



(11)

EP 2 616 739 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

09.12.2015 Bulletin 2015/50

(51) Int Cl.:

F21V 17/10 ^(2006.01) **F21V 14/04** ^(2006.01)
F21V 7/00 ^(2006.01) **F21V 5/04** ^(2006.01)
F21V 7/06 ^(2006.01) **F21V 13/12** ^(2006.01)

(21) Application number: **11825537.1**

(86) International application number:

PCT/SE2011/051114

(22) Date of filing: **15.09.2011**

(87) International publication number:

WO 2012/036623 (22.03.2012 Gazette 2012/12)

(54) **A LIGHTING HEAD, A FASTENING FIXTURE AND A REFLECTOR FOR A LIGHTING SYSTEM**

BELEUCHTUNGSKOPF, BEFESTIGUNGSARMATUR UND REFLEKTOR FÜR EIN
BELEUCHTUNGSSYSTEM

TÊTE D'ÉCLAIRAGE, APPAREIL DE FIXATION ET RÉFLECTEUR POUR UN SYSTÈME
D'ÉCLAIRAGE

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

- **BLIXT, Pär**
S-185 92 Vaxholm (SE)
- **SUNDSTRÖM, Tommy**
S-138 36 Älta (SE)
- **SVENSSON, Jonny**
S-192 48 Sollentuna (SE)

(30) Priority: **17.09.2010 US 383778 P**

(43) Date of publication of application:

24.07.2013 Bulletin 2013/30

(74) Representative: **Zacco Sweden AB**

**P.O. Box 5581
114 85 Stockholm (SE)**

(73) Proprietor: **Profoto AB**

172 25 Sundbyberg (SE)

(56) References cited:

EP-A2- 1 586 815 DE-C- 371 140
DE-C- 371 140 DE-U1-202010 003 778
GB-A- 225 651 JP-U- S58 130 306
US-A- 1 880 399 US-A- 2 778 929
US-A- 2 945 945 US-A- 3 413 462
US-A- 3 892 960 US-A- 4 475 147
US-A- 5 394 316 US-A1- 2005 248 941
US-A1- 2005 248 941

(72) Inventors:

- **FALK, Anton**
S-141 91 Huddinge (SE)
- **DALENIUS, Bo**
S-122 31 Enskede (SE)
- **MARÉN, Göran**
S-136 72 Vendelsö (SE)

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).

EP 2 616 739 B1

Description

TECHNICAL FIELD

[0001] The present invention relates to the field of lighting systems, in particular to a lighting head, a fastening fixture and a reflector for providing light in a lighting system.

BACKGROUND

[0002] A lighting system normally comprises at least one lighting head having a reflector arranged to disperse light from a light source located at suitable focal point of the reflector.

[0003] Document US 1 880 399 A discloses a fastening fixture for a lighting head according to the preamble of claim 1.

[0004] SUMMARY This disclosure relates to a fastening fixture for a lighting head arranged to detachably connect a reflector to the lighting head according to claim 1.

[0005] Further aspects of the present invention are set out in the dependent claims.

A BRIEF DESCRIPTION OF THE DRAWINGS

[0006] The above and other features and advantages of the present invention will become readily apparent to those skilled in the art by the following detailed description of exemplary embodiments thereof with reference to the accompanying drawings, wherein:

- Fig. 1 illustrates a side view of an embodiment according to the invention,
- Fig. 2 illustrates a front view of an embodiment according to the invention shown in Fig. 1,
- Fig. 3 illustrates embodiments of a device and a system providing continuous light according to the invention,
- Fig. 4 illustrates a flowchart of an embodiment of the method according to the invention.
- Fig. 5 illustrates a flowchart of another embodiment of the method according to the invention.
- Fig. 6 illustrates a side view of an embodiment of a connector for the cable device shown in Fig. 3.

[0007] The figures are schematic and simplified for clarity, and they merely show details which are essential to the understanding of the invention, while other details have been left out. Throughout, the same reference numerals are used for identical or corresponding parts or steps.

DESCRIPTION

[0008] Fig. 1 shows a side view of embodiments of a lighting head 1, a fastening fixture 5 and a reflector 6 according to the invention. The lighting head 1 comprises

a first reflector body 2 having a first reflector 4. The first reflector body 2 comprises a first aperture 8 for receiving a light source 7. The light source 7 may be entered through an opening at the back end of the first reflector body 2 and may be extended through the first aperture 8 such that at least a portion of the light from the light source 7 may be reflected of the first reflector 4. The first reflector 4 comprises a first reflective surface 4A which is arranged to reflect light from the light source 7 out through the larger forward facing opening of the first reflector body 2.

[0009] The first reflector body 2 may also comprise a fastening member 3 for safely securing the light source 7 as it has been entered through the opening at the back end of the first reflector body 2. The fastening member 3 enables the light source 7 to be moved forward or backwards through the opening at the back end of the first reflector 2 and be tightly secured to the first reflector body 2 once a suitable placement of the light source 7 has been found.

[0010] The lighting head 1 may also comprise fastening fixture 5. The fastening fixture 5 may be any form of fastener, fastening device or holding device. The fastening fixture 5 may be movably arranged between a first open position and a second locked position. In Fig. 1, the fastening fixture 5 is shown in its second locked position. The fastening fixture 5 may be arranged to move between the first open position and the second locked position through a moving member 5C. The moving member 5C may be connected between the first reflector body 2 and the fastening fixture 5. The moving member 5 may preferably be a spring operated member or any form of member enabling the fastening fixture 5 to be rotated around the centre of the member 5C between a first open position and a second locked position.

[0011] The fastening fixture 5 may also comprise a first receiving means 5A for detachably connecting a lens 10 to the lighting head 1 in front of the light source 7. One example of such a receiving means is a first reception cavity 5A. The lens 10 may be placed in the first reception cavity 5A of the fastening fixture 5 and be securely fastened to the first reflector body 2 in front of the light source 7 by moving the fastening fixture 5 into the second locked position (as shown in Fig. 1).

[0012] According to some embodiments of the invention, the fastening fixture 5 further comprises a second receiving means for detachably connecting a second reflector 6 to the lighting head 1. One example of such a second receiving means is at least one second reception cavity 5B. The at least one second reception cavity 5B of the fastening fixture 5 may be arranged to receive a fastening means 6B of the second reflector 6. The fastening means 6B of the second reflector 6 may be placed in the second reception cavity 5B of the fastening fixture 5 and be securely fastened to the first reflector body 2 by moving the fastening fixture 5 into the second locked position (as shown in Fig. 1). The fastening fixture 5 may be arranged to securely fasten the second reflector 6 to

the first reflector body 2 such that the light source 7 may extend through an aperture 9 of the second reflector 6 configured to receive the light source 7. The fastening fixture 5 may also be arranged to securely fasten the second reflector 6 such that at least a portion of the light from the light source 7, when extended through the aperture 9 of the second reflector 6, is reflected of a reflective surface 6A of the second reflector 6 out through the larger forward facing opening of the first reflector body 2.

[0013] It should be noted that any number of fastening fixtures 5 may be used in order to detachably connect a second reflector 6 and/or the lens 10 to the first reflector body 2. In Fig. 2, four fastening fixtures 5 are arranged on the first reflector body 2. Fig. 2 also shows the fastening fixtures 5 in their second locked position.

[0014] The second reflector 6 is arranged to be detachably connected to the lighting head 1. The second reflector 6 is arranged to be received in the first reflector body 2 of the lighting head 1. The second reflector 6 may comprise an aperture 9 for receiving a light source 7. The second reflector 6 may also comprise fastening means 6B arranged to be detachably connected to the lighting head 1. The fastening means 6B of the second reflector may be arranged so as to enable the light source 7 to extend through the aperture 9. The fastening means 6B of the second reflector may be arranged such that the light source 7 may extend through the aperture 9. The fastening means 6B of the second reflector may be arranged to enable the second reflector 6 to be positioned such that at least a portion of the light from the light source 7 may be reflected of the reflective surface 6A of the second reflector 6.

[0015] The fastening means 6B may be arranged to be detachably mounted and securely fastened by at least one fastening fixture 5 comprised in the lighting head 1. According to some embodiments, the fastening means 6B may comprise at least one protrusion of the second reflector 6 extending away from the forward facing opening of the reflector 6 located opposite the aperture 9. The at least one protrusion of the second reflector 6 extending away from the forward facing opening of the reflector 6 and towards the fastening fixture 5 of the first reflector body 2 may be arranged to be received by the second reception cavity 5B of the at least one fastening fixture 5 of the first reflector body 2 in the lighting head 1. However, it should also be noted that although the fastening means 5 may comprise any form of protrusion or extension of the second reflector 6 arranged to be received by the second reception cavity 5B of the at least one fastening fixture 5 of the first reflector body 2 in the lighting head 1, the fastening means 5 may also comprise any form of fastener, fastening device or holding device arranged to be received by the at least one fastening fixture 5 of the first reflector body 2 in the lighting head 1.

[0016] The embodiments of the invention described above provides for a lighting head 1 in which a first reflector 4 may be easily replaced by an exchangeable second reflector 6. Advantageously, this allows an operator

of the lighting head 1 to adjust the reflecting properties of the lighting head 1 in a simple and cost-efficient manner.

[0017] According a further aspect of the invention, the invention also relates to a method, devices and system for providing continuous light.

[0018] This relates to the field of lighting systems, in particular to a method, devices and system for providing continuous light in a continuous lighting system.

[0019] A continuous lighting system normally comprises at least one lighting unit having at least one light source being connected via a power cable to a ballast or generator unit in order to receive a power supply signal.

[0020] According to one aspect, this disclosure relates to a lighting unit comprising at least one light source for providing continuous light, the lighting unit comprising a processing unit configured to send control signals to a ballast or generator unit for controlling the power supplied to the at least one light source by the ballast or generator unit.

[0021] According to yet a further aspect, this disclosure also relates to a method for use in a lighting unit comprising at least one light source for providing continuous light, comprising the steps of: sending control signals to a ballast or generator unit for controlling the power supplied to the at least one light source by the ballast or generator unit.

[0022] According to yet a further aspect, this disclosure also relates to a cable comprising a first communication path being arranged to transmit control signals to a ballast or generator unit and a second communication path being arranged to transmit a power signal from the ballast or generator unit to a lighting unit.

[0023] According to yet a further aspect, this disclosure also relates to a cable connector comprising electrical pin connectors, wherein at least a first electrical pin connector is arranged to receive control signals to a ballast or generator unit and at least a second electrical pin connector is arranged to transmitting a power signal from the ballast or generator unit, the pin(s) of the at least second electrical pin connector being longer than the pin(s) of the first pin electrical connector.

[0024] According to yet a further aspect, this disclosure also relates a ballast or generator for providing a power signal to lighting unit comprising a cable connector.

[0025] Fig. 3 shows embodiments of a lighting unit 10, a cable 110 and connectors 19, 112 for use in a lighting system 100 for providing continuous light according to the invention.

[0026] Fig. 3 shows a remote control unit 11. The remote control unit 11 may be used by an operator of the lighting system 100 to transmit control signals and/or other data information to a lighting unit 10. The remote control unit 11 may comprise input devices for receiving inputs from an operator of the remote control unit 11, and may also comprise indicating means for displaying information to the operator of the remote control unit 11, such as, for example, a display and/or indicator lights. The

input devices may be used by an operator to control the performance of a light source 113 of the lighting unit 10. Examples of control functions for controlling the performance of a light source 113 that may be performed using the input devices of the remote control unit 11 may be, for example, dimming the light source 113, controlling the fan speed of a fan unit 114, turning the light source 113 on and off, etc.

[0027] The remote control unit 11 may comprise a radio unit (for example, a radio transmitter, radio receiver or radio transceiver) arranged to relay control signals and/or other data information to/from other radio units (for example, a radio transmitter, radio receiver or radio transceiver), such as, for example, a radio unit 120 in a computer 119 and/or a radio unit 12 in the lighting unit 10. The radio unit 12 in the lighting unit 10 may also be referred to a receiving unit, although it may also be used for transmitting control signals and/or data information back to the remote control unit 11 and/or the computer 119. The remote control unit 11 may be any handheld device comprising a radio unit arranged to communicate with another radio unit located in the lighting unit 10.

[0028] The computer 119 comprising the radio unit 120 may also be arranged to relay control signals and/or other data information to/from other radio units, such as, the remote control unit 11 and/or radio unit 12 in the lighting unit 10.

[0029] The lighting unit 10 may also be referred to a lamp or lamp unit. In the lighting unit 10, the radio unit 12 may be communicatively connected to a processing unit 13. The processing unit 13 may further be communicatively connected to all of the following units that may be present in the lighting unit 10: a persistent memory unit 14, a time counter 15, one or more input devices 16, a display 17, a cable connector 19, at least one light source 113, a fan unit 114, a temperature sensor 115, a zero-cross detector 116, and a light source voltage monitoring unit 117. The lighting unit 10 may also comprise an ignitor unit 118. The ignitor unit 118 may be arranged to boosting the voltage to ignite the bulb. The lighting unit 10 may be connected to a ballast or generator unit 111 via the cable connector 19.

[0030] The time counter 15, which also may be implemented as a software in the processing unit 12, may be arranged to, for example, count the hours of the usage of the light source 113 and store this time information in the persistent memory unit 14. The one or more input devices 16 may represent different control functions of the lighting unit 10 and may comprise, for example, a dimmer knob arranged to indicate a specific amount of dimming of the light source 113 desired by an operator (e.g. a dimming percentage of the maximum effect of the light source 113) and/or a fan mode button for setting the speed of the fan unit 114 (e.g. in order to eliminate any sound from the lighting unit 113) and/or an on/off-button for turning the light source 113 on or off. The display 17 may be used by the processing unit 13 for displaying information indicative of the performance of the at least

one light source 113. The display 17 may also be used by the processing unit 13 for displaying information showing the selected setting(s) of the lighting unit 10, a time counter value of the usage of the light source 113, which radio channel the radio unit 12 in the lighting unit 10 is set to, and which group of lighting units the lighting unit 10 belong to (if any). The cable connector 19 may be arranged to connect the lighting unit 10 with a ballast or generator unit 111 via a cable 110. The cable connector 19 may be arranged to transmit control signals to the ballast or generator unit 111 through the cable 110 and receiving a power signal from the ballast or generator unit 111 through the same cable 110 in response to the control signals sent to the ballast or generator unit 111. The control signals may be DMX control signals and may also comprise DMX logical power signals. The received power signal provides power to the light source 113. The cable connector 19 and the cable connecting the lighting unit 10 and the ballast or generator unit 111 are described in more detail below with reference to Figs. 5-6. The light source 113 may be a Metal Halide Discharge (HMI) bulb or a standard halogen bulb. However, these examples are not to be considered limited, since other similar bulbs may also be used in a similar manner by the invention. The fan unit 114 may be arranged to cool, i.e. lower the temperature, of the light source 113. The zero cross detector 116 may sense the voltage polarity-switching at the zero voltage point, of the bulb voltage. The light source voltage monitoring unit 117 may monitor the voltage over the light source.

[0031] According to some embodiments, the processing unit 12 in the lighting unit 10 may be configured to send control signals to a ballast or generator unit 111 for controlling the power supplied to the at least one light source 113 by the ballast or generator unit 111. The control signals may be DMX control signals and may also comprise DMX logical power signals. The control signals may be based on received or retrieved measurements indicative of the performance of the at least one light source 113. These measurements signals may originate from or be retrieved from, for example, the persistent memory unit 14, the time counter 15, the fan unit 114, the temperature sensor 115, the zero-cross detector 116, and/or the light source voltage monitoring unit 117.

[0032] According to some embodiments, the processing unit 13 may be arranged to receive measurements indicative of the performance of the at least one light source 113 from the temperature sensor 115. The processing unit 13 may then send control signals to a fan unit 114 based on received measurements indicative of the performance of the at least one light source 113 in combination with control signals to a ballast or generator unit 111. This may, for example, be performed in case the processing unit 13 has detected that there is a risk that the light source 113 is going to be overheated, whereby the processing unit 13 may change to fan speed of the fan unit 114 and/or send control signals to a ballast or generator unit 111 to reduce the power to the light

source 113.

[0033] According to some embodiments, the processing unit 13 may be arranged to receive measurements indicative of the performance of the at least one light source 113 from the zero-cross detector 116 and the light source voltage monitoring unit 117. The processing unit 13 may be arranged to send control signals to the ballast or generator unit 111 based on received measurements indicative of the performance of the at least one light source 113 from the zero-cross detector (116) and/or the light source voltage monitoring unit 117. This may, for example, be performed in case the processing unit 13 detects that the ignitor unit 118 being arranged to ignite the light source 113, it not successful in igniting the light source 113. Thus, in order to prevent damage to the light source 113, the lighting unit 10 or the ignitor unit 118, the processing unit 13 may send control signals to the ballast or generator unit 111 to stop providing power signal to the light source 113.

[0034] According to some embodiments, the processing unit 12 may be configured to receive control signals and/or data information from the radio unit 12 and/or from the one or more input devices 16 for controlling the performance of the at least one light source 113. The processing unit 12 may also be configured to receive or retrieve measurements indicative of the actual performance of the light source 113. These measurements signals may originate from or be retrieved from, for example, the persistent memory unit 14, the time counter 15, the fan unit 114, the temperature sensor 115, the zero-cross detector 116, and/or the light source voltage monitoring unit 117. The processing unit 13 may be configured to modify the received control signals based on the received measurements indicative of the performance of the light source 113. The processing unit 13 may also be configured to send these modified control signals to a ballast or generator unit 111.

[0035] It should be noted that the processing unit 12 may comprise logic for performing the functionality of the lighting unit 10. This functionality may be implemented by means of a software or computer program. The processing unit 12 may also comprise storage means or a memory unit 14 for storing the computer program and processing means, such as e.g. a microprocessor or microcontroller, for executing the computer program. The storage means may also be readable storage medium separated from, but connected to the processing unit 12. When, it is described herein that the processing unit 12 performs a certain action or function it is to be understood that the processing unit 12 may use its processing means to execute a certain part of the software or computer program which may be stored in its storage means 14. The processing unit 12 in the lighting unit 10 may be configured to perform the steps of the method as described with reference to Fig. 4.

[0036] According to one aspect, a computer program product may be provided for use in a processing unit 12 in a lighting unit 10 as described in any of the embodi-

ments above, which comprises computer readable code means, which when run in the processing unit 12 in the transmitting node causes the processing unit 12 to perform any one of the steps described in any of the methods described above. The code means of the computer program product may be stored on any form of readable storage medium, such as, for example, in the persistent memory 14.

[0037] Fig. 4 shows a flowchart of an embodiment of the method for use in a lighting unit 10 comprising at least one light source 113 for providing continuous light.

[0038] In step S41, the processing unit 13 may receive or retrieve measurements indicative of the performance of the light source 113. These measurements may originate from or be retrieved from, for example, the persistent memory unit 14, the time counter 15, the fan unit 114, the temperature sensor 115, the zero-cross detector 116, and/or the light source voltage monitoring unit 117.

[0039] In step S42, the processing unit 13 may send control signals to a ballast or generator unit 111, wherein the control signals may be based on the received measurements indicative of the performance of the light source 113. The control signals may control the power supplied to the light source 113 by the ballast or generator unit 111.

[0040] Fig. 5 illustrates a flowchart of another embodiment of the method for use in a lighting unit 10 comprising at least one light source 113 for providing continuous light.

[0041] In step S51, the processing unit 13 may receive control signals for controlling the performance of the light source 113. The control signal may be wirelessly received from a remote control unit 11 or received manually through the input devices 18 on the lighting unit 10.

[0042] In step S52, the processing unit 13 may receive measurements indicative of the performance of the light source 113. These measurements may originate from or be retrieved from, for example, the persistent memory unit 14, the time counter 15, the fan unit 114, the temperature sensor 115, the zero-cross detector 116, and/or the light source voltage monitoring unit 117.

[0043] In step S53, the processing unit 13 may modify the received control signals based on the received measurements in the lighting unit 10 indicative of the performance of the light source 113.

[0044] In step S54, the processing unit 13 may send the modified control signals to a ballast or generator unit 111. The control signals may control the power supplied to the light source 113 by the ballast or generator unit 111.

[0045] Fig. 6 shows a side view of an embodiment of a connector for the cable shown in Fig. 3.

[0046] The cable 110 may comprise a first communication path (110A in Fig. 3) being arranged to transmit control signals to a ballast or generator unit 111 and a second communication path (110B in Fig. 3) being arranged to transmit a power signal from the ballast or generator unit 111 to a lighting unit 10. The control signals are DMX control signals and DMX logical power signals following the DMX protocol.

[0047] The cable connector 110 may be arranged to receive control signals to a ballast or generator unit 111 and transmit a power signal from the ballast or generator unit 111. The control signals are DMX control signals and DMX logical power signals. The cable connector 110 may comprise electrical pin connectors, wherein at least a first electrical pin connector may be arranged to receive control signals to a ballast or generator unit 111 and at least a second electrical pin connector may be arranged to transmitting a power signal from the ballast or generator unit 111. The pin(s) of the at least second electrical pin connector may be longer than the pin(s) of the first pin electrical connector. This may be performed so as to ensure that the power supply to the light source 113 is stopped, before the control signals to the ballast or generator 111.

[0048] The cable connector may advantageously be fitted to a ballast or generator unit 111 for providing a power signal to lighting unit 10.

Using only one cable for both DMX and the Power to the HMI lamp

[0049] One reason to have one cable with cords for both DMX control of the ballast or generator unit 111, and the power from the ballast to the light source 113 (e. g. HMI bulb) is that it is simple and easier to use than when having multiple cables. DMX communication will come from the lighting unit 10 and not from an external DMX controlling device. Some effects of using of using one cable and one connector

- Impossible for user to connect DMX cable to wrong Ballast when using many ballasts and lamps,
- Physical control of what order the pins are connected. By using different length of the connector pins inside of the connector. This means that the DMX control signal always can be connected/disconnected first or last,
- Different keying possibilities of different female and mails connectors is enabled.

Radio

Radio unit that can relay data wirelessly to other Radio units, both directions receive/transmit.

Display

Display for showing information e q dimming percentage

Dimmer knob

Rotary knob for input of e q dimming percentage

Fan mode button

Button for input of e g Fan speed

On button

Temperature

Sensors giving input of actual temperature

Fan

Fan for cooling

Logical power

Sense of the presence of logical power

Bulb voltage

Sense of the voltage to the bulb

Zero cross detector

Sense of the voltage polarity-switching at the zero voltage point, of the bulb voltage

Ignitor

Boosting the voltage to ignite the bulb

Bulb

Ballast

The ballast can regulate the power to the bulb

Remote control

Handheld unit that can through a radio unit can communicate with the HMI Lamp

Computer program

Computer program that through a radio unit can communicate with the HMI Lamp

[0050] The Microcontroller has a program that controls the Ballast power and the fan speed and the bulb ignitor. The control is dependent of the inputs to the microcontroller

- Fan mode button are used to set the fan speed (eliminate any sound from the lamp)
- Dimmer knob is used to change the power to the bulb from the ballast
- The display is used to show the user the selected setting and the time counter of the lamp usage and radio channel and group.
- Temperature inputs are used to protect the lamp from over heat by means of changing the fan speed and/or the power to the bulb
- The program has a software time counter that counts the hours of the usage of the lamp and stores this the persistent memory
- The microcontroller controls/changes the power to the bulb troue the DMX protocol
- The zero cross detector and bulb voltage are used to determine the sate of the ballast
- The radio are used for wireless control of the lamp
- The logical power are used to determine the type of ballast, e g Profoto Ballast can have logical power and other brand ballast with adapter can not have logical power

[0051] According to one aspect of the invention, a lighting unit 10 comprising at least one light source 113 for providing continuous light is provided. The lighting unit 10 comprising a processing unit 13 configured to send control signals to a ballast or generator unit 111 for controlling the power supplied to the at least one light source 113 by the ballast or generator unit 111.

[0052] According to one aspect of the lighting unit 10, the processing unit 13 is configured to send the control signals based on received measurements indicative of the performance of the at least one light source 113.

[0053] According to another aspect of the lighting unit

10, the lighting unit 10 comprises a receiving unit configured to receive control signals for controlling the performance of the at least one light source 113, and wherein the processing unit 13 is configured to modify the received control signals based on received measurements in the lighting unit 10 indicative of the performance of the at least one light source 113.

[0054] According to a further aspect of the lighting unit 10, the processing unit 13 is arranged to receive measurements indicative of the performance of the at least one light source 113 from a temperature sensor 115 in the lighting unit 10.

[0055] According to yet another aspect of the lighting unit 10, the processing unit 13 is arranged to send control signals to a fan unit 114, said fan unit 114 being arranged to lower the temperature of the at least one light source 113, based on received measurements indicative of the performance of the at least one light source 113 and the control signals to the ballast or generator unit 111.

[0056] According to yet another aspect of the lighting unit 10, the processing unit 13 is arranged to receive measurements indicative of the performance of the at least one light source 113 from a zero-cross detector 116 and a light source voltage monitoring unit 117.

[0057] According to yet another aspect of the lighting unit 10, the processing unit 13 is arranged to send control signals to a ballast or generator unit 111 based on received measurements indicative of the performance of the at least one light source 113 from the zero-cross detector 116 and/or the light source voltage monitoring unit 117, in order to control an ignitor unit 118 in the lighting unit 10, said ignitor unit 118 being arranged to ignite the light source 113 in the lighting unit 10.

[0058] According to yet another aspect of the lighting unit 10, the light source 113 is a Metal Halide Discharge (HMI) lamp or a standard halogen lamp.

[0059] According to yet another aspect of the lighting unit 10, the processing unit 13 is arranged to display information on a display unit 17 on the continuous lighting unit 10 indicative of the performance of the at least one light source 113.

[0060] According to yet another aspect of the lighting unit 10, the receiving unit is a radio unit 12 configured to wirelessly receive the control signals from a remote control unit 11.

[0061] According to yet another aspect of the lighting unit 10, the receiving unit is at least one input device 18 configured to receive the control signals manually on the continuous lighting unit 10.

[0062] According to yet another aspect of the lighting unit 10, the lighting unit 10 further comprises a connecting unit 19 for connecting to a cable device 110, the connecting unit 19 being arranged to send control signals to the ballast or generator unit 111 through the cable device 110 and receiving a power signal from the ballast or generator unit 111 through the same cable device 110 in response to the control signals sent to the ballast or generator unit 111.

[0063] According to another aspect of the invention, a method for use in a lighting unit 1 comprising at least one light source 113 for providing continuous light is provided. The method comprising the step of: sending control signals to a ballast or generator unit 111 for controlling the power supplied to the at least one light source 113 by the ballast or generator unit 111.

[0064] According to one aspect of the method, the control signals based on received measurements indicative of the performance of the at least one light source 113. According to another aspect of the method, the method further comprises the steps of: receiving control signals for controlling the performance of the at least one light source 113; received measurements indicative of the performance of the at least one light source 113; and modifying the received control signals based on the received measurements in the lighting unit 10 indicative of the performance of the at least one light source 113.

[0065] According to a further aspect of the method, the method further comprises the step of: sending the modified control signals to a ballast or generator unit 111.

[0066] According to yet another aspect of the method, the method further comprises the step of: receiving measurements indicative of the performance of the at least one light source 113 from a temperature sensor 115 in the lighting unit 10.

[0067] According to yet another aspect of the method, the method further comprises the step of: sending control signals to a fan unit 114 in the lighting unit 10 based on received measurements indicative of the performance of the at least one light source 113 and the sent modified control signals to a ballast or generator unit 111.

[0068] According to yet another aspect of the method, the method further comprises the step of: receiving measurements indicative of the performance of the at least one light source 113 from a zero-cross detector 116 and a light source voltage monitoring unit 117.

[0069] According to yet another aspect of the method, the method further comprises the step of: sending modified control signals to a ballast or generator unit 111 based on received measurements indicative of the performance of the at least one light source 113 from the zero-cross detector 116 and/or the light source voltage monitoring unit 117, in order to control an ignitor unit 118 in the lighting unit 10.

[0070] According to yet another aspect of the method, the method further comprises the step of: displaying information on a display unit 17 in the continuous lighting unit 10 indicative of the performance of the at least one light source 113.

[0071] According to yet another aspect of the method, the method further comprises further comprising the step of: wirelessly receiving the control signals from a remote control unit 11.

[0072] According to yet another aspect of the method, the method further comprises the step of: receiving the control signals manually on the continuous lighting unit 10. According to yet another aspect of the method, the

method further comprises the step of: send control signals to the ballast or generator unit 111 through a cable device 110 and receiving a power signal from the ballast or generator unit 111 through the same cable device 110 in response to the control signals sent to the ballast or generator unit 111.

[0073] According to a further aspect of the invention, a cable 110 is provided. The cable 110 comprising a first communication path 110A being arranged to transmit control signals to a ballast or generator unit 111 and a second communication path 110B being arranged to transmit a power signal from the ballast or generator unit 111 to a lighting unit 10.

[0074] According to one aspect of the cable, the control signals are DMX control signals and DMX logical power signals.

[0075] According to yet another aspect of the invention, a cable connector 110 is provided. The cable connector 110 is arranged to receive control signals to a ballast or generator unit 111 and transmit a power signal from the ballast or generator unit 111.

[0076] According to one aspect of the cable connector 110, the control signals are DMX control signals and DMX logical power signals.

[0077] According to another aspect of the cable connector 110, the cable connector 110 comprises electrical pin connectors, wherein at least a first electrical pin connector is arranged to receive control signals to a ballast or generator unit 111 and at least a second electrical pin connector is arranged to transmitting a power signal from the ballast or generator unit 111, the pin(s) of the at least second electrical pin connector being longer than the pin(s) of the first pin electrical connector.

[0078] According to yet another aspect of the invention, a ballast or generator 111 for providing a power signal to lighting unit 10 is provided. The ballast or generator 111 comprising a cable connector 110 as described above.

[0079] It should be noted that in addition to the exemplary embodiments of the invention shown in the accompanying drawings, the invention may be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the concept of the invention to those skilled in the art.

Claims

1. A fastening fixture (5) for a lighting head (1) arranged to detachably connect a reflector (6) to the lighting head (1), wherein the lighting head (1) comprises a reflector body (2) having a first reflector (4) with a first reflective surface (4A) and a first aperture (8) for receiving a light source (7), the fastening fixture (5) comprising a first receiving means (5A) for detachably connecting a lens (10) to the lighting head (1)

in front of the light source (7), and wherein the fastening fixture (5) further comprises at least a second receiving means (5B) for detachably connecting a second reflector (6) to the lighting head (1) the second receiving means (5B) is arranged such that the light source (7) extends through a second aperture (9) of the second reflector (6) for receiving the light source (7) and such that at least a portion of the light from the light source (7) is reflected of the reflective surface (6A) of the second reflector (6), **characterized in that** the first receiving means is a first reception cavity (5A) inside the fastening fixture (5), wherein said fastening fixture (5) is arranged to move between a first open position and a second locked position through a moving member (5C), and the second receiving means is at least one second reception cavity (5B) inside the fastening fixture (5) for detachably connecting the second reflector (6) to the lighting head (1), wherein the moving member (5C) enables the fastening fixture (5) to be rotated around the centre of the moving member (5C)

2. A fastening fixture (4) according to claim 1, comprising two or more second reception cavities (5B) for detachably connecting a reflector (6) to the lighting head (1).
3. A lighting head (1) being arranged to detachably connect a reflector (6) to the lighting head (1), said lighting head comprising a fastening fixture (4) according to any of claims 1-2.

Patentansprüche

1. Befestigungsarmatur (5) für einen Beleuchtungskopf (1), vorgesehen für das lösbare Verbinden eines Reflektors (6) mit dem Beleuchtungskopf (1), wobei der Beleuchtungskopf (1) einen Reflektorkörper (2) umfasst, der einen ersten Reflektor (4) mit einer ersten reflektierenden Oberfläche (4A) und eine erste Öffnung (8) zur Aufnahme einer Lichtquelle (7) aufweist, welche Befestigungsarmatur (5) ein erstes Aufnahmemittel (5A) zum lösbaren Verbinden einer Linse (10) mit dem Beleuchtungskopf (1) vor der Lichtquelle (7) umfasst, und wobei die Befestigungsarmatur (5) ferner zumindest ein zweites Aufnahmemittel (5B) zum lösbaren Verbinden eines zweiten Reflektors (6) mit dem Beleuchtungskopf (1) umfasst, wobei das zweite Aufnahmemittel (5B) derart angeordnet ist, dass die Lichtquelle (7) durch eine zweite Öffnung (9) des zweiten Reflektors (6) zur Aufnahme der Lichtquelle (7) hindurchgeht, und derart, dass zumindest ein Teil des Lichts aus der Lichtquelle (7) von der reflektierenden Oberfläche (6A) des zweiten Reflektors (6) reflektiert wird, **dadurch gekennzeichnet, dass** das erste Aufnahmemittel eine erste Aufnahmevertiefung (5A) im Inneren der

Befestigungsarmatur (5) ist, wobei die Befestigungsarmatur (5) derart angeordnet ist, dass sie sich zwischen einer ersten offenen Stellung und einer zweiten verriegelten Stellung durch ein Bewegungsmittel (5C) bewegt, und das zweite Aufnahmemittel zumindest eine zweite Aufnahmevertiefung (5B) im Inneren der Befestigungsarmatur (5) zum lösbaren Verbinden des zweiten Reflektors (6) mit dem Beleuchtungskopf (1) ist, wobei das Bewegungsmittel (5C) die Drehung der Befestigungsarmatur (5) um den Mittelpunkt des Bewegungsmittels (5C) ermöglicht.

2. Befestigungsarmatur (4) nach Anspruch 1, umfassend zwei oder mehrere zweite Aufnahmevertiefungen (5B) zum lösbaren Verbinden eines Reflektors (6) mit dem Beleuchtungskopf (1).
3. Beleuchtungskopf (1), der für das lösbare Verbinden eines Reflektors (6) mit dem Beleuchtungskopf (1) vorgesehen ist, welcher Beleuchtungskopf eine Befestigungsarmatur (4) nach einem der Ansprüche 1-2 umfasst.

l'élément mobile (5C) permet au dispositif de fixation (5) d'être tourné autour du centre de l'élément mobile (5C).

2. Dispositif de fixation (4) selon la revendication 1, comprenant deux ou plusieurs deuxièmees cavités de réception (5B) pour relier de manière amovible un réflecteur (6) à la tête d'éclairage (1).
3. Tête d'éclairage (1) étant agencée pour relier de manière amovible un réflecteur (6) à la tête d'éclairage (1), ladite tête d'éclairage comprenant un dispositif de fixation (4) selon l'une quelconque des revendications 1 à 2.

Revendications

1. Dispositif de fixation (5) pour une tête d'éclairage (1), agencé de manière à connecter de façon amovible un réflecteur (6) à la tête d'éclairage (1), la tête d'éclairage (1) comprenant un corps de réflecteur (2) comportant un premier réflecteur (4) avec une première surface réfléchissante (4A) et une première ouverture (8) pour la réception d'une source de lumière (7), le dispositif de fixation (5) comprenant un premier moyen de réception (5A) pour relier de manière amovible une lentille (10) à la tête d'éclairage (1) en face de la source de lumière (7), et le dispositif de fixation (5) comprenant en outre au moins un deuxième moyen de réception (5B) pour relier de manière amovible un deuxième réflecteur (6) à la tête d'éclairage (1), le deuxième moyen de réception (5B) étant agencé si bien que la source de lumière (7) s'étend à travers une deuxième ouverture (9) du deuxième réflecteur (6) pour la réception de la source de lumière (7) et si bien qu'au moins une portion de la lumière provenant de la source de lumière (7) est réfléchiée de la surface réfléchissante (6A) du deuxième réflecteur (6), **caractérisé en ce que** le premier moyen de réception est une première cavité de réception (5A) à l'intérieur d'un dispositif de fixation (5), dans lequel le dispositif de fixation (5) est agencé pour se déplacer entre une première position ouverte et une deuxième position verrouillée à travers un élément mobile (5C) et le deuxième moyen de réception est au moins une deuxième cavité de réception (5B) à l'intérieur du dispositif de fixation (5) pour relier de manière amovible le deuxième réflecteur (6) à la tête d'éclairage (1), dans lequel

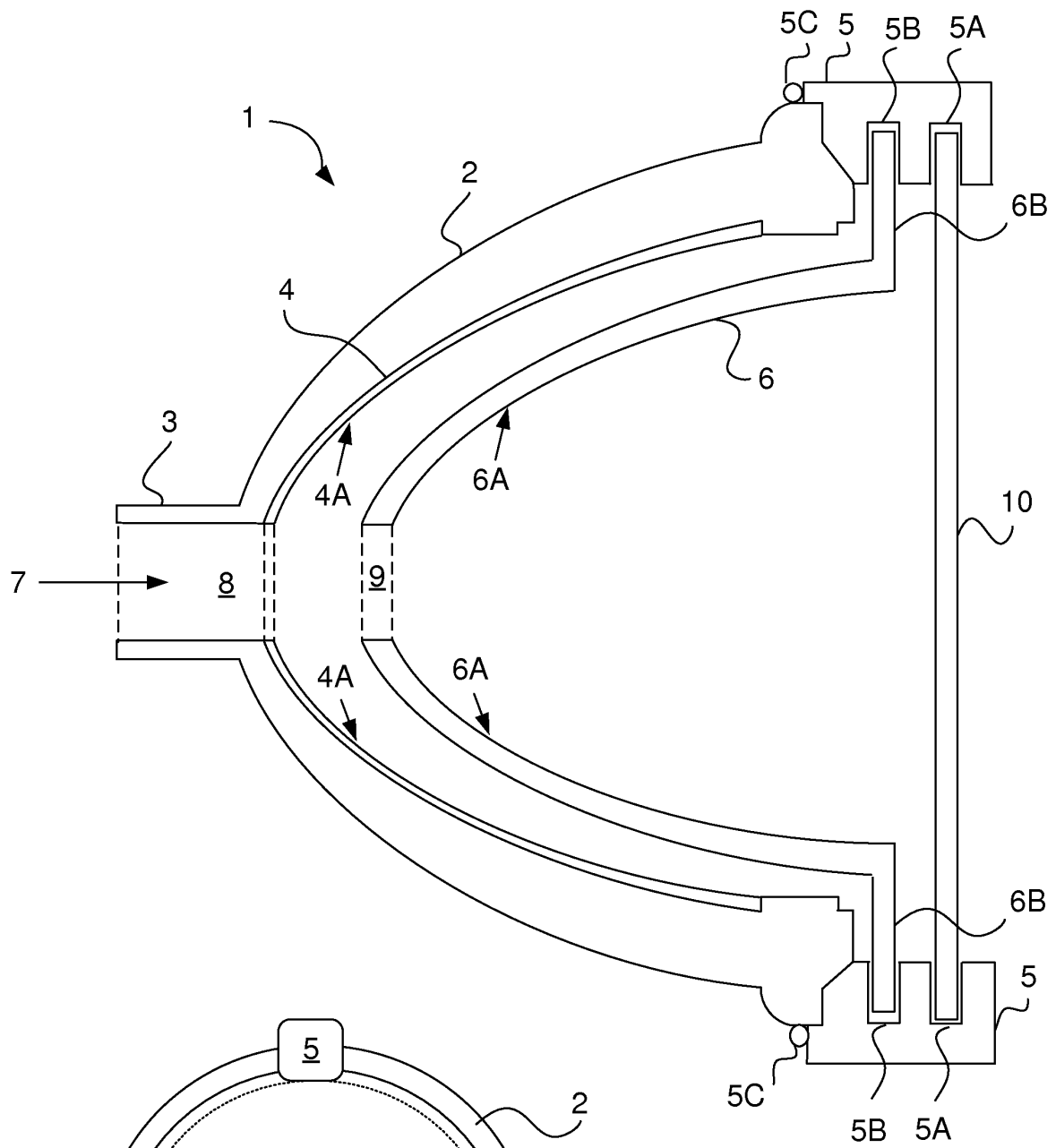


FIG. 1

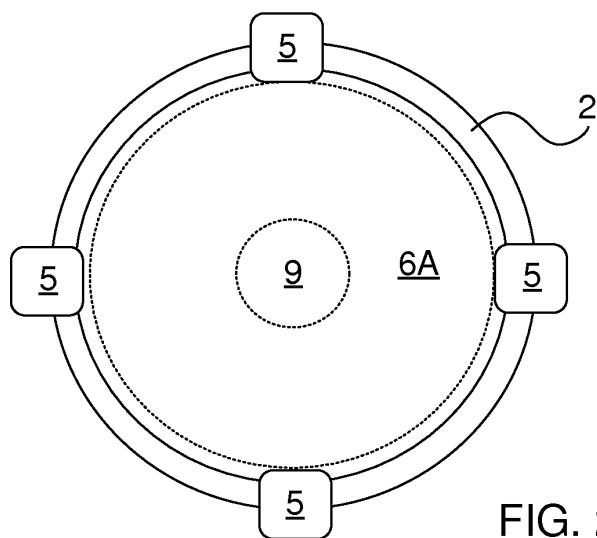


FIG. 2

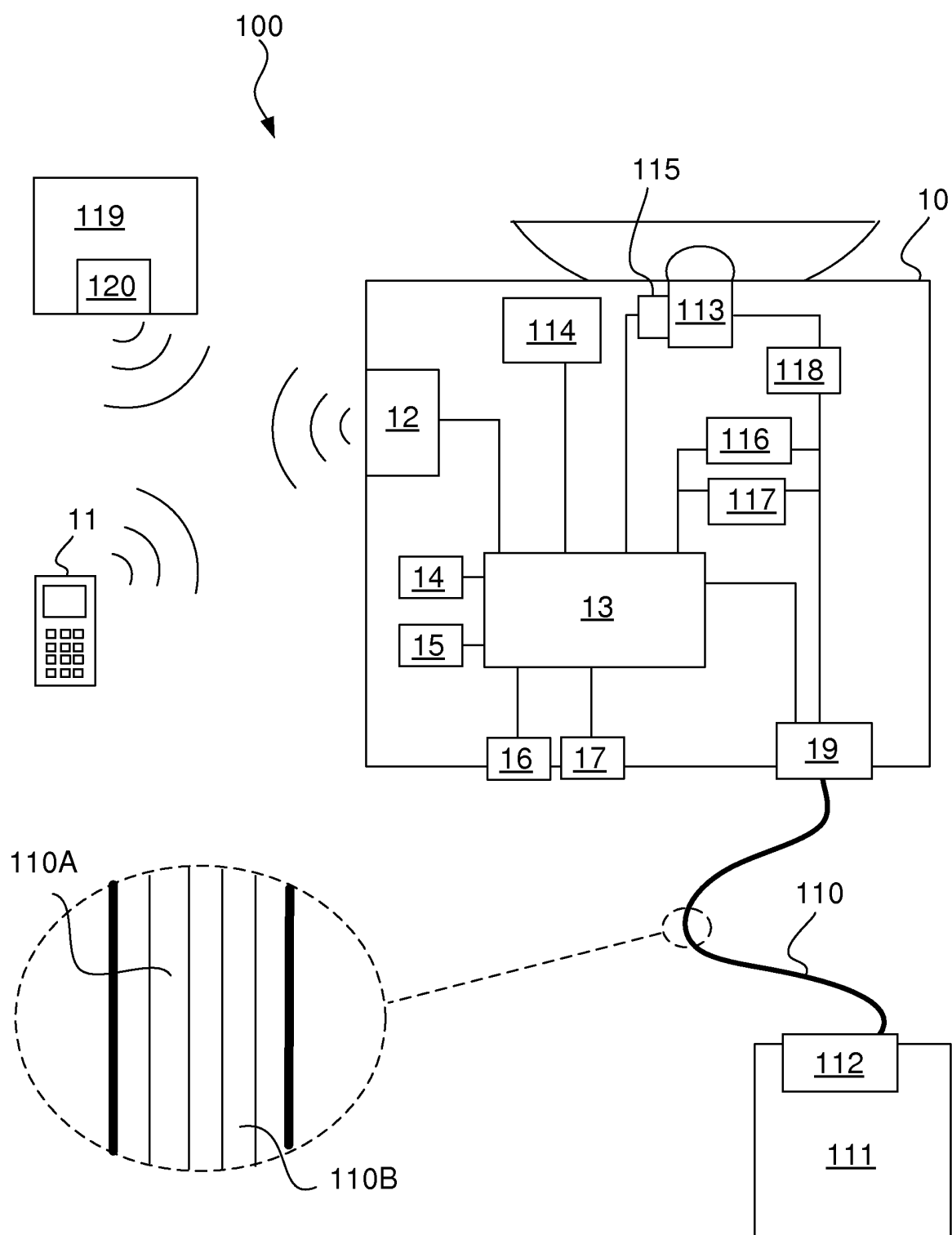


FIG. 3

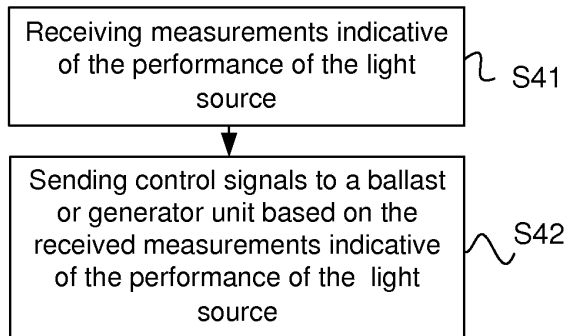


FIG. 4

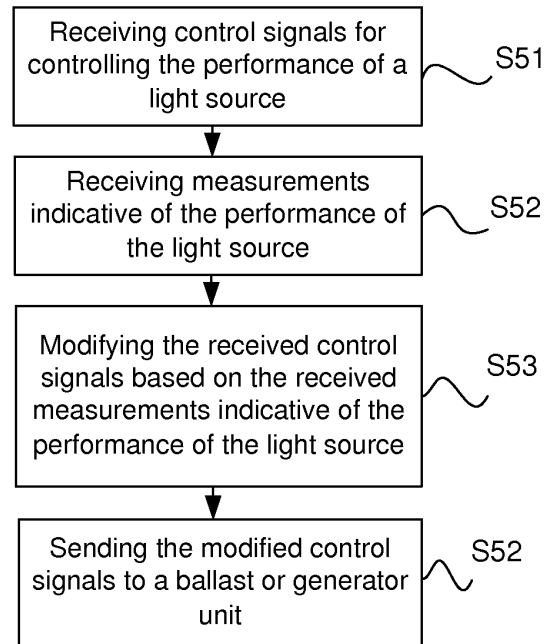


FIG. 5

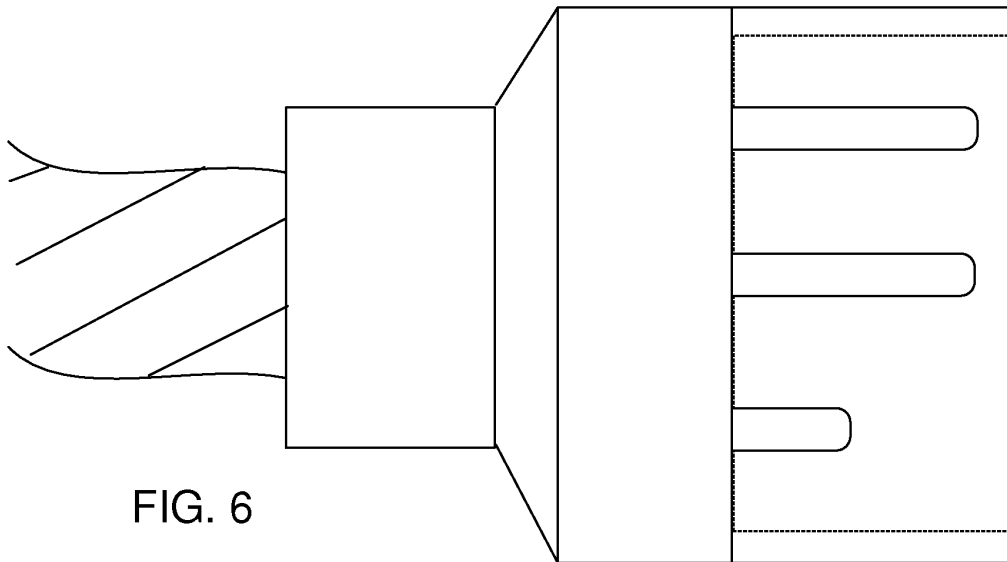


FIG. 6

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

- US 1880399 A [0003]