



(11) **EP 1 946 618 B9**

(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**

(15) Correction information:  
**Corrected version no 1 (W1 B1)**  
**Corrections, see**  
**Claims EN 1, 2, 4**

(48) Corrigendum issued on:  
**25.12.2013 Bulletin 2013/52**

(45) Date of publication and mention  
of the grant of the patent:  
**17.07.2013 Bulletin 2013/29**

(21) Application number: **06809728.6**

(22) Date of filing: **27.10.2006**

(51) Int Cl.:  
**F21S 2/00** <sup>(2006.01)</sup> **F21V 23/04** <sup>(2006.01)</sup>  
**H05B 37/02** <sup>(2006.01)</sup>

(86) International application number:  
**PCT/IB2006/053961**

(87) International publication number:  
**WO 2007/052197 (10.05.2007 Gazette 2007/19)**

(54) **METHOD, SYSTEM AND REMOTE CONTROL FOR CONTROLLING THE SETTINGS OF EACH OF A MULTITUDE OF SPOTLIGHTS**

VERFAHREN, SYSTEM UND FERNBEDIENUNG ZUM STEUERN DER EINSTELLUNGEN JEDES VON MEHREREN SPOTLIGHTS

PROCEDE, SYSTEME ET TELECOMMANDE DE CONTROLE DES PARAMETRES DE CHAQUE UNITE D'UN ENSEMBLE DE PROJECTEURS

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR**

(30) Priority: **01.11.2005 EP 05110237**

(43) Date of publication of application:  
**23.07.2008 Bulletin 2008/30**

(73) Proprietor: **Koninklijke Philips N.V.**  
**5656 AE Eindhoven (NL)**

(72) Inventor: **FONTIJN, Wilhelmus, F., J.**  
**NL-5656 AA Eindhoven (NL)**

(74) Representative: **Bekkers, Joost J.J.**  
**Philips**  
**Intellectual Property & Standards**  
**P.O. Box 220**  
**5600 AE Eindhoven (NL)**

(56) References cited:  
**EP-A1- 0 591 899 WO-A-2004/057927**  
**CH-A5- 671 821 US-A1- 2003 107 888**  
**US-A1- 2004 178 750**

**EP 1 946 618 B9**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

**[0001]** The invention relates to a method for controlling the settings of each of a multitude of spotlights, such as light intensity, colour and light beam direction, wherein a remote control is used for sending control signals to a control system comprising a multitude of control units for changing the settings of said multitude of spotlights to desired values, which control units are each associated with one of said multitude of spotlights, and wherein said control units can change the settings of their associated spotlights to the desired values. The term "spotlight" in this respect must be interpreted broadly, and may also include atmospheric support lights, such as glowing walls, wide beam lamps etc.

**[0002]** As lamps and lamp fittings acquire more options like colour of the light and direction of the beam, setting and controlling these options becomes an issue. For instance, lamps may be mounted in such a way that changing the direction of the light is possible. This may be done using actuators that change the direction of the lamp holder if instructed to do so, or by using a movable mirror. Connecting all lighting devices to a central point and setting options from there is a possibility but is neither convenient nor intuitive. The use of a remote control is desired, so that the settings can be checked while working under the spotlights, using the remote control.

**[0003]** Document WO2004/057927 describes a method for associating a group of lighting units in a wireless-controlled lighting system to respective buttons or other control elements on a remote control. Each of the lighting units transmits, via modulation of its own illumination light, a unique identification code for the respective unit. The remote control is successively positioned to receive the modulated light from each lighting unit and, at each position, the user activates a respective control element of the remote control for association with the lighting unit. The remote control then transmits to a control master for the group the unique codes and codes identifying the respective control elements with which they have been associated.

**[0004]** Also, US2003/0107888 describes a remote-control modular lighting system utilizing a directional wireless remote control for the selective adjustment and programming of individual lighting modules. Individual lighting modules may be selected for adjustment by momentarily pointing the remote control at the lighting module to be adjusted.

**[0005]** The invention therefore aims at a comfortable and reliable method for controlling the settings of a multitude of spotlights.

**[0006]** According to the invention each of said multitude of spotlights radiates a unique light signal which is superimposed on its light beam, wherein the remote control comprises a sensor for determining said unique light signal, wherein the remote control sends with said control signal a spotlight-identifying signal associated with the determined unique light signal as determined at the time

that the remote control is used, and wherein the control unit associated with said spotlight-identifying signal reacts to the combined spotlight-identifying signal and control signal by changing the settings of its associated spotlight to the desired values.

**[0007]** A control unit in this respect is defined as comprising any mechanical actuators and electronic components (such as a ballast and/or a dimming unit) that are spotlight specific and are necessary to change and maintain said settings of its associated spotlight, as well as any circuitry and processing components that are necessary to process the remote control signals and translate those into instructions for said mechanical actuators and electronic components. The circuitry and processing components of said multitude of control units may well however be (partly) housed in one housing, and may even be implemented by software in one processor unit. Said control units hence need not be entirely separate entities in a physical sense. The term control system in this respect is defined as comprising all of said control units as well as any additional circuitry and electronic components that are needed to process the remote control signals and are common to all the control units and their associated spotlights.

**[0008]** Although it may be implemented as such, it is not necessary that the remote control actually sends two separate signals, one being a spotlight-identifying signal and one being a control signal. The combined spotlight-identifying signal and control signal which is sent by the remote control can be one combined control signal which is unique, and which triggers a specific action in only one of the control units associated with one of the spotlights. The control signal that is actually sent by the remote control in that case depends on both the control button that is pushed and the unique light signal that is determined by the sensor.

**[0009]** In a preferred embodiment said remote control and/or said control determine the absolute or relative movement of the remote control and change the beam direction of the associated spotlight such that the spotlight follows said movement. When sliding the remote control with the sensor out of the light beam while a special "follow" button on the remote control is pushed, the spotlight will follow the remote control and will try to keep the sensor in the centre of the beam. The user can thus effectively drag the light beam to its desired position. This can also be used to centre the light on a task on a desk or to focus light on a book that is being read. This preferred embodiment can be considered to be a separate invention as well, which is applicable also in a single spotlight system, and which invention also relates to a remote control comprising means for determining the absolute or relative movement or position of the remote control.

**[0010]** The invention also relates to a system for lighting an object, comprising a multitude of spotlights, a control system comprising a multitude of control units for changing the settings such as light intensity, colour and light beam direction of said multitude of spotlights to de-

sired values, wherein each of said control units is associated with one of said multitude of spotlights for changing the settings of their associated spotlights to the desired values, and a remote control for sending control signals to said control units, wherein each control unit is arranged to let the spotlight radiate a unique light signal which is superimposed on its light beam, wherein the remote control comprises a sensor for determining said unique light signal, wherein the remote control is arranged to send with said control signal a spotlight-identifying signal associated with said unique light signal as determined at the time that the remote control is used, and wherein the control units are arranged to react to the combined spotlight-identifying signal associated with their associated spotlight and the control signal by changing the settings of their associated spotlight to the values which are determined by the control signal.

**[0011]** Furthermore the invention relates to a remote control for sending control signals to a multitude of control units, wherein the remote control comprises a sensor for determining a unique light signal, and wherein the remote control is arranged to send with said control signal an identifying signal associated with said unique light signal as determined at the time that the remote control is used.

**[0012]** The invention will be illustrated by means of a preferred embodiment with reference to the figures, wherein:

Figure 1 shows schematically a system for lighting an object; and

Figures 2A and 2B show schematically the use of a remote control to change the direction of a light beam.

**[0013]** According to the schematic view of Figure 1, a system for lighting an object, such as a living room, theatre stage, film studio or shop window, comprises a multitude of spotlights 1a, 1b, 1c, which are typically mounted on a ceiling. Said spotlights 1a, 1b, 1c each cast a light beam 2a, 2b, 2c on the object. The spotlights 1a, 1b, 1c are each connected to a control unit 3a, 3b, 3c, which comprise actuators and electronic circuitry that can change the direction, intensity (on/off/dimming) and colour of the light beam 2a, 2b, 2c. The control units 3a, 3b, 3c are connected (wired or wireless) to a central control panel 4. The settings of the spotlights 1a, 1b, 1c can be individually changed in a known manner by a person using the control panel 4. According to the invention a remote control 5 can however be used as follows.

**[0014]** The remote control 4 comprises a light-sensitive pixel array, such as those used in a video camera, on its upper side. Each control unit sends with the light beam 2a, 2b, 2c a superimposed high frequency light signal, which is unique for each spotlight 1a, 1b, 1c, and which can be used to identify each of said spotlights 1a, 1b, 1c. The remote control 5 comprises means to analyse the video signal of the light-sensitive pixel array when a control button is pushed and to determine from said signal

an identifying code (of the strongest light beam received), associated with one of said spotlights. In this case an identifying code for spotlight 1b will be determined when a button is pushed on the remote control 5.

**[0015]** The control signal that the remote control 5 sends to the control panel 4 depends on the combination of the button on said remote control 5 that is pushed by a person and the spotlight-identifying code that is determined by means of the light-sensitive pixel array, wherein each control signal is unique. In an alternative embodiment the remote control sends both a control signal that depends only on the button that is pushed and a spotlight-identifying signal that depends only on the spotlight-identifying code that is determined. Also in that case the combination of both signals can be considered to be one unique signal. The number of possible unique control signals that the remote control 5 can send is thereby as large as the number of buttons on the remote control multiplied by the number of spotlights in the system. It will be apparent that the control panel 4 translates the received control signals and sends the appropriate instruction signals to the control unit associated with the spotlight-identifying signal that was received by the remote control 5. Thus, in the situation of Figure 1, when a person pushes the "brighter" button on the remote control, the system will determine that the person wants spotlight 1b to shine brighter and act in accordance therewith. If the person thereafter wants spotlight 1c to shine less bright, he must first move the remote control 5 under the beam 2c and then push the "darker" button. Alternatively, it is possible for a user to first define a group of spotlights based on the identifying codes received and stored in the remote control, and then change the settings of the entire group at the same time.

**[0016]** In an alternative embodiment the system does not comprise a central control panel 4, and in said embodiment the signal of the remote control 5 is directly received by the control units 3a, 3b, 3c. The control units are arranged such that only the control unit to which the control signal is addressed (i.e. the control signal comprises, or is associated with, the identifying signal of the spotlight that is associated with said control unit) will react to said control signal.

**[0017]** Figures 2A and 2B schematically illustrate a further use of the system. When sliding the remote control 5 with the light-sensitive pixel array on the table 6 out of the light beam 2 (represented here by a centre line) from a predetermined position while a special "follow" button on the remote control 5 is pushed, the remote control 5 can determine from the pixel image in which direction the remote control 5 is moved, and can calculate the change in angle relative to the spotlight. The spotlight 1 will follow the remote control 5 and will try to keep the light-sensitive pixel array on the remote control 5 in the centre of the beam 2. The user can thus effectively drag the light beam 2 to its desired position.

**[0018]** In another embodiment of the invention the remote control comprises an accelerometer and an (elec-

tromagnetic, digital) compass in order to determine the relative movement of the remote control. Also an (optical) mouse principle, well known for moving a cursor on a computer screen, can be used to determine said relative movement. In yet another embodiment, wherein the absolute movement of the remote control is determined and which allows greater freedom of movement thereby, the control system comprises beacons that are positioned at fixed positions and which can be used to determine the absolute position of the remote control. Ultrasound or video-imaging can for instance be used to determine its position relative to said beacons in such embodiments. It will be appreciated that various means for determining the relative or absolute movement (or position) of the remote control are known and available, and that it is not considered appropriate to describe all those here.

### Claims

1. Method for controlling the settings of each of a multitude of spotlights, (1a, 1b, 1c) such as light intensity, colour and light beam direction, wherein a remote control (5) is used for sending control signals to a control system comprising a multitude of control units (3a, 3b, 3c) for changing the settings of said multitude of spotlights to desired values, which control units are each associated with one of said multitude of spotlights, wherein said control units can change the settings of their associated spotlights to the desired values, wherein each of said multitude of spotlights is radiating a unique light signal which is superimposed on its light beam, and wherein the remote control comprises a sensor for determining said unique light signal, **characterized in that** the remote control (5) sends with said control signal a spotlight identifying signal associated with the determined unique light signal as determined at the time that the remote control is used, and wherein the control unit (3a, 3b, 3c) associated with said spotlight identifying signal reacts to the combined spotlight identifying signal and control signal by changing its associated spotlight's settings to the desired values.
2. System for lighting an object, comprising a multitude of spotlights, (1a, 1b, 1c) a control system comprising a multitude of control units (3a, 3b, 3c) for changing the settings such as light intensity, colour and light beam direction of said multitude of spotlights to desired values, and a remote control for sending control signals to said control units, wherein each of said control units is associated with one of said multitude of spotlights for changing the settings of their associated spotlights to the desired values,

wherein each control unit is arranged to let the spotlight radiate a unique light signal which is superimposed on its light beam, wherein the remote control (5) comprises a sensor for determining said unique light signal,

#### **characterized in that**

the remote control is arranged to send with said control signal a spotlight identifying signal associated with said unique light signal as determined at the time that the remote control is used, and wherein the control units are arranged to react to the combined spotlight identifying signal associated with their associated spotlight and the control signal by changing their associated spotlight's settings to the values which are determined by the control signal.

3. System according to claim 2, wherein said sensor comprises a light sensitive pixel array.

4. Remote control (5) for sending control signals to a multitude of units to be controlled, wherein the remote control comprises a sensor for determining a unique light signal, **characterized in that** the remote control is arranged to send with said control signals an identifying signal associated with said unique light signal as determined at the time that the remote control is used.

### Patentansprüche

1. Verfahren zur Steuerung der Einstellungen jedes einer Vielzahl von Spotlights (1a, 1b, 1c), wie z.B. Lichtintensität, Farbe und Lichtstrahlrichtung, wobei eine Fernbedienung (5) verwendet wird, um Signale zu einem Steuersystem mit einer Vielzahl von Steuereinheiten (3a, 3b, 3c) zu übertragen, um die Einstellungen der Vielzahl von Spotlights auf gewünschte Werte zu ändern, wobei die Steuereinheiten jeweils einem der Vielzahl von Spotlights zugeordnet sind, wobei die Steuereinheiten die Einstellungen ihrer zugeordneten Spotlights auf die gewünschten Werte ändern können, wobei jedes der Vielzahl von Spotlights ein eindeutiges Lichtsignal ausstrahlt, das seinem Lichtstrahl überlagert ist, und wobei die Fernbedienung einen Sensor zum Ermitteln des eindeutigen Lichtsignals umfasst, **dadurch gekennzeichnet, dass** die Fernbedienung (5) zusammen mit dem Steuersignal ein Spotlightidentifizierungssignal übermittelt, das dem ermittelten eindeutigen Lichtsignal, wie zum Zeitpunkt der Verwendung der Fernbedienung ermittelt, zugeordnet ist, und wobei die dem Spotlightidentifizierungssignal zugeordnete Steuereinheit (3a, 3b, 3c) auf das kombinierte Spotlightidentifizierungssignal und Steuersi-

gnal anspricht, indem sie ihre zugeordneten Spotlighteinstellungen auf die gewünschten Werte ändert.

2. System zur Beleuchtung eines Objekts, mit einer Vielzahl von Spotlights (1a, 1b, 1c), einem Steuerungssystem mit einer Vielzahl von Steuereinheiten (3a, 3b, 3c), um die Einstellungen, wie z.B. Lichtintensität, Farbe und Lichtstrahlrichtung, der Vielzahl von Spotlights auf gewünschte Werte zu ändern, sowie einer Fernbedienung zur Übertragung von Steuersignalen zu den Steuereinheiten, wobei jede der Steuereinheiten einem der Vielzahl von Spotlights zugeordnet ist, um die Einstellungen ihrer zugeordneten Spotlights auf die gewünschten Werte zu ändern, wobei jede Steuereinheit so eingerichtet ist, dass sie das Spotlight ein eindeutiges Lichtsignal ausstrahlen lässt, das seinem Lichtstrahl überlagert ist, wobei die Fernbedienung (5) einen Sensor zum Ermitteln des eindeutigen Lichtsignals umfasst.  
**dadurch gekennzeichnet, dass** die Fernbedienung so eingerichtet ist, dass sie mit dem Steuersignal ein Spotlightidentifizierungssignal übermittelt, das dem ermittelten eindeutigen Lichtsignal, wie zum Zeitpunkt der Verwendung der Fernbedienung ermittelt, zugeordnet ist, und wobei Steuereinheiten so eingerichtet sind, dass sie auf das deren zugeordneten Spotlights zugeordnete kombinierte Spotlightidentifizierungssignal ansprechen, indem sie ihre zugeordneten Spotlighteinstellungen auf die von dem Steuersignal ermittelten Werte ändern.
3. System nach Anspruch 2, wobei der Sensor ein lichtempfindliches Pixelarray umfasst.
4. Fernbedienung (5) zur Übertragung von Steuersignalen zu einer Vielzahl von zu steuernden Einheiten, wobei die Fernbedienung einen Sensor zum Ermitteln eines eindeutigen Lichtsignals umfasst, **dadurch gekennzeichnet, dass** die Fernbedienung so eingerichtet ist, dass sie zusammen mit den Steuersignalen ein Identifizierungssignal übermittelt, das dem eindeutigen Lichtsignal, wie zum Zeitpunkt der Verwendung der Fernbedienung ermittelt, zugeordnet ist.

## Revendications

1. Procédé de commande des paramètres de chacun d'une pluralité de projecteurs (1a, 1b, 1c), comme l'intensité lumineuse, la couleur et la direction de faisceau lumineux, dans lequel une télécommande (5) est utilisée pour envoyer des signaux de commande à un système de commande comprenant une pluralité d'unités de

commande (3a, 3b, 3c) afin de changer les paramètres de ladite pluralité de projecteurs à des valeurs souhaitées, chaque unité de commande étant associée à l'un de ladite pluralité de projecteurs, dans lequel lesdites unités de commande peuvent changer les paramètres de leur projecteur associé aux valeurs souhaitées, dans lequel chacun de ladite pluralité de projecteurs rayonne un signal lumineux unique qui est superposé sur son faisceau lumineux, et dans lequel la télécommande comprend un capteur pour déterminer ledit signal lumineux unique, **caractérisé en ce que** la télécommande (5) envoie, avec ledit signal de commande, un signal d'identification de projecteur associé au signal lumineux unique déterminé qui est déterminé au moment auquel la télécommande est utilisée, et dans lequel l'unité de commande (3a, 3b, 3c) associée au dit signal d'identification de projecteur réagit à la combinaison du signal d'identification de projecteur et du signal de commande en changeant les paramètres de son projecteur associé aux valeurs souhaitées.

2. Système d'éclairage d'un objet, comprenant une pluralité de projecteurs (1a, 1b, 1c), un système de commande comprenant une pluralité d'unités de commande (3a, 3b, 3c) pour changer des paramètres comme l'intensité lumineuse, la couleur et la direction de faisceau lumineux de ladite pluralité de projecteurs à des valeurs souhaitées, et une télécommande pour envoyer des signaux de commande auxdites unités de commande, dans lequel chacune desdites unités de commande est associée à l'un de ladite pluralité de projecteurs afin de changer les paramètres de son projecteur associé aux valeurs souhaitées, dans lequel chaque unité de commande est agencée pour laisser le projecteur rayonner un signal lumineux unique qui est superposé sur son faisceau lumineux, dans lequel la télécommande (5) comprend un capteur pour déterminer ledit signal lumineux unique, **caractérisé en ce que** la télécommande est agencée pour envoyer, avec ledit signal de commande, un signal d'identification de projecteur associé audit signal lumineux unique qui est déterminé au moment auquel la télécommande est utilisée, et dans lequel les unités de commande sont agencées pour réagir à la combinaison du signal d'identification de projecteur associé à leur projecteur associé et du signal de commande en changeant les paramètres de leur projecteur associé aux valeurs qui sont déterminées par le signal de commande.
3. Système selon la revendication 2, dans lequel ledit

capteur comprend un réseau de pixels sensibles à la lumière.

4. Télécommande (5) pour envoyer des signaux de commande à une pluralité d'unités à commander, dans laquelle la télécommande comprend un capteur pour déterminer un signal lumineux unique, **caractérisée en ce que** la télécommande est agencée pour envoyer, avec lesdits signaux de commande, un signal d'identification associé audit signal lumineux unique qui est déterminé au moment auquel la télécommande est utilisée.

15

20

25

30

35

40

45

50

55

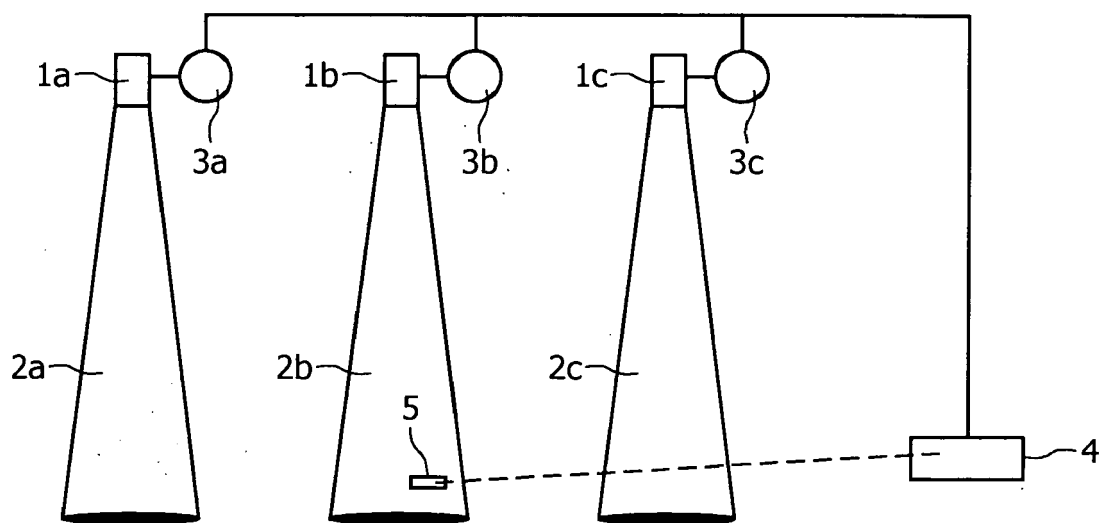


FIG. 1

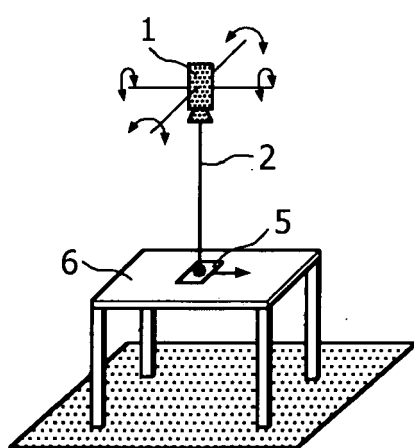


FIG. 2A

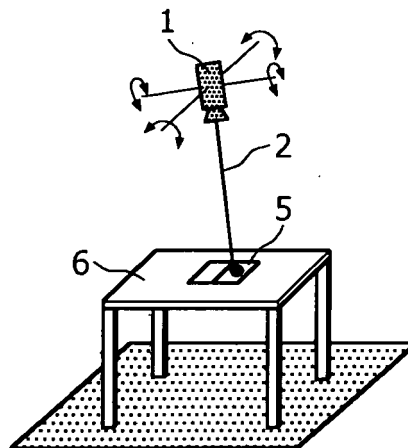


FIG. 2B

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- WO 2004057927 A [0003]
- US 20030107888 A [0004]