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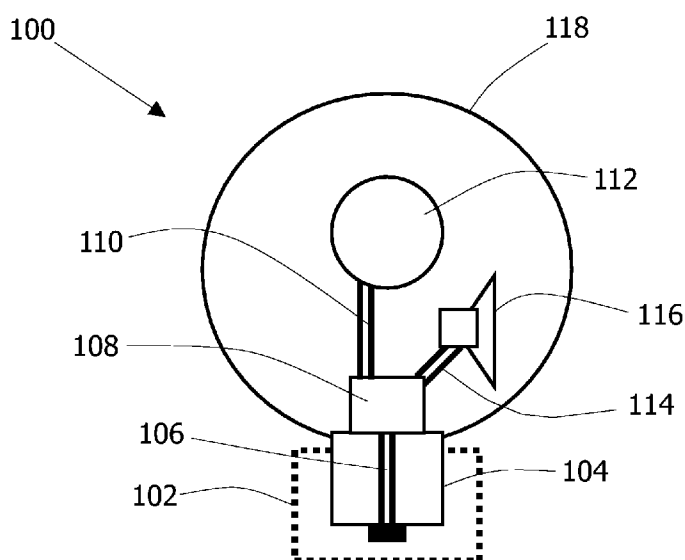
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(54) Title: AUDIBLE FEEDBACK FOR REMOTE-CONTROLLED LIGHT DEVICES



(57) Abstract: The present invention relates to a remote-controlled light device (100) comprising a light-emitting element (112), which light device is arranged to adjust a property of the light-emitting element (112) in response to a control signal. The present invention also relates to a remote-controlled lighting system, a set of control electronics and a method of providing feedback, in response to a control signal for adjusting a property of a light device (100), to an operator of the remote-controlled light device. A remote-controlled light device (100) is provided, which comprises audio means (116) and a light-emitting element (112), which light device (100) is arranged to adjust a first property of the light-emitting element (112) in response to a control signal and to temporarily activate the audio means (116), such that an audible feedback signal is communicated to an operator of the light device (100).

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Audible feedback for remote-controlled light devices

The present invention relates to a remote-controlled light device comprising a light-emitting element, which light device is arranged to adjust a property of the light-emitting element in response to a control signal. The present invention also relates to a remote-controlled lighting system, a set of control electronics and a method of providing
5 feedback, in response to a control signal for adjusting a property of a light device, to an operator of the remote-controlled light device.

The market of lighting devices or systems is increasingly moving away from the manufacture of light bulbs and tends towards the provision of complete lighting solutions. This shift is supported by technology developments and trends, such as usage of LEDs as an
10 alternative to traditional light sources. In their turn, these new technology developments create new opportunities for using light sources. An important issue when providing lighting solutions is how to design intuitive and easily understood interfaces with which the operator can control the properties of the lighting device.

Light sources, such as traditional light bulbs, energy-saving lamps, LED-based
15 lamps and halogen lamps, etc. are increasingly designed to enable remote controls to control one or more of their properties, such as color, intensity, focus, degree of diffusion or programming status. When using remote control, an operator is able to change the properties of the light source. The properties of the light source may also be changed in accordance with a predetermined or programmed path. The changes induced by the operator or the
20 predetermined path are sometimes barely visible, or not visible at all to the operator. For example, subtle color shifts may hardly be noticeable, and changes in remote control programming might not be visible at all. Small colored light elements such as LED used to be included in a light source to indicate when an operator sends a remote-controlled signal to the light source in order to change a property of the light source. However, this has the
25 disadvantage that only custom-made, non-standard light sources can be used. Inclusion of visual feedback means, e.g. LEDs, in the light source itself is impractical as they are situated very close to a potentially bright and blinding light source, or is possibly totally obscured by a lamp shade.

US 2004/0201491 discloses a lamp set remote control system comprising a handheld remote controller and a lamp set control box. The handheld remote controller has a key module for signal entry, a first address-setting switch for setting an address serial code, and a radio transmitter for transmitting a control signal by radio which is subject to the remote control signal from the key module and the address serial code signal from the first address-setting switch. The handheld remote controller further comprises a buzzer electrically connected to the address encoder circuit. Upon operation of the remote controller, the buzzer buzzes. The lamp set control box has a radio receiver for receiving the control signal from the radio transmitter, an address comparator circuit for recognizing the address serial code of the control signal, and a lamp set control module, which controls the flash of lamp sets connected thereto subject to the nature of the control signal from the remote controller.

The problem of the prior art is that it is difficult to locate the light source being remotely controlled.

It is an object of the invention to alleviate the problems of the prior art.

This object is met by the invention as set forth in the appended independent claims.

In a first aspect of the invention, a remote-controlled light device is provided, which comprises audio means and a light-emitting element, which light device is arranged to adjust a first property of the light-emitting element in response to a control signal and to temporarily activate the audio means, such that an audible feedback signal is communicated to an operator of the remote-controlled light device.

A second aspect of the invention relates to a method of providing a feedback signal in response to a control signal for adjusting a property of a light-emitting element comprising audio means, which method comprises the steps of receiving the control signal so as to change a first property of the light-emitting element, temporarily activating the audio means, wherein said change of the property is communicated as an audible feedback signal to a sender of the control signal, and adjusting the property of the light-emitting element in accordance with the control signal.

The invention is based on the recognition that an improved method of providing feedback is employed, because the visual means for providing feedback known in the art are not easily perceivable. Accordingly, a remote-controlled light device comprising audio means has been designed, which audio means is activated when a control signal is received by the light device, and feedback will thus be provided when the remote-controlled

light device is controlled. The audio means may be, for example, a buzzer, a sound transmitter, sound-generating means, an acoustic element, a loudspeaker, a bell or a piezoelectric acoustic element. When receiving a control signal, the light device supplies an audible feedback signal to an operator by activating the audio means, such that a sound that is perceivable by the operator is created. Then, the control electronics set a property to be controlled in accordance with the control signal being sent. Hence, the light device can be easily located when the properties of the light device are remote-controlled, allowing the operator to receive feedback on whether a remote control-induced change of the properties has or has not taken place. It is to be understood that the order of the steps of sending the audible feedback signal and changing the property may be interchangeable. Thus, these steps may be performed simultaneously or one after/before the other.

In a first embodiment of the light device according to the invention, a remote-controlled light device is provided, wherein the audible feedback signal is arranged to be pulsed. This improves the audibility of the sound generated, such that localization of the light device, i.e. the audio means, is facilitated.

In a second embodiment of the device of the invention, a remote-controlled light device is provided, wherein the audible feedback signal is arranged to be different for different control signals applied to the light device. This leads to the possibility of customizing the feedback signal in such a way that e.g. an increase of a property yields two short signals (sounds or buzzes), whereas e.g. a decrease yields a single continuous signal (sound or buzz).

In another embodiment, a remote-controlled light device is provided, wherein the audible feedback signal is arranged to be adjustable by the operator. In this manner, it is possible for an operator to adjust the feedback signal in such a way that it is easily perceivable.

In another embodiment, a remote-controlled light device is provided, which further comprises means for detecting sound, which means is arranged to provide a control signal for adjusting the audible feedback signal. Advantageously, in a situation in which ambient noise jeopardizes the audibility of the feedback signal, the audible feedback signal is increased.

In still a further embodiment, a remote-controlled light device is provided, wherein the audible feedback signal is arranged to be adjustable in accordance with a programmed schedule. This embodiment has the advantage of allowing personalized setups of the audible feedback signals. Moreover, it enables the remote-controlled light device to

use different schemes at different times of the day. For example, during bright daylight hours, a low-volume sound may be unsuitable and a high-volume feedback signal is used instead, and during the night, a low-volume change is easily perceivable (as ambient sound level is usually lower during the night than during the day).

5 The audible feedback signal preferably has a frequency in a frequency range that is easily heard by people of most ages, and may be adapted to preferred frequencies of hearing aids.

 In more detail, the audible feedback signal has a frequency in the range from 20 Hz to 20,000 Hz, more preferably from 500 Hz to 10,000 Hz, and most preferably around
10 4,000 Hz.

 In a further embodiment, a remote-controlled light device is provided, wherein the audible feedback signal is arranged to provide a melody or a tune as a feedback signal.

 In yet another embodiment of the light device of the invention, the remote-controlled light device further comprises a housing, which is provided with openings. The
15 openings facilitate spreading of the audible feedback signal.

 Advantageously, the remote-controlled light device is manufactured of a material that is adapted to spread audio signals, wherein the audio signals will be stronger and hence easier to perceive by the operator of the light device.

 In yet a further embodiment of the present invention, a lighting system is
20 provided, which comprises at least two remote-controlled light devices according to the invention, wherein the audible feedback signal is different from one light device to another.

 Further features and advantages of the present invention will become apparent when studying the appended claims and the following description. It will be evident to those skilled in the art that different features of the present invention can be combined to create
25 embodiments other than those described hereinafter.

 The various aspects of the invention, including its particular features and advantages, will be readily understood from the following detailed description and the
30 accompanying drawing, in which:

 Fig. 1 is a cross-sectional side view of the remote-controlled light device according to the invention; and

 Fig. 2 shows a typical flow diagram of the method according to the invention.

Figure 1 shows an example of a light device 100 in accordance with an embodiment of the invention. The light device 100 comprises a light-emitting element 112, a first set of connections 110, control electronics 108, a second set of connections 106, a third set of connections 114, an acoustic element 116, a connecting element 104 and, possibly, a housing 118. The light-emitting element 112 is connected to the control electronics 108 via the first set of connections 110. The control electronics are connected to the connecting element 104 via the second set of connections 106. The connecting element 104 is connected to a socket 102 which supplies energy to the light device 100. The acoustic element 116 is connected to the control electronics 108 via the third set of connections 114. A remote control enables an operator to change the properties of the light device. A control signal is sent from the remote control to the control electronics, which then execute a control protocol as shown in Figure 2.

Figure 2 shows a typical flow diagram of a method in accordance with an embodiment of the present invention. The control signal is sent to the control electronics, which activate the acoustic element, such that an audible signal indicates a remote-controlled (RC) change to the operator. In Figure 2, the light device property that is controlled is brightness. Steps 1 to 4 described in Figure 2 may be defined as follows. Initially, the light device may emit, for instance, light of a very low brightness. In step 1, an operator uses a remote control so as to change the brightness of the light device, e.g. changing to “standard/normal” brightness. In step 2, the control electronics receive the RC signal and interpret the signal in order to change the brightness in accordance with the operator’s command. In step 3, an audible signal is given as a feedback signal to the operator. In step 4, the light device is set to the brightness intended by the operator, i.e. the “normal” brightness mentioned with reference to step 2. Consequently, the light device emits light of “normal” brightness, as intended by the operator, by means of an adjustment provided by the remote control.

In a further example, an operator can select one light device from a plurality of light devices. The operator selects a light device and receives feedback from the light device so as to acknowledge the choice by means of an audible signal originating from the light device itself. When the operator has selected a light device, it is operated as described above.

It should be noted that audible feedback means may be combined with visual feedback means. Visual feedback means are disclosed in patent application PH001101EP1, which is herein incorporated by reference. Even though the invention has been described with

reference to specific examples, many different alterations, modifications and the like will be apparent to those skilled in the art. The described examples are therefore not intended to limit the scope of the invention, as defined in the appended claims.

CLAIMS:

1. A remote-controlled light device (100) comprising audio means (116) and a light-emitting element (112), which light device is arranged to adjust a first property of the light-emitting element (112) in response to a control signal and to temporarily activate said audio means (116), such that an audible feedback signal is communicated to an operator of the remote-controlled light device (100).

2. The remote-controlled light device (100) according to claim 1, wherein said audible feedback signal is arranged to be pulsed.

3. The remote-controlled light device (100) according to claim 1 or 2, wherein said audible feedback signal is arranged to be different for different control signals applied to the light device (100).

4. The remote-controlled light device (100) according to any one of claims 1 to 3, wherein said audible feedback signal is arranged to be adjustable by the operator.

5. The remote-controlled light device (100) according to any one of claims 1 to 4, wherein said audible feedback signal is arranged to be adjustable in accordance with a programmed schedule.

6. The remote-controlled light device (100) according to any one of claims 1 to 5, wherein said audible feedback signal has a frequency in the range from 20 Hz to 20,000 Hz, more preferably from 500 Hz to 10,000 Hz and most preferably around 4,000 Hz.

7. The remote-controlled light device (100) according to any one of claims 1 to 6, wherein said remote-controlled light device further comprises a housing (118), which is provided with openings.

8. The remote-controlled light device (100) according to any one of claims 1 to 7, wherein said light device is manufactured of a material which is adapted to spread audio signals.

9. The remote-controlled light device (100) according to any one of claims 1 to 8, wherein said feedback signal is arranged to be combined with a visual feedback signal.

10. A remote-controlled lighting system comprising at least two remote-controlled light devices (100) according to any one of claims 1 to 9.

11. The remote-controlled lighting system according to claim 10, wherein said feedback signal is different from one light device to another.

12. A set of control electronics comprising at least one remote-controlled light device according to any one of claims 1 to 9.

13. A method of providing a feedback signal in response to a control signal for adjusting a property of a light-emitting element (112) comprising audio means (116), which method comprises the steps of:

- receiving said control signal so as to change a first property of the light-emitting element (112),
- temporarily activating said audio means, wherein said change of the property is communicated as an audible feedback signal to a sender of the control signal ; and
- adjusting the property of the light-emitting element (112) in accordance with said control signal.

14. The method according to claim 13, wherein the sender is an operator, which method further comprises the step of:

- allowing the operator to adjust the feedback signal.

15. The method according to claim 13 or 14, further comprising the step of:

- adjusting the feedback signal in accordance with a programmed schedule.

16. The method according to any one of claims 13 to 15, further comprising the step of:

- selecting, at said sender, one light device from a plurality of light devices (100), preferably before said light-emitting element receives said control signal so as to
5 change a first property of the light-emitting element (112).

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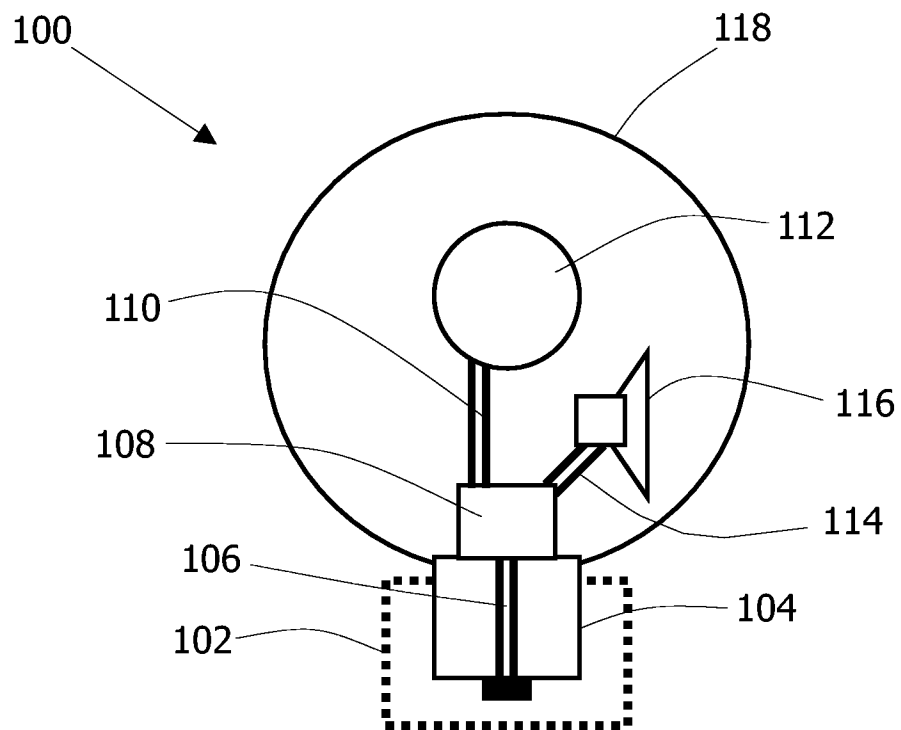


FIG.1

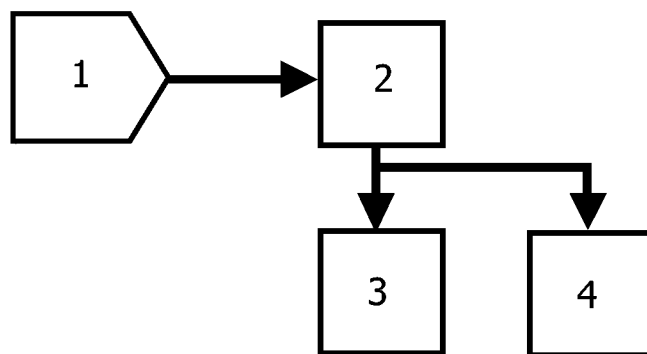


FIG.2