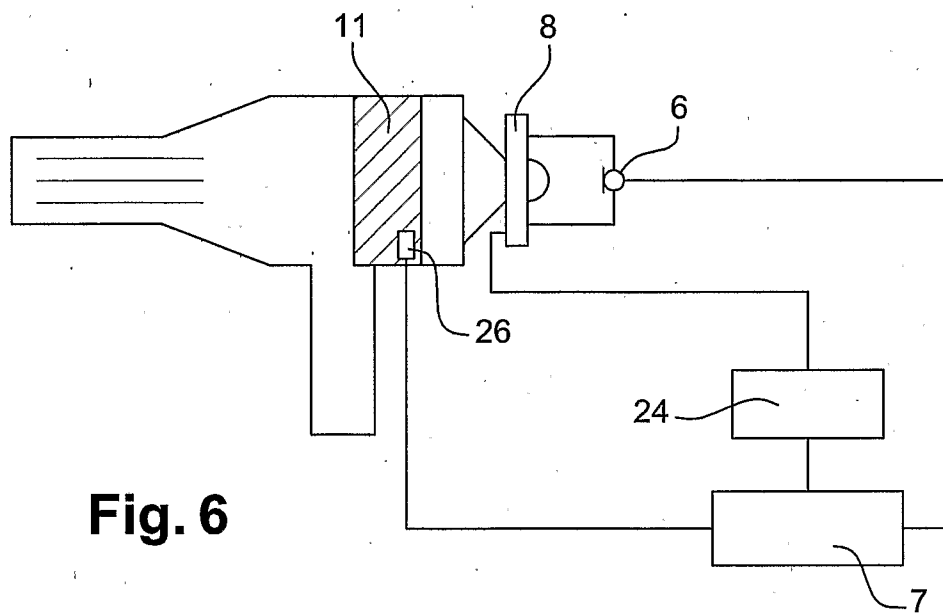


Fig. 6

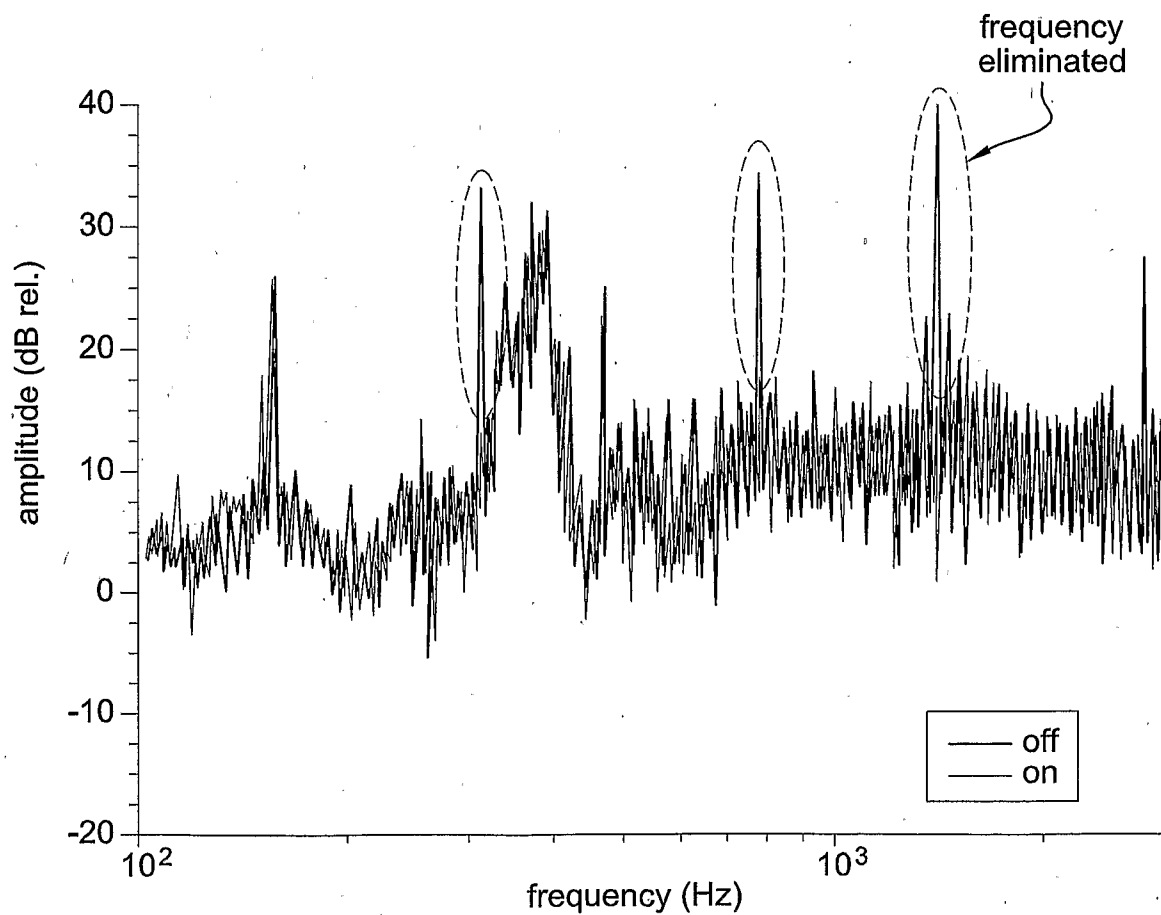
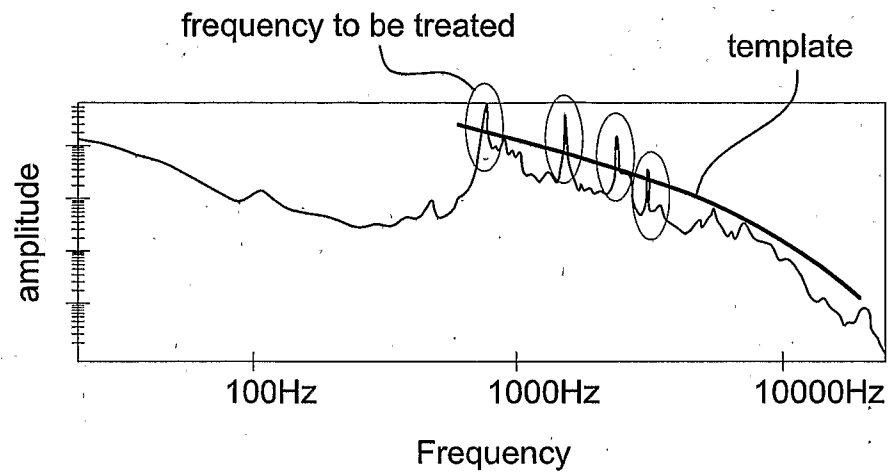
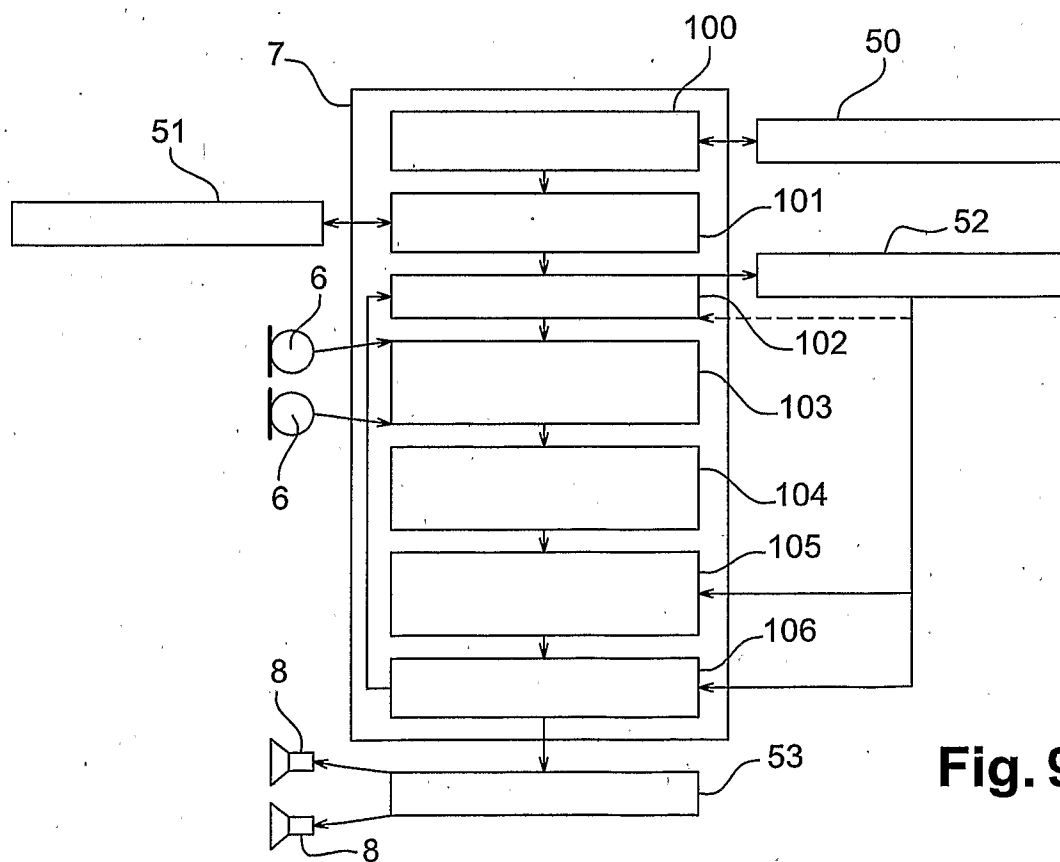


Fig. 7

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**Fig. 8****Fig. 9**

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/050855

A. CLASSIFICATION OF SUBJECT MATTER
INV. G10K11/178
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G10K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EP0-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 6 209818 A (MATSUSHITA ELECTRIC WORKS LTD) 2 August 1994 (1994-08-02) * abstract	1,2,5-7, 9,10,12, 15
X	JP 8 299050 A (BROTHER IND LTD) 19 November 1996 (1996-11-19) * abstract	1,2,5-7, 9,10,12, 15
X	DE 10 2006 027383 A1 (TRIODATA GMBH [DE]) 14 June 2007 (2007-06-14) * abstract paragraphs [0003], [0004], [0007], [0093] - [0110]; claims 1,3 -/--	1-3,6, 10,15



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Date of the actual completion of the international search

24 June 2010

Date of mailing of the international search report

30/06/2010

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Thomas, Judith

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2010/050855

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 10 177391 A (FUJITSU LTD) 30 June 1998 (1998-06-30) * abstract -----	1-4, 6, 8, 11, 12
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Y	US 2005/094823 A1 (KOBORI TOMOKI [JP] ET AL) 5 May 2005 (2005-05-05) paragraph [0030] - paragraph [0033]; figures 1, 2 -----	12-14, 16
Y	DE 195 15 769 A1 (ATSUGI UNISIA CORP [JP]) 2 November 1995 (1995-11-02) column 13, line 45 - column 14, line 51; figures 16-18 -----	12-14, 16