(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

PCT

(43) International Publication Date
11 June 2009 (11.06.2009)

(10) International Publication Number
WO 2009/072689 A1

(51) International Patent Classification:
F21S 10/00 (2006.01) *F21V 14/00* (2006.01)

(21) International Application Number:
PCT/KR2007/006368

(22) International Filing Date:
7 December 2007 (07.12.2007)

(25) Filing Language: Korean

(26) Publication Language: English

(71) Applicant *(for all designated States except US)*: **FEELUX CO., LTD.** [KR/KR]; 624-8, Seogu-ri, Gwangjeok-myeon, Yangju-si, Gyeonggi-do 482-840 (KR).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **NOH, Si Chung** [KR/KR]; 624-8, Seogu-ri, Gwangjeok-myeon, Yangju-si, Gyeonggi-do 482-840 (KR).

(74) Agent: **AJU INTERNATIONAL LAW & PATENT GROUP**; 12th Floor, Poonglim Building, 823-1, Yeok-sam-dong, Gangnam-gu, Seoul 135-784 (KR).

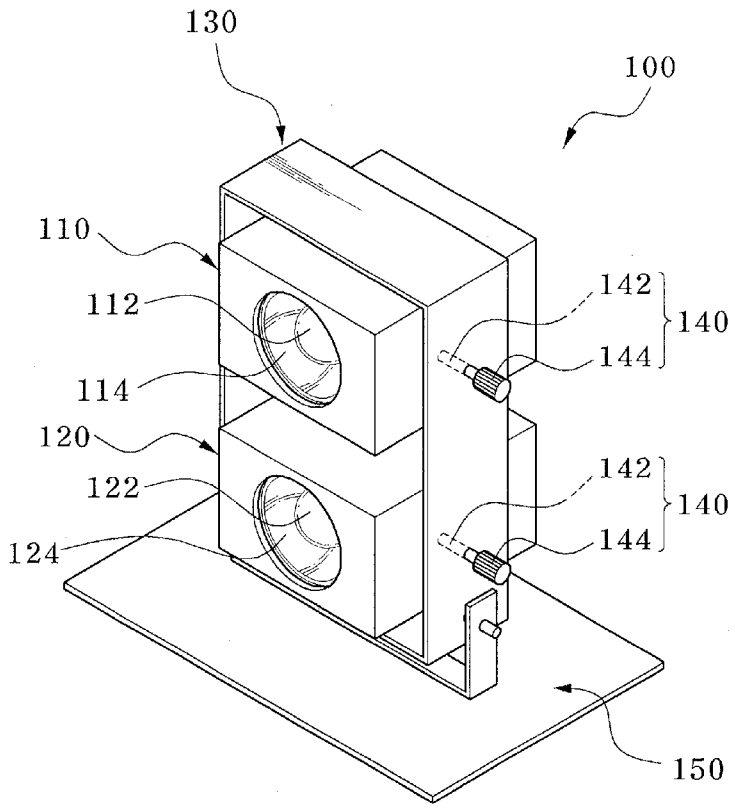
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

(54) **Title:** LIGHT PROJECTOR AND CONTROLLING METHOD THEREOF

【Figure 1】



(57) **Abstract:** A light projector and a method for controlling the same are disclosed. The light projector includes a first light source unit including a first light source to emit a first light beam, and a first reflector to reflect the first light beam, and a second light source unit including a second light source to emit a second light beam having a different color temperature from that of the first light beam, and a second reflector to reflect the second light beam. The light projector irradiates the light beams to the object by a method of mixing two or more light sources and a dimming control method, thereby being capable of freely realizing various light beams having different illuminations and color temperatures from one another, and being capable of adjusting the amount of light beams so as to irradiate a required amount of light to the object. As a result, the light projector can achieve a high lighting effect and power-saving effect.

WO 2009/072689 A1

[DESCRIPTION]

[Invention Title]

LIGHT PROJECTOR AND CONTROLLING METHOD THEREOF

[Technical Field]

The present invention relates to a light projector and a method for controlling the same, and more particularly, to a light projector having several different color temperatures, and a method for controlling the same.

[Background Art]

A light projector designates a floodlight, which is a light source installed at a distance from outdoor billboards or a variety of structures and buildings, etc. Although the light projector is mainly used as an outdoor lighting fitting, it also may be used as a high-light for illuminating extensive indoor places such as gymnasiums, performance stages, etc. if necessary.

Generally, the light projector must have a configuration and materials resistant to outdoor environments, snow, rain, strong wind, direct rays of light, or dusts, gases, and moisture. Since the light projector is used when a special purpose of beam angles are required to send light beams to a distance, or to irradiate light beams over a wide range, the light projector uses a high-capacity lamp.

Further, it is impossible to anticipate where the light projector will be used. Therefore, conventionally, a glass cover for the light projector has been subjected to a heat-resistance treatment, or a body of the light projector has been designed to have a heat-resistance configuration, in order to prolong the lifespan of the lamp. Also, a reflector has been used to control the flow of light.

As described above, the conventional light projector employs the high-

capacity lamp mounted in the body and the reflector provided along the periphery of the lamp, and also employs an angle regulator to regulate an irradiation angle of light beams. As a result, the conventional light projector can provide a variety of billboards, structures, or buildings with decorative effects and also, create completely new images. In the daytime and at night, the light projector improves visibility and attention of the above mentioned billboards, etc., and maximizes advertisement effects thereof.

[Disclosure]

[Technical Problem]

However, the above described conventional light projector cannot realize various colors because a single lamp is used to emit light beams having only one inherent color temperature.

Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a light projector having an improved structure to realize and emit light beams having a variety of color temperatures, and a method for controlling the same.

[Technical Solution]

In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of a light projector comprising: a first light source unit to emit a first light beam; and a second light source unit to emit a second light beam having a different color temperature from that of the first light beam.

Preferably, the first light source unit comprises: a first light source unit to emit the first light beam; and a first reflector to reflect the first light beam.

Preferably, the first reflector has at least one of circular, elliptical, and

polygonal shapes.

Preferably, the second light source unit comprises: a second light source unit to emit the second light beam; and a second reflector to reflect the second light beam.

Preferably, the second reflector has at least one of circular, elliptical, and polygonal shapes.

Preferably, the light projector further comprises: a case receiving at least one of the first light source unit and the second light source unit coupled thereto; and an angle regulator to rotatably couple at least one of the first light source unit and the second light source unit to the case.

Preferably, the angle regulator comprises: a coupling member fixed to the first light source unit or the second light source unit and rotatably coupled to the case; and a grip portion to rotate the coupling member.

Preferably, the angle regulator comprises: a coupling member fixed to the first light source unit or the second light source unit and rotatably coupled to the case; and a drive unit to rotate the coupling member.

Preferably, the light projector further comprises: a dimming control unit to control the light-on/off and illumination of at least one of the first light source unit and the second light source unit.

Preferably, the dimming control unit comprises: a dimming controller to generate a dimming control signal of at least one of the first light source unit and the second light source unit; and a stabilizer to control the light-on/off and illumination of at least one of the first light source unit and the second light source unit upon receiving the dimming control signal from the dimming controller.

Preferably, the first light source unit and the second light source unit are arranged vertically.

Preferably, the first light source unit and the second light source unit are arranged horizontally.

Preferably, the first light source unit has a color temperature of 2,000K to

2,500K, and the second light source unit has a color temperature of 4,000K to 6,000K.

In accordance with another aspect of the present invention, there is provided a method for controlling a light projector comprising: irradiating a first light beam emitted from a first light source unit and a second light beam emitted from a second light source unit to an object, the first light beam and the second light beam having different color temperatures from each other; and adjusting the first light source unit and the second light source unit such that the first light beam and the second light beam are mixed and irradiated to the object.

Preferably, the method further comprises: performing a dimming control operation on at least one of the first light source unit and the second light source unit.

[Advantageous Effects]

With a light projector and a method for controlling the same according to the present invention, light beams are irradiated to an object by use of a method of mixing two or more light sources having different color temperatures from each other and a dimming control method. This has the effect of irradiating light beams, having different color temperatures from each other, to the object. Further, according to the present invention, the light beams can be irradiated to the object up to a desired amount via regulation of the amount of light. As a result, the present invention can achieve an enhanced lighting effect and power-saving effect. Furthermore, the present invention can irradiate light beams even to a wide object by regulating light source units.

[Description of the Drawings]

The above and other objects, features and other advantages of the present

invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a perspective view illustrating a light projector according to a first embodiment of the present invention;

FIG. 2 is a block diagram illustrating the configuration of the light projector according to the first embodiment of the present invention;

FIG. 3 is a flow chart illustrating a method for controlling the light projector according to the first embodiment of the present invention;

FIGS. 4 and 5 are side views schematically illustrating the use of the light projector shown in FIG. 1;

FIG. 6 is a Table illustrating the variation of a color temperature of a light projector by a dimming control operation according to an embodiment of the present invention;

FIG. 7 is a perspective view illustrating a light projector according to a second embodiment of the present invention;

FIG. 8 is a front view illustrating a light projector according to a third embodiment of the present invention;

FIG. 9 is a front view illustrating a light projector according to a fourth embodiment of the present invention;

FIGS. 10 and 11 are plan views schematically illustrating the use of the light projector shown in FIG. 9; and

FIG. 12 is a front view illustrating a light projector according to a fifth embodiment of the present invention.

[Mode for Invention]

Hereinafter, preferred embodiments of a light projector according to the present invention will be described with reference to the accompanying drawings. In the drawings, the thickness of lines or the size of constituent elements may be

exaggerated for the clear understanding and convenience of description. Also, the terms used in the following description are terms defined taking into consideration the functions obtained in accordance with the present invention, and may be changed in accordance with the option of a user or operator or a usual practice. Therefore, the definitions of these terms should be determined based on the whole content of this specification.

FIG. 1 is a perspective view illustrating a light projector according to a first embodiment of the present invention.

Referring to FIG. 1, the light projector 100 according to the first embodiment of the present invention includes a first light source unit 110, a second light source unit 120, a case 130, and at least one angle regulator 140.

The first light source unit 110 includes a first light source 112 to emit a first light beam, and a first reflector 114.

In the present embodiment, the first light source 112 may include a natrium lamp to emit the first light beam. In this case, the natrium lamp included in the first light source 112 can emit a light beam having a color temperature of about 2,000K to 2,500K. Accordingly, the first light beam has a color temperature of about 2,000K to 2,500K.

The first reflector 114 serves to reflect the first light beam emitted from the first light source 112 in a predetermined direction. The first reflector 114 has an open surface having at least one of circular, elliptical, and polygonal cross sections. The first light source 112 and the first reflector 114 can be integrally coupled with each other, to be rotated together. In addition, other various alternative embodiments are also possible, and for example, the first light source 112 and the first reflector 114 may be coupled to the case 130 such that they can be rotated together.

The second light source unit 120 includes a second light source 122 to emit a second light beam, and a second reflector 124.

In the present embodiment, the second light source 122 may include a

metal halide lamp to emit the second light beam. In this case, the metal halide lamp included in the second light source 122 can emit a light beam having a color temperature of about 4,000K to 6,000K. Accordingly, the second light beam has a color temperature of about 4,000K to 6,000K.

The second reflector 124 serves to reflect the second light beam emitted from the second light source 122 in a predetermined direction. Similar to the first reflector 114, the second reflector 124 has an open surface having at least one of circular, elliptical, and polygonal cross sections. The second light source 122 and the second reflector 124 can be integrally coupled with each other, to be rotated together. In addition, other various alternative embodiments are also possible, and for example, the second light source 122 and the second reflector 124 may be coupled to the case 130 such that they can be rotated together.

In an embodiment, the second light source unit 120 and the first light source unit 110 may be aligned vertically. For example, the second light source unit 120 may be located above or below the first light source unit 110. Although the present embodiment exemplifies the second light source unit 120 located below the first light source unit 110, the present invention is not limited thereto. Other various alternative embodiments are possible, and for example, the second light source unit 120 may be located above the first light source unit 110. When the first light source unit 110 and the second light source unit 120 are aligned vertically, the first and second light source units 110 and 120 have substantially the same light distribution degree as each other in a vertical direction. As a result, it is easy to control the light projector 100 when light beams are irradiated in a vertical direction.

At least one of the first light source unit 110 and the second light source unit 120 is coupled to the case 130. Although the case 130 preferably has a hexahedral shape having both open surfaces, the present invention is not limited thereto, and other various alternative embodiments are possible. For example, the case 130 may have a polyhedral shape other than the hexahedral shape, or may

have a circular or elliptical shape.

The angle regulator 140 is used to rotatably couple at least one of the first and second light source units 110 and 120 to the case 130. The angle regulator 140 includes a coupling member 142 and a grip portion 144.

The coupling member 142 is coupled to the first light source unit 110 or the second light source unit 120 while being rotatably coupled to the case 130. The coupling member 142 has one end fixedly coupled to the first reflector 114 of the first light source unit 110 or the second reflector 124 of the second light source unit 120, and the other end rotatably coupled to the case 130. Consequently, the coupling member 142 can rotatably couple the first light source unit 110 or the second light source unit 120 to the case 130.

Preferably, the coupling member 142 is coupled to the case 130, to allow the first light source unit 110 or the second light source unit 120 to be rotated only when a predetermined or more force is applied to the first light source unit 110 or the second light source unit 120. Note that other various alternative embodiments are possible, and for example, the coupling member 142 may be interference fitted into the case 130, or may be screwed to the case 130.

The grip portion 144 is provided to manually rotate the coupling member 142. The grip portion 144 is coupled to the other end of the coupling member 142 rotatably coupled to the case 130. The grip portion 144 coupled to the other end of the coupling member 142 is exposed to the outside of the case 130. Accordingly, a user can easily rotate the first light source unit 110 or the second light source unit 120 by use of the grip portion 144. As a result, the first light source unit 110 or the second light source unit 120 is rotatable upward and downward, and can regulate an irradiating position of the first light beam or the second light beam.

Meanwhile, although the present embodiment illustrates two angle regulators 140 provided at both the first and second light source units 110 and 120, the present invention is not limited thereto, and other various alternative

embodiments are possible. For example, the angle regulator 140 is provided only at any one of the first and second light source units 110 and 120 such that only one of the first and second light source units 110 and 120 can be rotatably coupled to the case 130, and the remaining light source unit can be fixedly coupled to the case 130.

A supporting member 150 may be further provided underneath the bottom of the case 130. The supporting member 150 is configured to be seated on the ground or on the bottom of a structure. The supporting member 150 is rotatably coupled with the case 130, to rotatably support the case 130. Thereby, the case 130 is rotatable upward and downward, and can regulate an irradiating position of the first light beam or the second light beam.

FIG. 2 is a block diagram illustrating the configuration of the light projector according to the first embodiment of the present invention.

As shown in FIG. 2, the light projector 100 according to the first embodiment of the present invention includes a dimming control unit 160. The dimming control unit 160 is used to control the light-on/off and illumination of at least one of the first light source unit 110 and the second light source unit 120. The dimming control unit 160 includes a dimming controller 161 and at least one stabilizer 166.

The dimming controller 161 generates a dimming control signal for at least one of the first light source unit 110 and the second light source unit 120. The dimming controller 161 includes a light source 162, a main control portion 163, an input portion 164, and a signal sending portion 165.

The power source 162 performs a surge removal filtering operation, and also, generates a power voltage as a constant DC voltage upon receiving power through an external power line (not shown). The power voltage generated from the power source 162 is applied as an operating voltage for the main control portion 163 and the signal sending portion 165.

The main control portion 163 generates dimming control data for the

dimming control of at least one of the first light source unit 110 and the second light source unit 120 upon receiving the operating voltage from the power source 162, and controls the dimming control data such as pulse width modulation data on the basis of a key input signal inputted from the input portion 164, thereby regulating the light-on/off and illumination of the first light or the second light emitted from the first light source unit 110 or the second light source unit 120. Although the present embodiment exemplifies the use of pulse width modulation data, the present invention is not limited thereto, and other various alternative embodiments including a phase control method are possible.

Here, the input portion 164 includes a plurality of buttons to control the light-on/off, illumination-up/down, reset, etc. of the first light or the second light emitted from the first light source unit 110 or the second light source unit 120, thereby allowing the user to input the key input signal.

The signal sending portion 165 amplifies the dimming control data generated by the illumination control operation of the main control portion 163 into an analogue signal, to output a dimming control signal such as a pulse width modulation (PWM) signal, and sends the dimming control signal to the stabilizer 166.

The stabilizer 166 is used to control the light-on/off and illumination of at least one of the first light source unit 110 and the second light source unit 120 upon receiving the dimming control signal from the dimming controller 161. The stabilizer 166 includes a signal receiver 167, and a stabilizing portion 168.

The signal receiver 167 receives the dimming control signal from the signal sending portion 165 of the dimming controller 161, to operate the stabilizing portion 168 based on the dimming control signal. The stabilizing portion 168 controls the light-on/off and illumination of at least one of the first light source unit 110 and the second light source unit 120 upon receiving the dimming control signal through the signal receiver 167.

FIG. 3 is a flow chart illustrating a method for controlling the light

projector according to the first embodiment of the present invention. FIGS. 4 and 5 are side views schematically illustrating the use of the light projector shown in FIG. 1. FIG. 6 is a Table illustrating the variation of a color temperature of the light projector by a dimming control operation according to an embodiment of the present invention.

Hereinafter, the control method for the light projector 100 according to the first embodiment of the present invention will be described with reference to FIGS. 3 to 6.

In the control method S100 for the light projector according to the first embodiment of the present invention, as shown in FIGS. 3 and 4, the first light beam L_1 emitted from the first light source unit 110 and the second light beam L_2 emitted from the second light source unit 120 are irradiated onto an object 1 (S110). In this case, to irradiate the light beams onto the object 1, the light projector 100 can be regulated leftward and rightward by rotating motions of the supporting member 150, and also, can be regulated upward and downward by rotating the case 130 upward and downward about a junction between the case 130 and the supporting member 150.

Next, as shown in FIG. 5, the first light source unit 110 and the second light source unit 120 are regulated such that the first light beam L_1 and the second light beam L_2 are mixed and irradiated to the object 1. Here, the angle of the first light source unit 110 and the second light source unit 120 can be regulated by rotating the grip portions 144 provided, respectively, at the first and second light source units 110 and 120 until the first light beam L1 and the second light beam L2 overlap each other.

In this case, assuming that the first light beam L_1 emitted from the first light source unit 110 has a color temperature of 4,200K, and the second light beam L_2 emitted from the second light source unit 120 has a color temperature of 2,000K, the mixture of the first light beam L1 and the second light beam L2 to be irradiated to the object 1 has a color temperature of about 3,200K.

According to the light projector 100 of the present embodiment, light beams having three or more color temperatures can be realized by use of a single device having the two light source units 110 and 120. Consequently, it will be appreciated that a variety of light beams having different color temperatures from one another can be realized by use of only a single device.

The control method S100 for the light projector according to the first embodiment of the present invention further comprises an operation (S130) for performing a dimming control operation on at least one of the first light source unit 110 and the second light source unit 120 by use of the dimming control unit 160 (See FIG. 2).

With the dimming control operation, assuming that the illumination of the first light beam L_1 or the second light beam L_2 is 100% when the first light source 112 provided in the first light source unit 110 or the second light source 122 provided in the second light source unit 120 are regulated to have the maximum illumination, and is 0% when the first and second light sources 112 and 122 are turned off, the illumination of the first light beam L_1 or the second light beam L_2 can be regulated within a range from 0% to 100%.

By regulating the illumination of the first light beam L_1 or the second light beam L_2, the first light beam L_1 or the second light beam L_2 also undergoes a slight variation in color temperature. Accordingly, when the dimming control unit 160 performs a dimming control operation on at least one of the first light beam L_1 and the second light beam L_2 to thereby have a regulated illumination and color temperature, the mixture of the first light beam L_1 and the second light beam L_2 to be irradiated to the object 1, as shown in FIG. 6, has an illumination and color temperature corresponding to the regulated illumination and color temperature. As a result, the light projector 100 can realize various illuminations and color temperatures.

The light projector 100 according to the first embodiment of the present invention, as described above, is configured to irradiate light beams to the object

by a method of mixing two or more light sources and a dimming control method, thereby being capable of freely realizing various light beams having different illuminations and color temperatures from one another, and being capable of adjusting the amount of light beams so as to irradiate a required amount of light to the object. As a result, the light projector 100 can achieve a high lighting effect and power-saving effect.

Although not shown in the present embodiment, in the case where the respective light source units emit light beams having different color temperatures from one another, and more particularly, in the case where a light projector has three light source units including a first one emitting a Red-color light beam, a second one emitting a Green-color light beam, and a third one emitting a Blue-color light beam, a variety of light beams having several different colors can be realized by use of only a single device by a method of mixing two or more light sources and a dimming control method. This has the effects of providing an object with an enhanced decorative lighting effect.

Meanwhile, it will be appreciated that the above described light projector merely corresponds to one embodiment of the present invention, and other various alternative embodiments are possible.

FIG. 7 is a perspective view illustrating a light projector according to a second embodiment of the present invention.

Hereinafter, the light projector according to the second embodiment of the present invention will be described with reference to FIG. 7.

Here, since the same reference numerals as those of the above described drawings have the same or similar functions as them, a repeated description thereof will be omitted for the convenience of description.

In the light projector 200 according to the second embodiment of the present invention, a first reflector 214 provided in a first light source unit 210 and a second reflector 224 provided in a second light source unit 220 have a polyhedral shape having a polygonal open surface. With this configuration of the first and

second reflectors 214 and 224, a first light source 212 provided in the first light source unit 210 and a second light source 222 provided in the second light source unit 220 may have an extended vertical or horizontal length as compared to the above described first embodiment.

The light projector 200 according to the second embodiment can achieve an advantage of allowing the first and second light source units 210 and 220 to more efficiently emit and amplify lights beams to be irradiated to an object.

FIG. 8 is a front view illustrating a light projector according to a third embodiment of the present invention.

Hereinafter, the light projector according to the third embodiment of the present invention will be described with reference to FIG. 8.

Here, since the same reference numerals as those of the above described drawings have the same or similar functions as them, a repeated description thereof will be omitted for the convenience of description.

The light projector 300 according to the third embodiment of the present invention, as shown in FIG. 8, includes angle regulators 340 each having the coupling member 142 and a drive unit 344.

The drive unit 344 is provided to rotate the coupling member 142 instead of the grip portion (designated by reference numeral 144, See FIG. 1) of the above described first embodiment. Preferably, the drive unit 344 may be provided on the case 130. The drive unit 344 includes a motor to provide a rotating force, a gear to transmit the rotating force of the motor to the coupling member 142, etc. Detailed configurations and operations of the drive unit 344 are well known to those skilled in the art, and a detailed description thereof will be omitted.

The light projector 300 according to the third embodiment can achieve an advantage of easily rotating the first and second light source units 110 and 120 by use of the rotating force of the motor, and consequently, easily regulating the angle of the first light source unit 110 and the second light source unit 120.

FIG. 9 is a front view illustrating a light projector according to a fourth

embodiment of the present invention.

Hereinafter, the light projector 400 according to the fourth embodiment of the present invention will be described with reference to FIG. 9.

Here, since the same reference numerals as those of the above described drawings have the same or similar functions as them, a repeated description thereof will be omitted for the convenience of description.

In the light projector 400 according to the fourth embodiment of the present invention, as shown in FIG. 9, a first light source unit 410 and a second light source unit 420 are aligned horizontally parallel to each other. With the horizontal arrangement of the first and second light source units 410 and 420, the first and second light source units 410 and 420 have substantially the same light distribution in a horizontal direction thereof. As a result, it is easy to control the light projector 400 when light beams are irradiated in a horizontal direction.

In the present embodiment, angle regulators 440 are provided to rotatably couple the first light source unit 410 and the second light source unit 420 to a case 430 in a horizontally rotatable manner. For this, a coupling member 442 of each angle regulator 440 has one end fixedly coupled to the top of the first reflector 114 of the first light source unit 410 or the second reflector 124 of the second light source unit 420, and the other end rotatably coupled to the top of the case 430. The angle regulator 440 further includes a grip portion 444 coupled to the other end of the coupling member 442. Preferably, the grip portion 444 is disposed on the case 430.

FIGS. 10 and 11 are plan views schematically illustrating the use of the light projector shown in FIG 9.

Hereinafter, a control method for the light projector 400 according to the fourth embodiment of the present invention will be described in brief with reference to FIGS. 10 and 11.

First, as shown in FIG. 10, the first light beam L_1 emitted from the first light source unit 410 and the second light beam L_2 emitted from the second light

source unit 420 are irradiated to the object 1. In this case, to irradiate the light beams to the object 1, the first and second light source units 410 and 420 can be regulated leftward and rightward by rotating the supporting member 150, and also, can be regulated upward and downward by rotating the case 430 about a junction with the supporting member 150.

Next, as shown in FIG. 11, the first light source unit 410 and the second light source unit 420 are regulated in angle by being rotated leftward and rightward such that the first light L_1 and the second light L_2 are mixed and irradiated to the object 1. The angle of the first light source unit 410 and the second light source unit 420 can be regulated by rotating the grip portions 444 provided, respectively, at the first and second light source units 410 and 420 until the first light beam L_1 and the second light beam L_2 overlap each other.

Thereafter, a dimming control operation for at least one of the first light source unit 410 and the second light source unit 420 may be additionally performed. Since the dimming control operation can be performed in the same manner as the above described first embodiment, a detailed description thereof will be omitted.

FIG. 12 is a front view illustrating a light projector according to a fifth embodiment of the present invention.

Hereinafter, the light projector 500 according to the fifth embodiment of the present invention will be described with reference to FIG. 12.

Here, since the same reference numerals as those of the above described drawings have the same or similar functions as them, a repeated description thereof will be omitted for the convenience of description.

The light projector 500 according to the fifth embodiment of the present invention includes a third light source unit 570 disposed horizontally parallel to at least one of the first light source unit 110 and the second light source unit 120. The third light source unit 570 is disposed on a case 530 in a horizontally rotatable manner, and emits a light beam having a different color temperature from that of at

least one of the first and second light beams emitted from the first and second light source units 110 and 120. The third light source unit 570 includes a third light source 572 to emit the third light beam, and a third reflector 574 to reflect the third light beam emitted from the third light source 572.

More specifically, for example, when the third light source unit 570 is disposed horizontal to the second light source unit 120, the third light beam emitted from the third light source unit 570 may have the same color temperature as that of the first light beam, or may have a different color temperatures from those of the first and second light beams.

When the third light beam has the same color temperature as that of the first light beam, the light projector 500 according to the present embodiment can adjust the angle of the first light source unit 110 and the second light source unit 120 or the angle of the second light source unit 120 and the third light source unit 570 selectively. When adjusting the angle of the first and second light source units 110 and 120, the light projector 500 can be controlled by the same method as the light projector 100 according to the first embodiment (See FIGS. 4 and 5). Also, when adjusting the angle of the second and third light source units 120, the light projector 500 can be controlled by the same method as the light projector 400 according to the fourth embodiment (See FIGS. 10 and 11).

Meanwhile, when the third light beam has a different color temperature from those of the first and second light beams, the light projector 500 according to the present embodiment can realize the mixture of the second and third light beams as well as the mixture of the first and second light beams. As a result, in addition to the above described advantage, the present embodiment can realize light beams having more various color temperatures.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

[CLAIMS]

[Claim 1] A light projector comprising:

a first light source unit including a first light source to emit a first light beam, and a first reflector to reflect the first light beam; and

a second light source unit including a second light source to emit a second light beam having a different color temperature from that of the first light beam, and a second reflector to reflect the second light beam.

[Claim 2] The light projector according to claim 1, wherein at least one of the first reflector and the second reflector has at least one of circular, elliptical, and polygonal shapes.

[Claim 3] The light projector according to claim 1, further comprising:

a case receiving at least one of the first light source unit and the second light source unit coupled thereto; and

an angle regulator to rotatably couple at least one of the first light source unit and the second light source unit to the case.

[Claim 4] The light projector according to claim 3, wherein the angle regulator comprises:

a coupling member fixed to the first light source unit or the second light source unit and rotatably coupled to the case; and

a grip portion to rotate the coupling member.

[Claim 5] The light projector according to claim 3, wherein the angle regulator comprises:

a coupling member fixed to the first light source unit or the second light source unit and rotatably coupled to the case; and

a drive unit to rotate the coupling member.

[Claim 6] The light projector according to claim 1, further comprising:

a dimming control unit to control the light-on/off and illumination of at least one of the first light source unit and the second light source unit.

[Claim 7] The light projector according to claim 6, wherein the dimming control unit comprises:

a dimming controller to generate a dimming control signal of at least one of the first light source unit and the second light source unit; and

a stabilizer to control the light-on/off and illumination of at least one of the first light source unit and the second light source unit upon receiving the dimming control signal from the dimming controller.

[Claim 8] The light projector according to claim 1, wherein the first light source unit and the second light source unit are arranged vertically.

[Claim 9] The light projector according to claim 1, wherein the first light source unit and the second light source unit are arranged horizontally.

[Claim 10] The light projector according to claim 1, wherein the first light source unit has a color temperature of 2,000K to 2,500K, and the second light source unit has a color temperature of 4,000K to 6,000K.

[Claim 11] A method for controlling a light projector comprising:

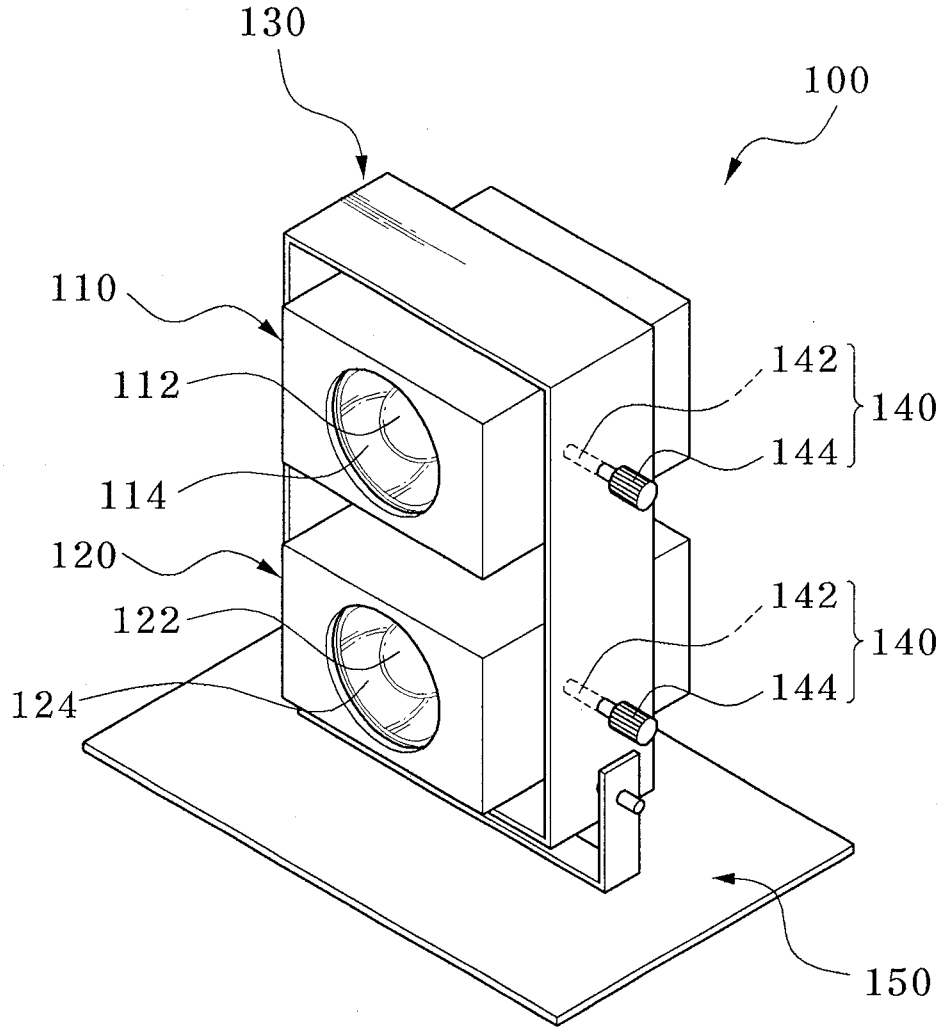
irradiating a first light beam emitted from a first light source unit and a second light beam emitted from a second light source unit to an object, the first light beam and the second light beam having different color temperatures from each other; and

adjusting the first light source unit and the second light source unit such that the first light beam and the second light beam are mixed and irradiated to the object.

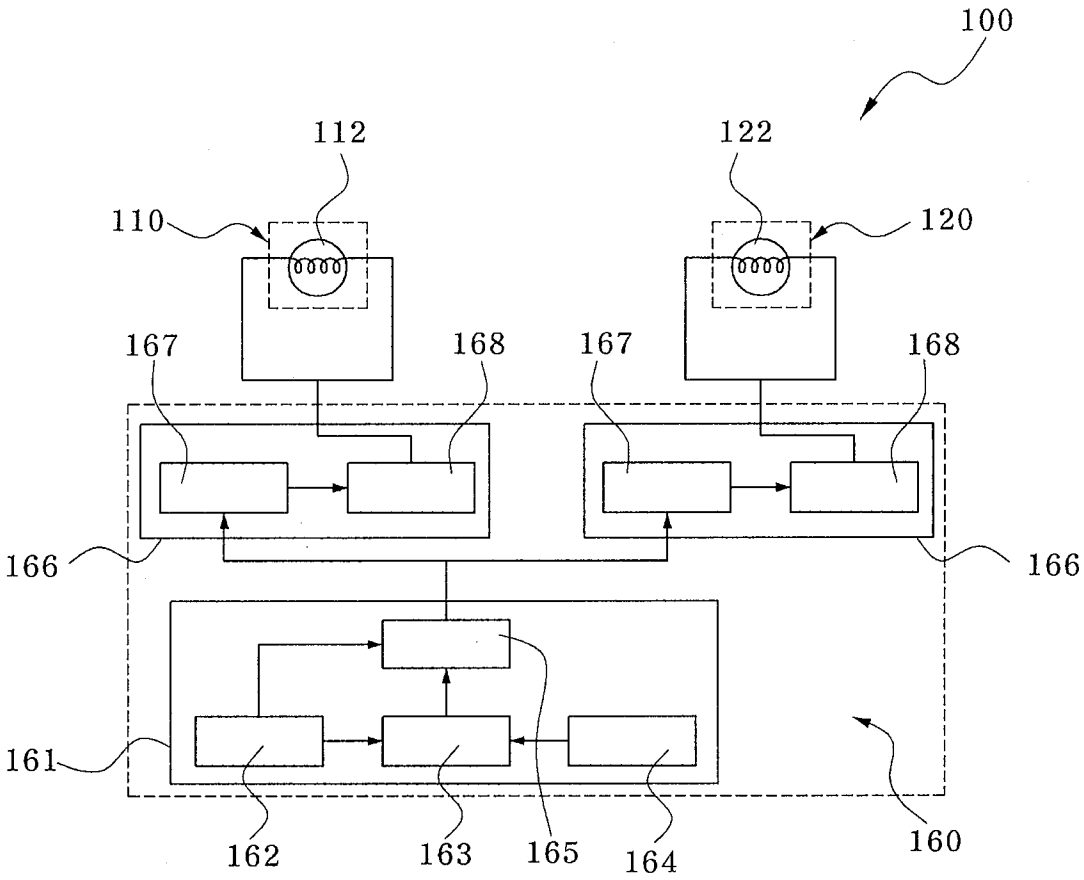
[Claim 12] The method according to claim 11, further comprising:

performing a dimming control operation on at least one of the first light source unit and the second light source unit.

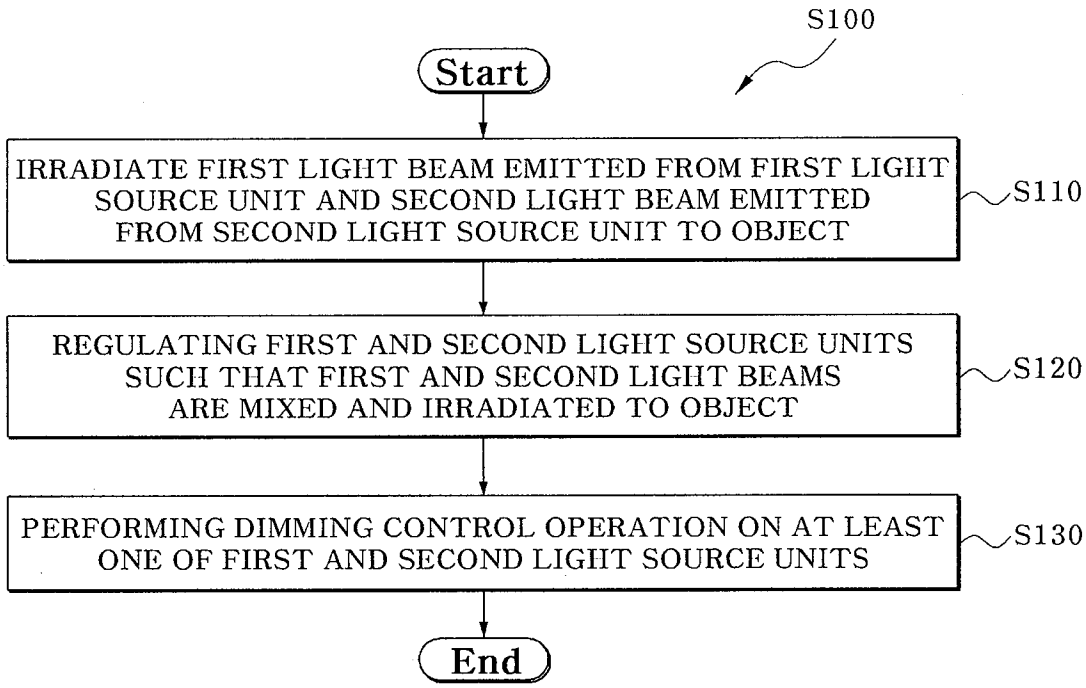
【Figure 1】



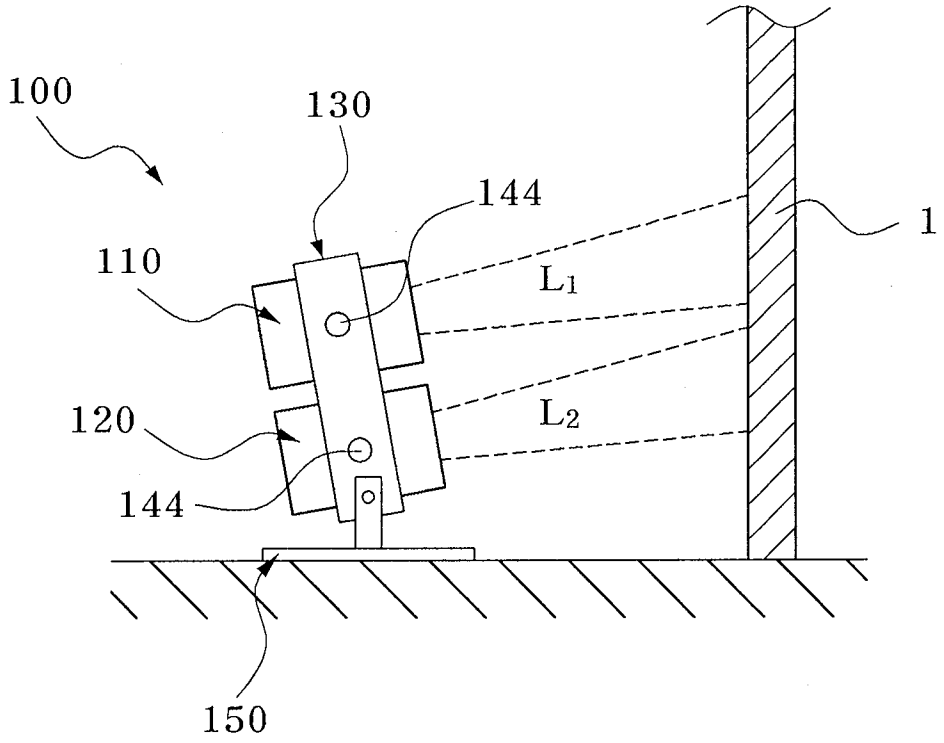
【Figure 2】


100
112
122
110
120
167
168
167
168
166
166
161
162
163
165
164
160

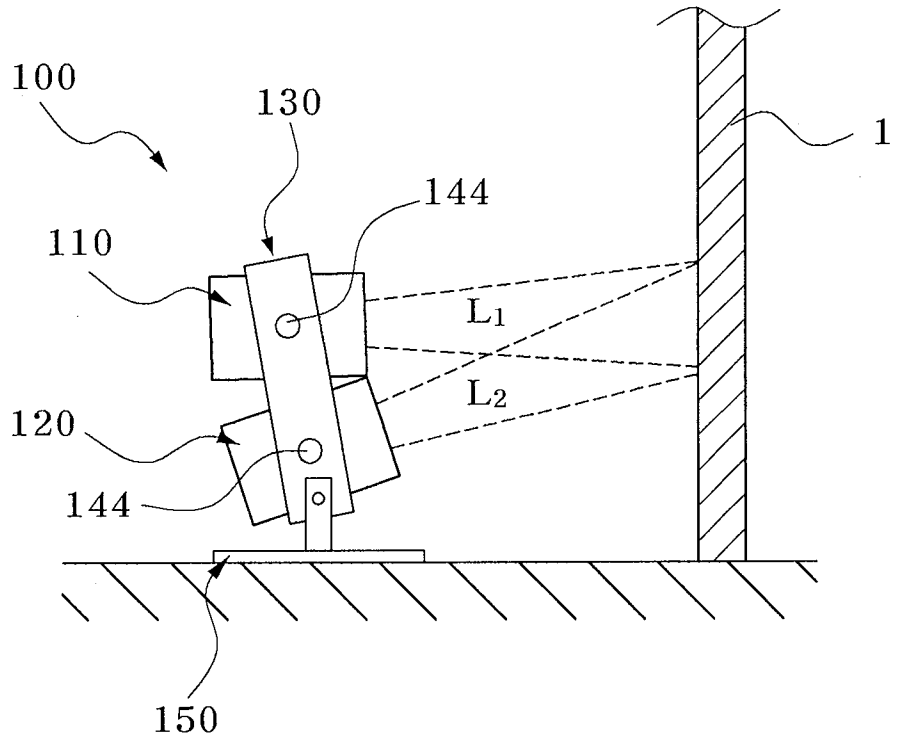
【Figure 3】


S100
Start
IRRADIATE FIRST LIGHT BEAM EMITTED FROM FIRST LIGHT SOURCE UNIT AND SECOND LIGHT BEAM EMITTED FROM SECOND LIGHT SOURCE UNIT TO OBJECT
S110
REGULATING FIRST AND SECOND LIGHT SOURCE UNITS SUCH THAT FIRST AND SECOND LIGHT BEAMS ARE MIXED AND IRRADIATED TO OBJECT
S120
PERFORMING DIMMING CONTROL OPERATION ON AT LEAST ONE OF FIRST AND SECOND LIGHT SOURCE UNITS
S130
End

【Figure 4】



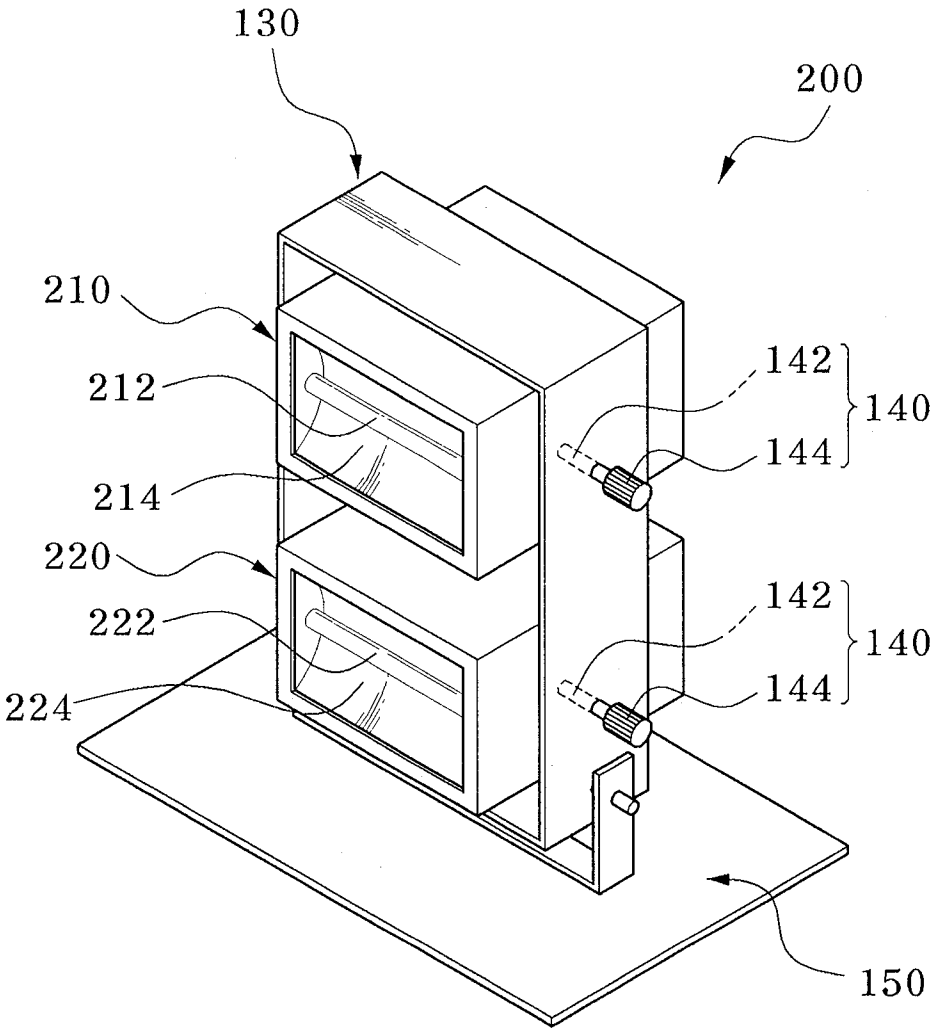
【Figure 5】



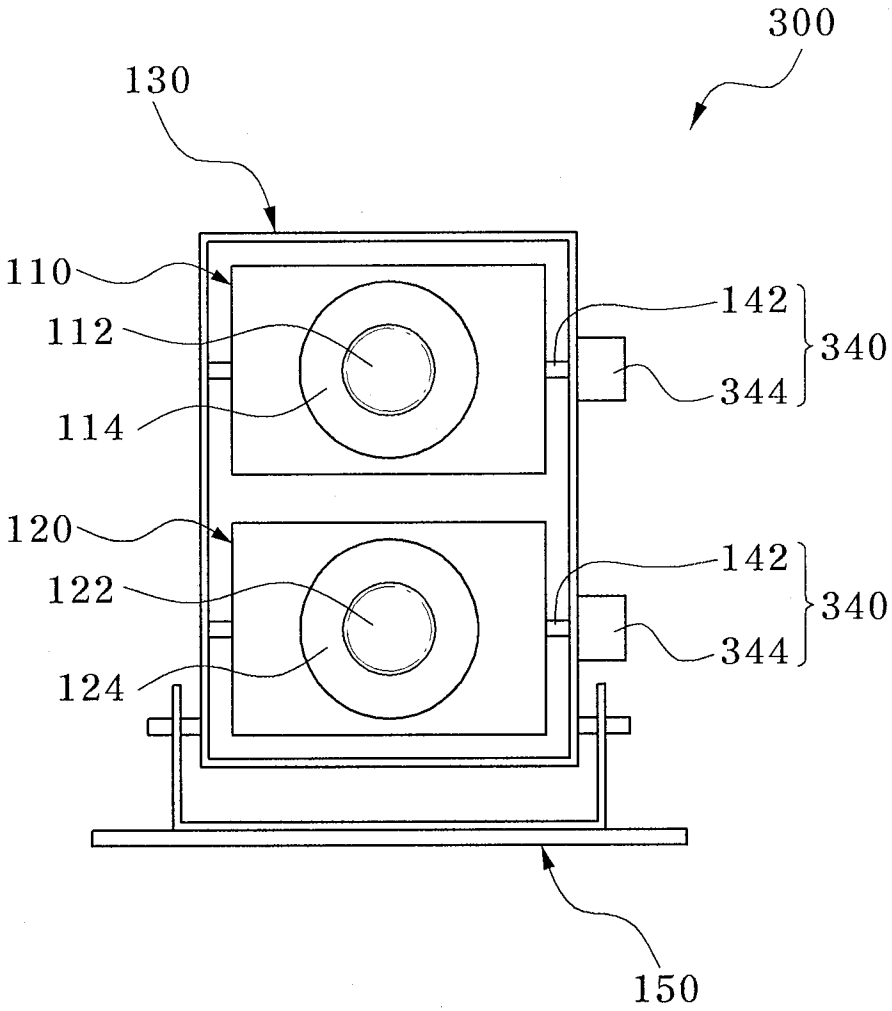
【Figure 6】

FIRST LIGHT BEAM (4200K)	SECOND LIGHT BEAM (2200K)	COLOR TEMPERATURE OF MIXED LIGHT BEAMS
100%	0%(off)	4200K
100%	50%	4000K
100%	60%	3800K
100%	70%	3600K
100%	80%	3400K
100%	90%	3300K
100%	100%	3200K
90%	100%	3100K
80%	100%	3000K
70%	100%	2800K
60%	100%	2600K
50%	100%	2400K
0%(off)	100%	2200K

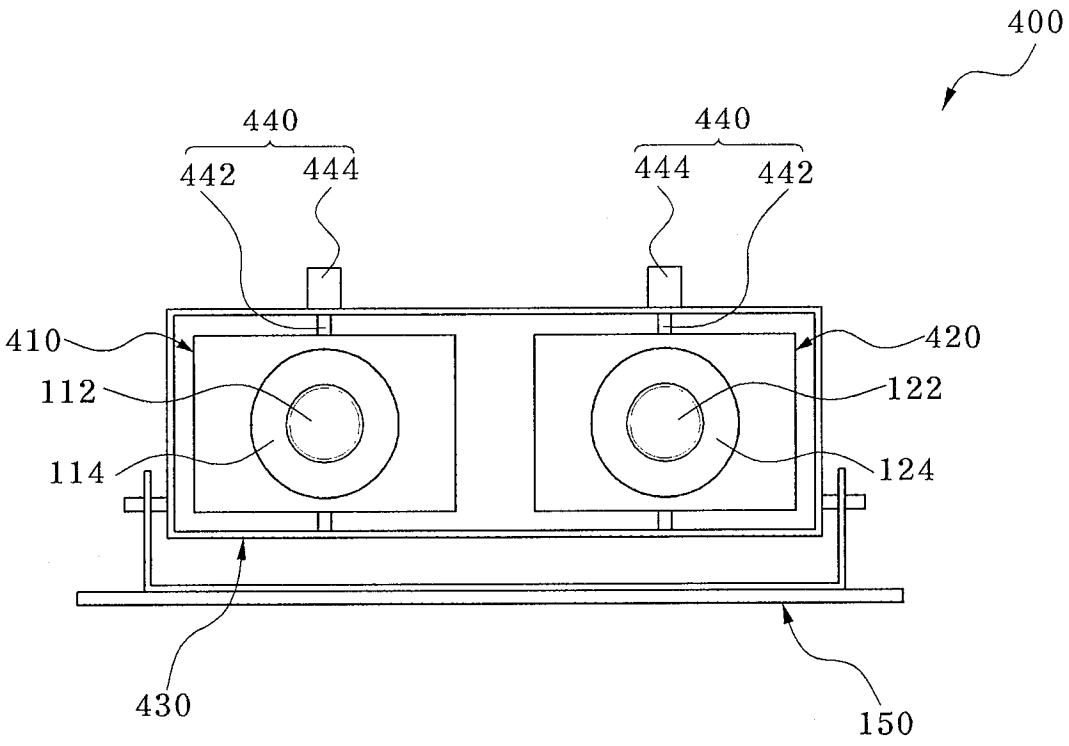
【Figure 7】



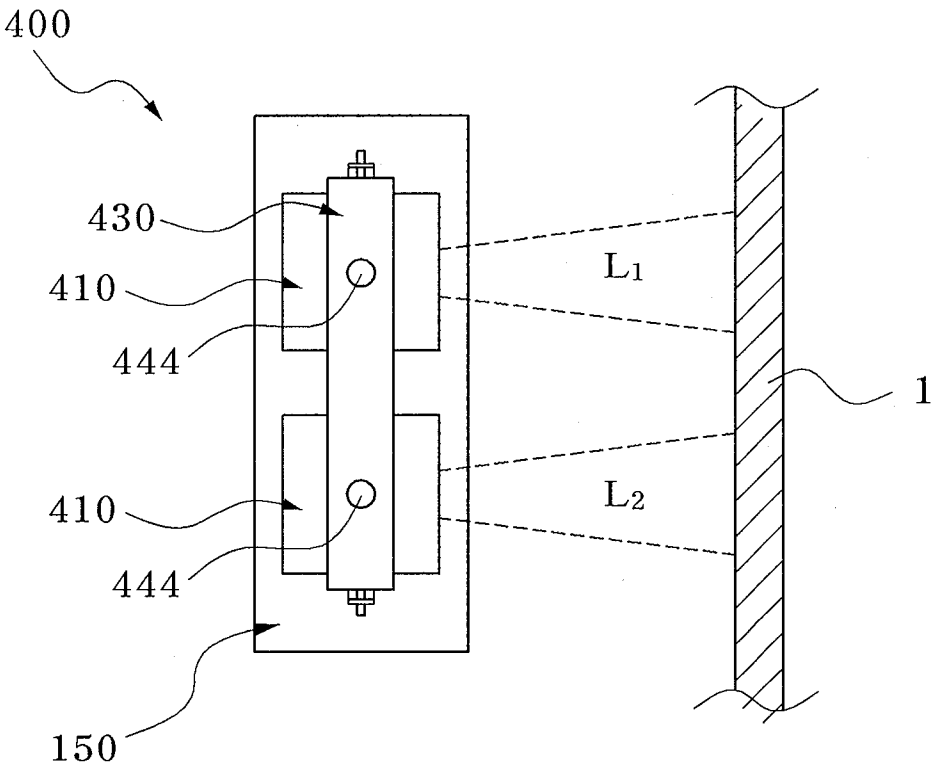
【Figure 8】



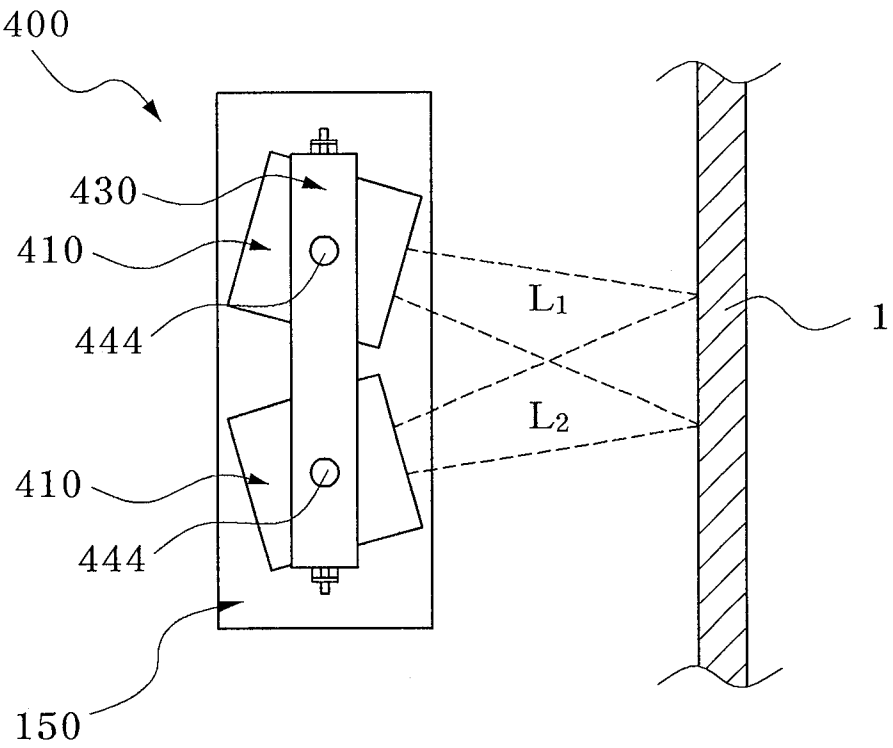
【Figure 9】



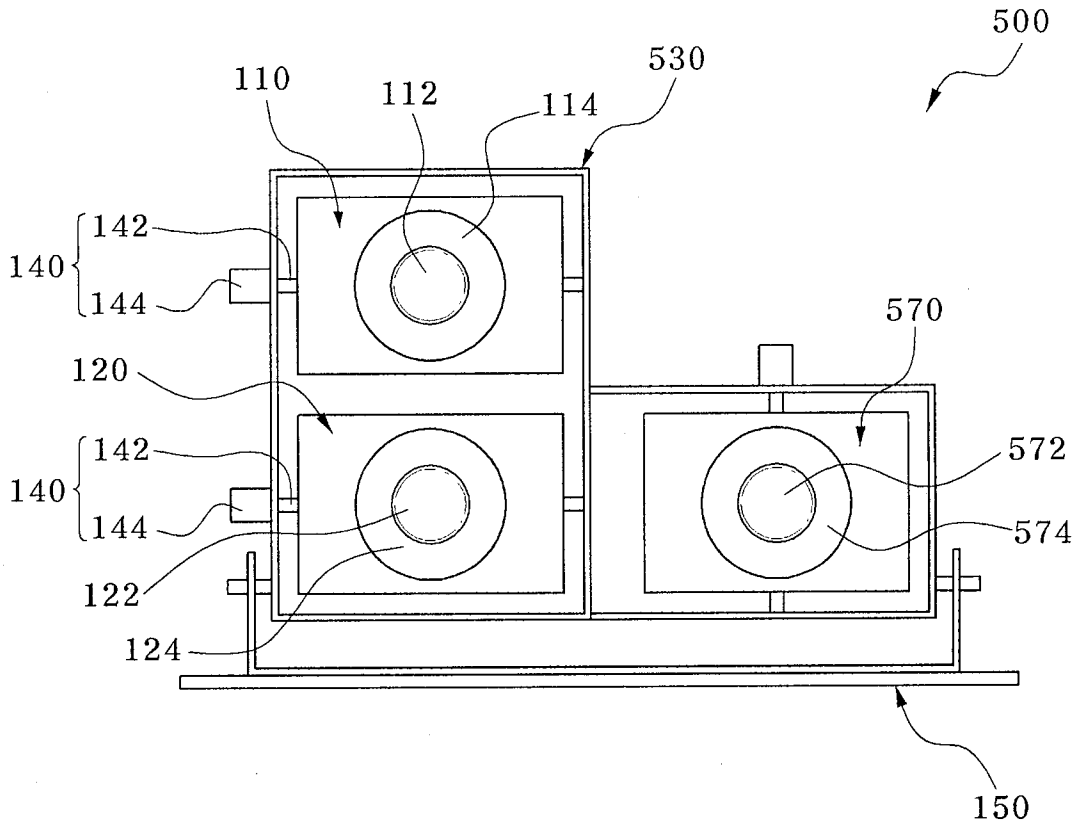
【Figure 10】



【Figure 11】



【Figure 12】


500
530
110
112
114
142
140
144
570
120
142
140
144
572
574
122
124
150

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2007/006368

A. CLASSIFICATION OF SUBJECT MATTER

F21S 10/00(2006.01)i, F21V 14/00(2006.01)i

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)

IPC 8 : F21S

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

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

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

PAJ, FPD, USPAT, eKIPASS, IEEE, YAHOO, GOOGLE , Keyword: "spot light, flood light, dimming, color temperature"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US7070293 B2 (Herb Seymour) 04 July 2006 (See Abstract, Figs.1-4, column 2 line 40 - column 5 line 5)	1-10 11-12
A Y	US 4535394 A(MICHAEL A. DUGRE) 13 August 1985 (See Abstract, Fig.1, column 1 line 54- column 4 line 16)	1-10 11-12
A	US 2005-253533 A1 (IHOR A. LYS et al) 17 November 2005 (See Abstract, Figs.1-2, paragraph [0005]-[0009], [0092]-[0107])	1-12
A	KR 20-0379464 Y1 (Jang Sung Jin) 18 March 2005 (See Abstract, Figs.1-3, page 3)	1-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
04 SEPTEMBER 2008 (04.09.2008)	**04 SEPTEMBER 2008 (04.09.2008)**

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Sun Dong Guk

Telephone No. 82-42-481-8248

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2007/006368

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7070293 B2	04.07.2006	US 2006-018112 AA	26.01.2006
US 4535394 A	13.08.1985	NONE	
US 2005-253533 A1	17.11.2005	AU 2003-237827 A1	11.11.2003
		EP 1502483 A1	02.02.2005
		JP 2005-524960 T2	18.08.2005
		US 7038399 B2	02.05.2006
		US 7358679 B2	15.04.2008
		US 2004-212321 A1	28.10.2004
		US 2006-208667 AA	21.09.2006
		WO 2003-096761 A1	20.11.2003
KR 20-0379464 Y1	18.03.2005	NONE	