(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 919 811 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
08.12.2021 Bulletin 2021/49

(21) Application number: **21708102.5**

(22) Date of filing: **03.02.2021**

(51) Int Cl.:
F21V 14/04 *(2006.01)* ***F21V 7/00*** *(2006.01)*
F21V 17/10 *(2006.01)* ***F21Y 115/10*** *(2016.01)*

(86) International application number:
PCT/KR2021/001438

(87) International publication number:
WO 2021/215633 (28.10.2021 Gazette 2021/43)

(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
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **23.04.2020 KR 20200049083**

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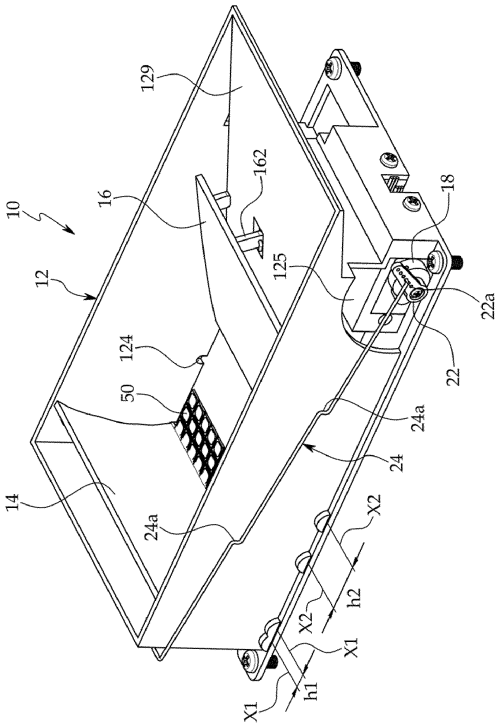
(54) DUAL REFLECTOR CONTROL MODULE FOR LED LIGHTS AND FLOODLIGHT USING SAME

(57) The present disclosure provides a dual reflector adjusting module for an LED lamp and a lighting lamp implement using of the same configured to individually rotate and control a pair of reflectors, thus making it possible to change a lighting direction and adjust a size of a lighting area.

[FIG. 1]



EP 3 919 811 A1

Description

TECHNICAL FIELD

[0001] The present disclosure relates to a dual reflector adjusting module for an LED lamp and a lighting lamp implement using of the same, in particular to, a dual reflector adjusting module for an LED lamp and a lighting lamp implement using of the same capable of implementing an optimum uniformity factor by forming a light distribution curve suitable for the object to be projected, obtaining four each different light distribution curves through four light transmitting holes in one light projector, and making a convenient application by overcoming a limit of vertical illuminance of 10 lux through a size adjustment and direction of a lighting area in any site condition by controlling an angle of the front and rear reflectors according to the standards of the Light Pollution Prevention Act.

BACKGROUND ART

[0002] The known LED asymmetric lighting method executes lighting by allowing light generated from an LED to be emitted through an asymmetric reflector facing each other. In this case, lighting is provided only in the area of a limited size by the inherent radius of curvature of a reflector. Accordingly, there is an inconvenience such that it is impossible to adjust a lighting direction and a lighting area to be large or small tailored for the installation situation of LED lighting equipment.

[0003] As a background technology of the present disclosure, as Korean Patent No. 10-2030931 entitled 'Glare-Free Asymmetry Floodlighting Reflector and Flood Light Using Same' has been proposed. This provides an asymmetry floodlighting reflector which has an asymmetrical reflection structure to eliminate glare during illumination at night and increases illuminance and luminance for a wide floodlighting area, and a flood light using the same. Herein, the asymmetry floodlighting reflector comprises a first reflective curved portion and a second reflective curved portion asymmetrical to a side facing the first reflective curved portion. However, in the background technology, since the first and second reflective curved portions are fixedly installed, it is difficult to form a light distribution curve suitable for the object to be projected, and an angle cannot be controlled, so there is a limitation in applying it to various site conditions.

DISCLOSURE OF INVENTION

TECHNICAL PROBLEM

[0004] The present disclosure provides a dual reflector adjusting module for an LED lamp and a lighting lamp implement using of the same capable of implementing an optimum uniformity factor by forming a light distribution curve suitable for the object to be projected, obtaining four each different light distribution curves through four light transmitting holes in one light projector, and making a convenient application by overcoming a limit of vertical illuminance of 10 lux through a size adjustment and direction of a lighting area in any site condition by controlling an angle of the front and rear reflectors according to the standards of the Light Pollution Prevention Act.

SOLUTION TO PROBLEM

[0005] A dual reflector adjusting module for an LED lamp according to a suitable embodiment of the present disclosure includes: a reflector housing having a light transmitting hole opened to one side; a rear reflector hinge combined to be rotatable to one side of the reflector housing; a front reflector hinge combined to be rotatable to another side of the reflector housing to face the rear reflector; a first servomotor and a second servomotor installed on parallel on the reflector housing; a first arm connected to a rotation shaft of the first servomotor; a rear reflector drive link having one end connected to the first arm and the other end connected to the rear reflector; a second arm connected to a rotation shaft of the second servomotor; and a front reflector drive link having one end connected to the second arm and the other end connected to the front reflector.

[0006] In addition, the first arm is formed with a plurality of rear reflector drive link connection holes formed at regular intervals so as to increase or decrease the rotation angle of the rear reflector, and one end of the rear reflector drive link is inserted into any one of the plurality of rear reflector drive link connection holes, and is hinge connected.

[0007] In addition, the rear reflector drive link is made of a wire rod, and has a bent stepped portion formed by bending the portion twice at regular intervals in the longest straight section to prevent buckling during operation and reinforce flexural rigidity.

[0008] In addition, the second arm is formed with a plurality of front reflector drive link connection holes formed at regular intervals to increase or decrease the rotation angle of the front reflector.

[0009] In addition, the rear reflector and the front reflector are installed in a mutually asymmetrical shape.

[0010] In addition, the reflector housing includes: a housing floor plate formed in a rectangular strip shape having an opening for arranging an LED in communication with a light transmitting hole; a housing wall stood at a predetermined height along the housing floor plate; one or more first hinge grooves formed to hinge combine a rear reflector to a lower surface of the housing floor plate; one or more second hinge grooves formed at a certain distance from the first hinge groove to hinge combine a front reflector to a lower surface of the housing floor plate; and a servomotor mount installed with a heat dissipation opening opened downward on the housing floor plate side to install the first servomotor and the second servomotor.

ADVANTAGEOUS EFFECTS OF INVENTION

[0011] According to the dual reflector adjusting module for an LED lamp and a lighting lamp implement using of the same of the present disclosure, the two front and rear reflectors can be individually rotated and controlled to adjust a lighting direction and an increase or decrease of a lighting area, thus implementing an optimum uniformity factor by forming a light distribution curve suitable for the object to be projected.

[0012] In addition, four each different light distribution curves can be obtained through four light transmitting holes in light projector, and a convenient application can be made by overcoming a limit of vertical illuminance of 10 lux through a size adjustment and direction of a lighting area in any site condition by controlling an angle of the front and rear reflectors according to the standards of the Light Pollution Prevention Act.

[0013] In addition, since the servomotor mount is installed in the reflector housing, it is easy to install the first servomotor and the second servomotor, and the lifespan is improved by the heat generation effect of the first servomotor and the second servomotor.

[0014] In addition, the rotation angles of the first and second front reflectors can be variously controlled in the manner that a drive link is hinge connected to any one of the holes formed in a plurality of the first arm and the second arm.

[0015] In addition, since the rear reflector drive link has a structure that is bent in multiple steps, buckling is prevented even if it is configured with a long wire rod, thereby increasing the reliability of the rotation operation of the rear reflector.

BRIEF DESCRIPTION OF DRAWINGS

[0016] The following drawings attached in this specification illustrate preferred embodiments of the present disclosure and are provided together with the detailed description of the present disclosure so that the technical spirit of the present disclosure may be better understood. Therefore, the present disclosure should not be limited to what is illustrated in the attached drawings.

FIG. 1 is a perspective view of a dual reflector adjusting module for an LED lamp according to an embodiment of the present disclosure.

FIG. 2 is an exploded perspective view of FIG. 1.

FIG. 3 is a front view of FIG. 1.

FIG. 4 is a rear view of FIG. 3.

FIG. 5 is a rear perspective view of a reflector housing illustrated in FIG. 1.

FIG. 6a is an exploded view showing a state in which three rear reflectors and three front reflectors is selectively installed in the reflector housing illustrated in FIG. 1.

FIG. 6b is an exemplary view showing a state in which three rear reflectors and three front reflectors illustrated in FIG. 6A is installed in a reflector housing.

FIGS. 7a and 7b are perspective and front views of a dual reflector adjusting module for an LED lamp according to another embodiment of the present disclosure.

FIG. 8a is a state diagram in which four dual reflector adjusting modules for an LED lamp according to an embodiment of the present disclosure are arranged.

FIG. 8b is a perspective view of a lighting lamp implement to which the four dual reflector adjusting modules for an LED lamp illustrated in FIG. 8a is applied.

FIGS. 9a to 9f are light distribution diagrams according to angle control of the front and rear reflectors according to the present disclosure.

FIG. 9a shows a time when the front reflector is varied on one side by 5 degrees;

FIG. 9b shows a time when the front reflector is varied on one side by 10 degrees;

FIG. 9c shows a time when the rear reflector is varied on a boundside by 5 degrees;

FIG. 9d shows a time when the rear reflector is varied on a boundside by 10 degrees;

FIG. 9e shows a time when the front and rear reflectors are varied on both sides by 5 degrees; and

FIG. 9f shows a time when the front reflector and the rear reflector are varied on both sides by 10 degrees, respectively.

DESCRIPTION OF EMBODIMENTS

[0017] Hereinafter, the present disclosure is described in detail with reference to exemplary embodiments illustrated in the accompanying drawings, but the proposed exemplary embodiments are exemplified for a clear understanding of the present disclosure and the present disclosure is not limited thereto.

[0018] The dual reflector adjusting module 10 for an LED lamp according to an embodiment of the present disclosure is provided with a reflector housing 12 having a light transmitting hole 12a opened to one side as shown in FIGS. 1 to 5. The reflector housing 12 includes a housing floor plate 121 formed in a rectangular strip shape having an opening 121a for arranging an LED in communication with a light transmitting hole 12a, a housing wall 122 stood at a predetermined height along a housing floor plate 121, one or more first hinge grooves 123 formed to hinge combine a rear reflector 14 to a lower surface of a housing floor plate 121, one or more second hinge grooves 124 formed at a certain distance from the first hinge groove 123 to hinge combine a front reflector 16 to a lower surface of a housing floor plate (121); and a servomotor mount 125 on a housing floor plate 121 side to install a first servomotor 18 and a second servomotor 20.

[0019] In this embodiment, the first hinge groove 123 is formed in two places with a constant shaft distance h1,

and the second hinge groove 124 is formed in two places with a shaft distance h2 different from the shaft distance h1. However, the present disclosure is not limited to such places, and may be formed at places more than that places or at one place as shown in FIGS. 7a and 7b.

[0020] The rear reflector 14 hinge combined to be rotatable to one side of the reflector housing 12 is provided. The rear reflector 14 is installed by being hinge combined with the first hinge groove 123 formed on the lower surface of the housing floor plate 121. Accordingly, the rear reflector 14 is rotatable with the first hinge groove 123 as a first rotation shaft X1. The radius of curvature R1 of the rear reflector 14 is formed smaller than the radius of curvature R2 of the front reflector 16 and is installed in a mutually asymmetrical shape. When installed in this way, constructive interference occurs to increase the illuminance and brightness of the corresponding lighting area. The rear reflector 14 and the front reflector 16 may have a radius of curvature on either side or both may be installed with a flat reflective surface without curvature.

[0021] In this embodiment, the rear reflector 14 is provided with three in number having reflection angles of 30°, 48°, and 60° of which any one of them is selected and is installed so that the rotation angle may be adjusted by selecting any one place of the first hinge grooves 123 of two places. The reflection angle of the rear reflector 14 is not limited to this embodiment.

[0022] The front reflector 16 hinge combined to be rotatable to the other side of the reflector housing 12 facing the rear reflector 14 is provided. The front reflector 16 is installed by being hinge combined with the second hinge groove 124 formed on the lower surface of the housing floor plate 121. Accordingly, the front reflector 16 is rotatable with the second hinge groove 124 as the second rotation shaft X2.

[0023] In this embodiment, the front reflector 16 is provided with three in number having reflection angles of 30°, 48°, and 60° of which any one of them is selected and is installed so that the rotation angle may be adjusted by selecting any one of the second hinge grooves 123 of two places. The reflection angle of the front reflector 16 is not limited to this embodiment.

[0024] The first servomotor 18 and the second servomotor 20 are installed on parallel on the reflector housing 12 side. In this embodiment, the first servomotor 18 and the second servomotor 20 are installed on parallel on a servomotor mount 125 installed on the housing floor plate 121 side of the reflector housing 12.

[0025] A first arm 22 for rotationally driving the rear reflector 14 is connected to the rotation shaft of the first servomotor 18 via the rear reflector drive link 24. A plurality of rear reflector drive link connection holes 22a formed at regular intervals are formed to increase or decrease the rotation angle of the rear reflector 14 in the first arm 22. One end of the rear reflector drive link 24 is hinge connected by being inserted into any one of the plurality of rear reflector drive link connection holes 22a. Accordingly, the rear reflector drive link 24 is hinge connected by selecting any one of the plurality of rear reflector drive link connection holes 22a, thereby controlling the adjustment of the rotation angle of the rear reflector 14 in various ways.

[0026] The rear reflector drive link 24 has one end connected to the first arm 22 and the other end connected to the rear reflector 14. The rear reflector drive link 24 is composed of a long wire rod, and it is preferable to have a bent stepped portion 24a formed by bending the portion twice at regular intervals in the longest straight section to prevent buckling during operation and reinforce flexural rigidity. In the case of configuring the rear reflector drive link 24 with a long wire rod, it is advantageous to manufacture the lighting lamp implement 100 as shown in FIG. 8a by arranging the dual reflector adjusting module 10 for an LED lamp on parallel in close proximity as shown in FIG. 8b.

[0027] A second arm 26 for rotationally driving the front reflector 16 is connected to the rotation shaft of the second servomotor 20 via the front reflector drive link 28. A plurality of front reflector drive link connection holes 26a formed at regular intervals are formed to increase or decrease the rotation angle of the front reflector 16 in the second arm 26. Accordingly, the front reflector drive link 28 is hinge connected by selecting any one of the plurality of front reflector drive link connection holes 26a, thereby controlling the adjustment of the rotation angle of the front reflector 16 in various ways.

[0028] The front reflector drive link 28 has one end connected to the second arm 26 and the other end connected to the front reflector 16. In this embodiment, the front reflector drive link 28 has one end hinge connected to one of the plurality of front reflector drive link connection holes 26a of the second arm 26, and the other end hinge connected to a connecting piece 162 protruded on the rear surface of the front reflector 16.

[0029] The servomotor mount 125 has a heat dissipation opening 125a that is opened downward for heat treatment when the first servomotor 18 and the second servomotor 20 are operated. Accordingly, the lifespan of the first servomotor 18 and the second servomotor 20 is improved.

[0030] Unexplained reference numeral' 129' denotes 'a reinforcement bulkhead.'

[0031] In the dual reflector adjusting module 10 for an LED lamp configured as described above, the rear reflector 14 is rotated around the first hinge shaft X1 of the reflector housing 12 to adjust an angle via the rear reflector drive link 24 according to the rotational drive direction of the first servomotor 18 as shown in FIG. 3.

[0032] In addition, the front reflector 16 is rotated around the second hinge shaft X2 of the reflector housing 12 to adjust an angle via the front reflector drive link 28 according to the rotational drive direction of the second servomotor 20.

[0033] In the dual reflector adjusting module 10 for an LED lamp configured as described above, an LED element 50 is installed on the floor surface of the reflector

housing 12 as shown in FIG. 8b, and a plurality of them are arranged on parallel, and are used as an LED lighting lamp implement 100 as shown in FIG. 8a. By adjusting the light distribution angle of the rear reflector 14 and the front reflector 16, an optimum uniformity factor may be implemented by forming a light distribution curve suitable for the object to be projected as illustrated in FIGS. 9a to 9f. In other words, it may be understood that a light distribution is made farther and wider when the front reflector 16 is varied on one side by 10 degrees as shown in FIG. 9b than when the front reflector 16 is varied on one side by 5 degrees as shown in FIG. 9a. In addition, it can be understood that a smaller light distribution is made when the rear reflector 14 is varied on a boundside by 10 degrees as shown in FIG. 9d than when the rear reflector 14 is varied on a boundside by 5 degrees as shown in FIG. 9c. In addition, it may be understood that a lighting is made farther when the front reflector 16 and the rear reflector 14 are varied on both sides by 5 degrees as shown in FIG. 9e than when the front reflector 16 and the rear reflector 14 are varied on both sides by 10 degrees as shown in FIG. 9f.

[0034] In addition, as shown in FIGS. 8a and 8b, when four dual reflector adjusting modules 10 for an LED lamp are applied to one lighting lamp implement 100, four each different light distribution curves may be obtained through four light transmitting holes. In addition, in the dual reflector adjusting module 10 for an LED lamp, the reflective surfaces of the rear reflector 14 and the front reflector 16 are installed asymmetrically, so there is an advantage in that it is possible to adjust a lighting direction and a size of a lighting area along with the glare-free lighting. Moreover, there is an advantage in that a convenient application may be made by overcoming a limit of vertical illuminance of 10 lux in any site condition by controlling two angles of the front reflector 16 and the rear reflector 14 according to the standards of the Light Pollution Prevention Act.

[0035] Reference numeral '90' denotes 'a front cover, ' reference numeral '70' denotes 'a rear cover,' and reference numeral '80' denotes 'a lighting lamp implement hinge bracket.'

[0036] From the foregoing, the present disclosure has been described in detail by way of preferable examples. In addition, it will be appreciated by a person having ordinary skill in the pertinent technical field that various modifications and variations may be made without departing from the scope and technical spirit of the present disclosure with referenced to the preferable examples. However, the scope of the present disclosure is not limited by such modifications and variations, but should be interpreted by the appended claims.

Claims

1. A dual reflector adjusting module for an LED lamp, comprising:

a reflector housing having a light transmitting hole opened to one side;
a rear reflector hinge combined to be rotatable to one side of the reflector housing;
a front reflector hinge combined to be rotatable to another side of the reflector housing to face the rear reflector;
a first servomotor and a second servomotor installed on parallel on the reflector housing;
a first arm connected to a rotation shaft of the first servomotor;
a rear reflector drive link having one end connected to the first arm and the other end connected to the rear reflector;
a second arm connected to a rotation shaft of the second servomotor; and
a front reflector drive link having one end connected to the second arm and the other end connected to the front reflector.

2. The dual reflector adjusting module of claim 1, wherein the first arm is formed with a plurality of rear reflector drive link connection holes formed at regular intervals so as to increase or decrease a rotation angle of the rear reflector, and wherein one end of the rear reflector drive link is inserted into any one of the plurality of rear reflector drive link connection holes, and is hinge connected.

3. The dual reflector adjusting module of claim 1, wherein the rear reflector drive link is made of a wire rod, and has a bent stepped portion formed by bending the portion twice at regular intervals in a longest straight section to prevent buckling during operation and reinforce flexural rigidity.

4. The dual reflector adjusting module of claim 1, wherein the second arm is formed with a plurality of front reflector drive link connection holes formed at regular intervals to increase or decrease a rotation angle of the front reflector.

5. The dual reflector adjusting module of claim 1, wherein the rear reflector and the front reflector are installed in a mutually asymmetrical shape.

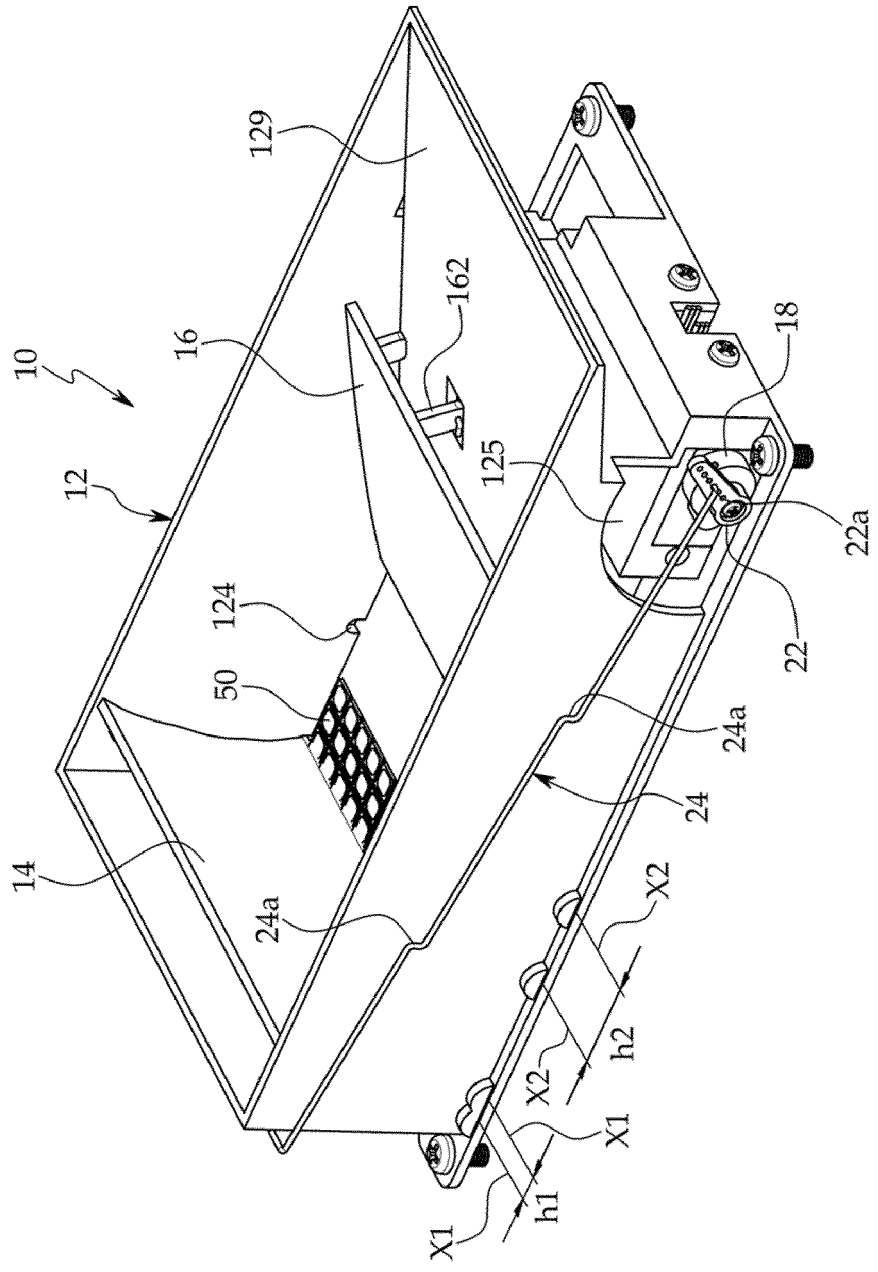
6. The dual reflector adjusting module of claim 1, wherein the reflector housing comprises:

a housing floor plate formed in a rectangular strip shape having an opening for arranging an LED in communication with a light transmitting hole;
a housing wall stood at a predetermined height along the housing floor plate;
one or more first hinge grooves formed to hinge combine a rear reflector to a lower surface of the housing floor plate;
one or more second hinge grooves formed at a

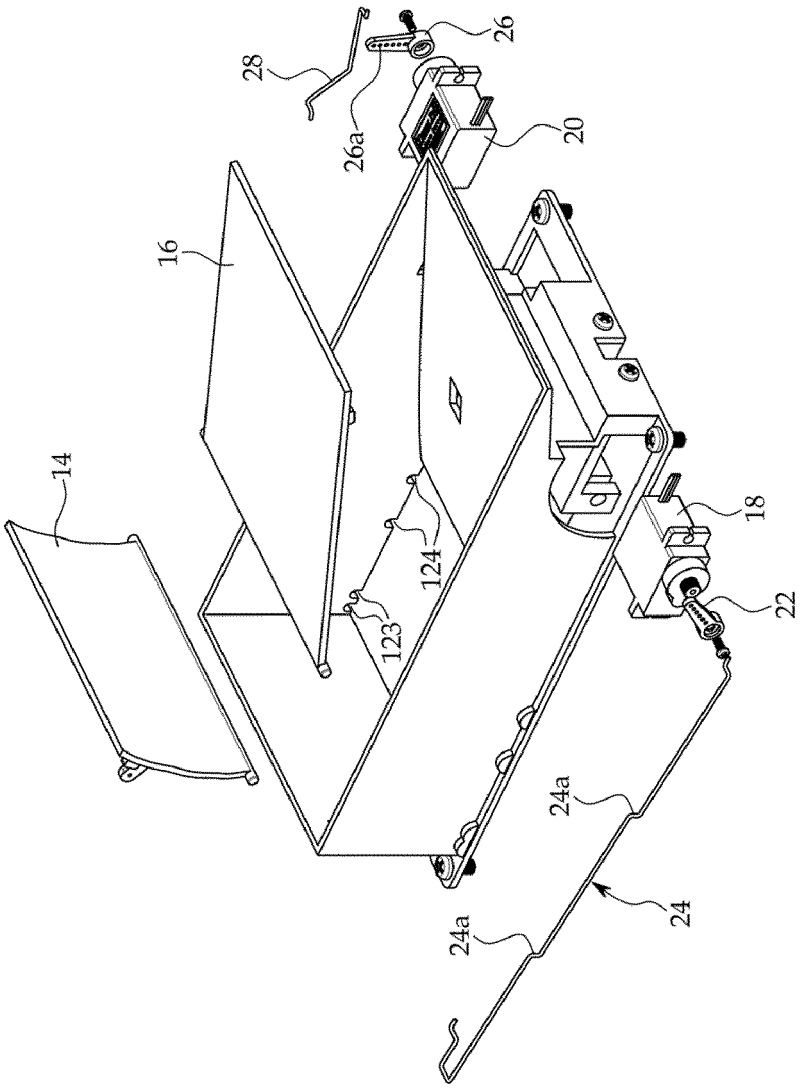
certain distance from the first hinge groove to hinge combine the front reflector to a lower surface of the housing floor plate; and
a servomotor mount installed with a heat dissipation opening opened downward on the housing floor plate side to install the first servomotor and the second servomotor.

7. A lighting lamp implement comprising an LED element arranged toward a light transmitting hole of the dual reflector adjusting module for an LED lamp, wherein any one of the dual reflector adjusting module for an LED lamp of claims 1 to 6 is comprised in a plural number and is installed on parallel in close proximity to each other.

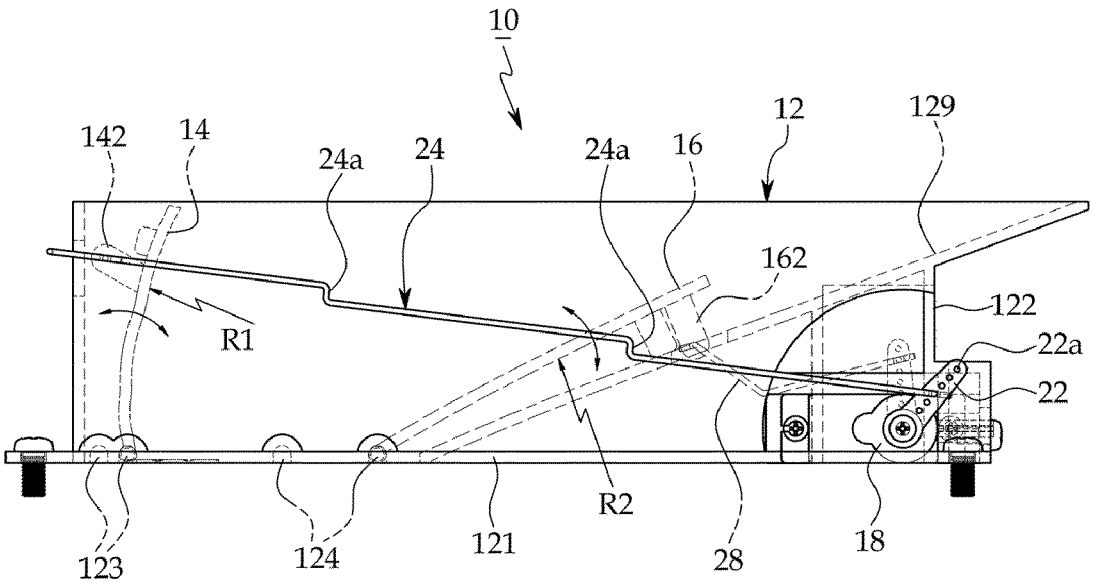
[FIG. 1]



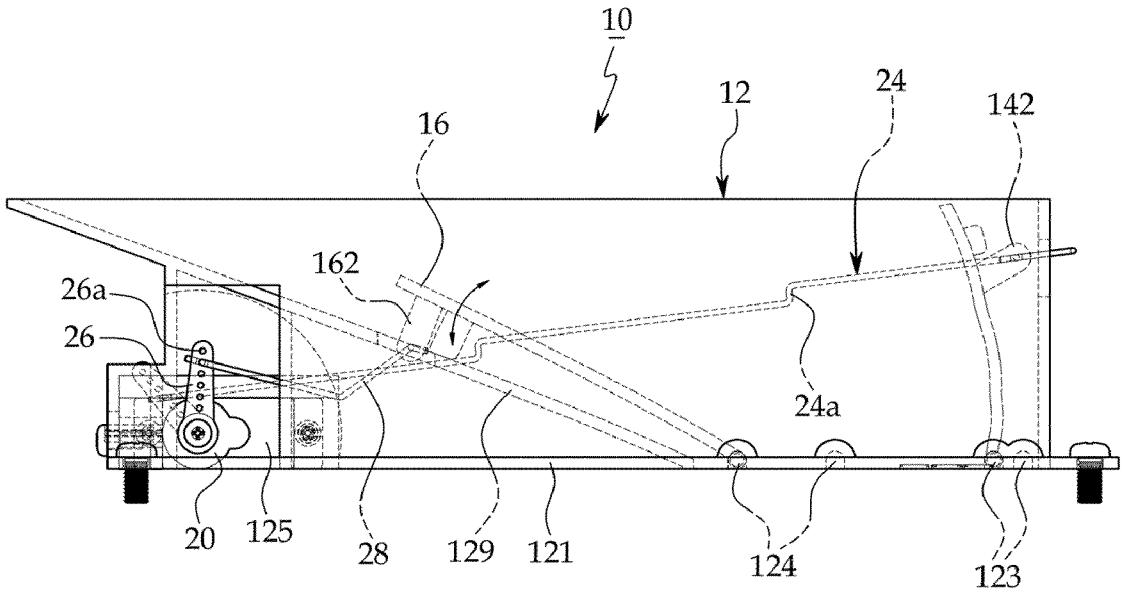
[FIG. 2]



[FIG. 3]


10
142
14
24a
24
24a
16
12
129
162
122
22a
22
R1
R2
123
124
121
28
18

[FIG. 4]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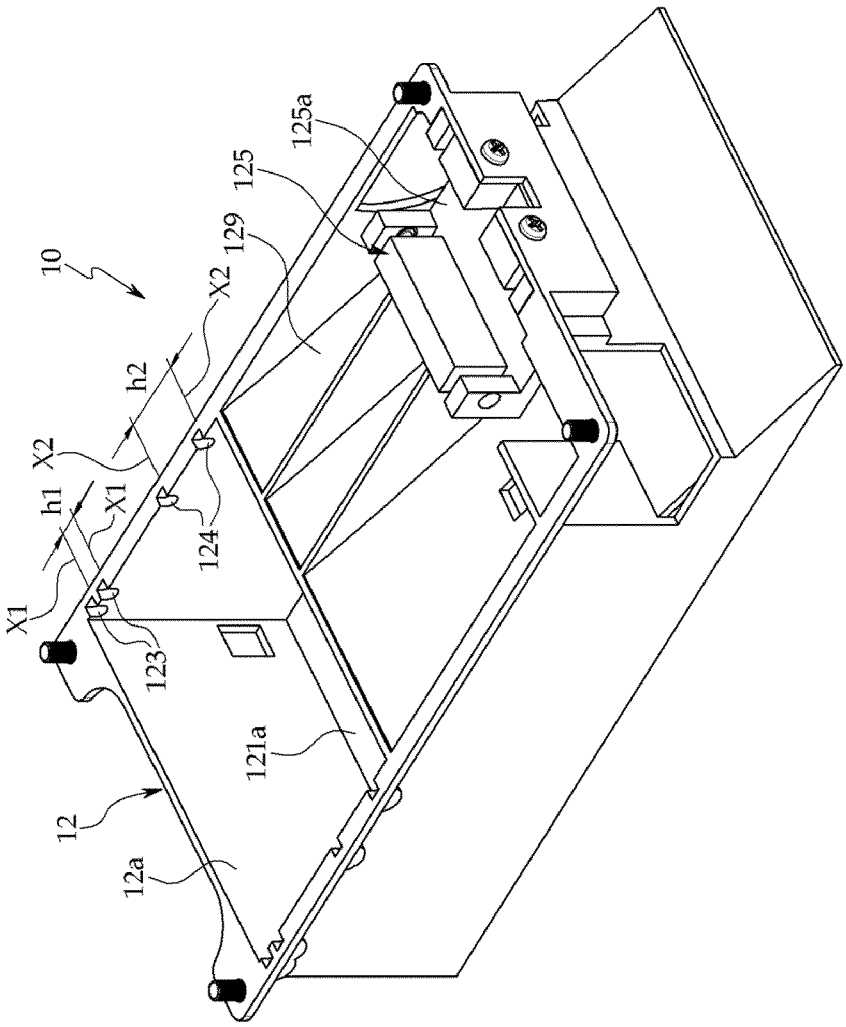
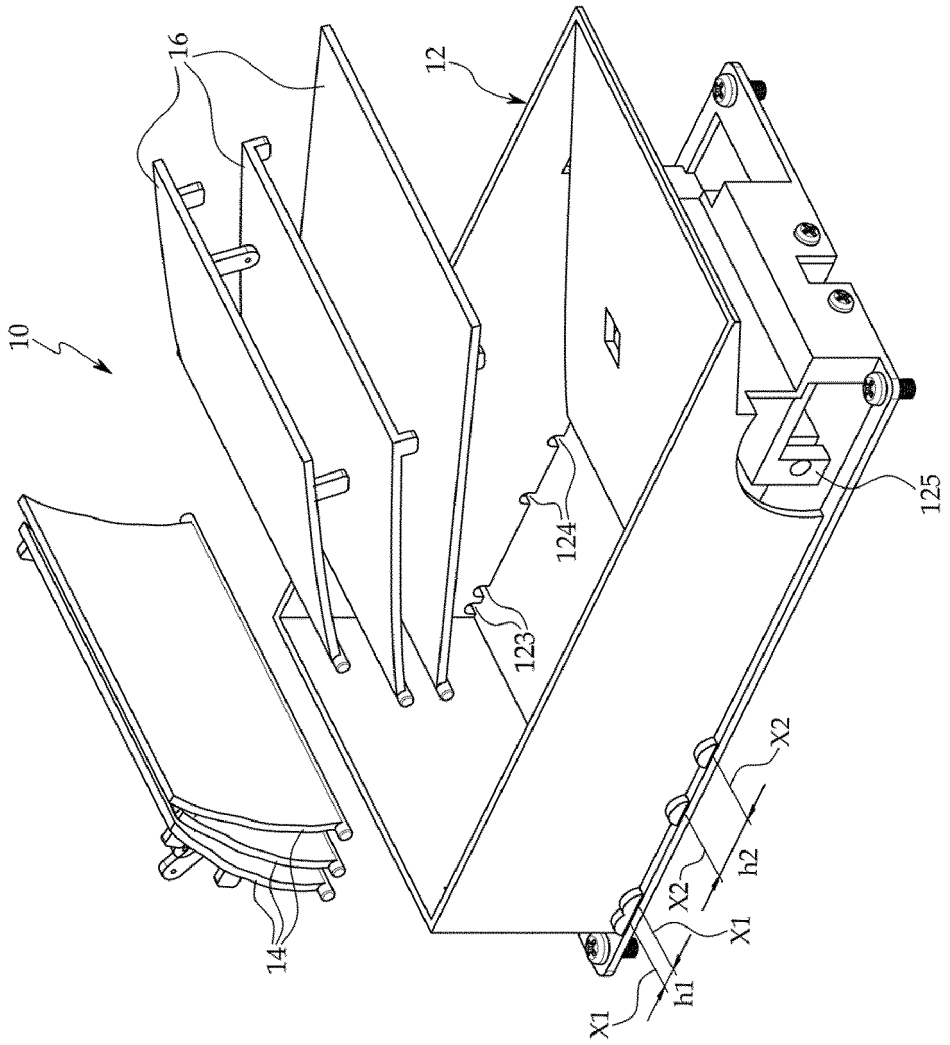
24
142
162
26a
26
24a
20
125
28
129
121
124
123

[FIG. 5]



[FIG. 6a]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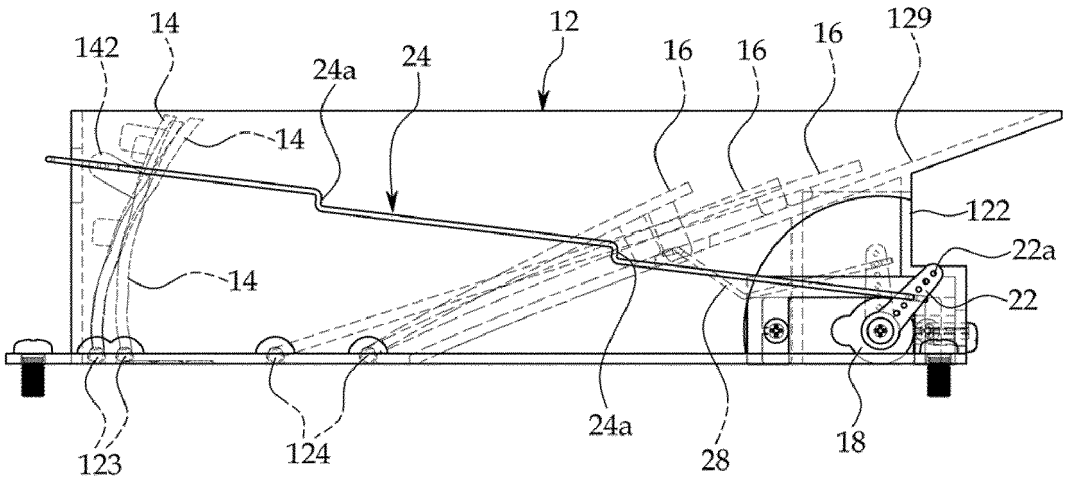
12
10
125
124
123
X2
h2
X2
X1
X1
h1
14

[FIG. 6b]


142
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24a
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22a
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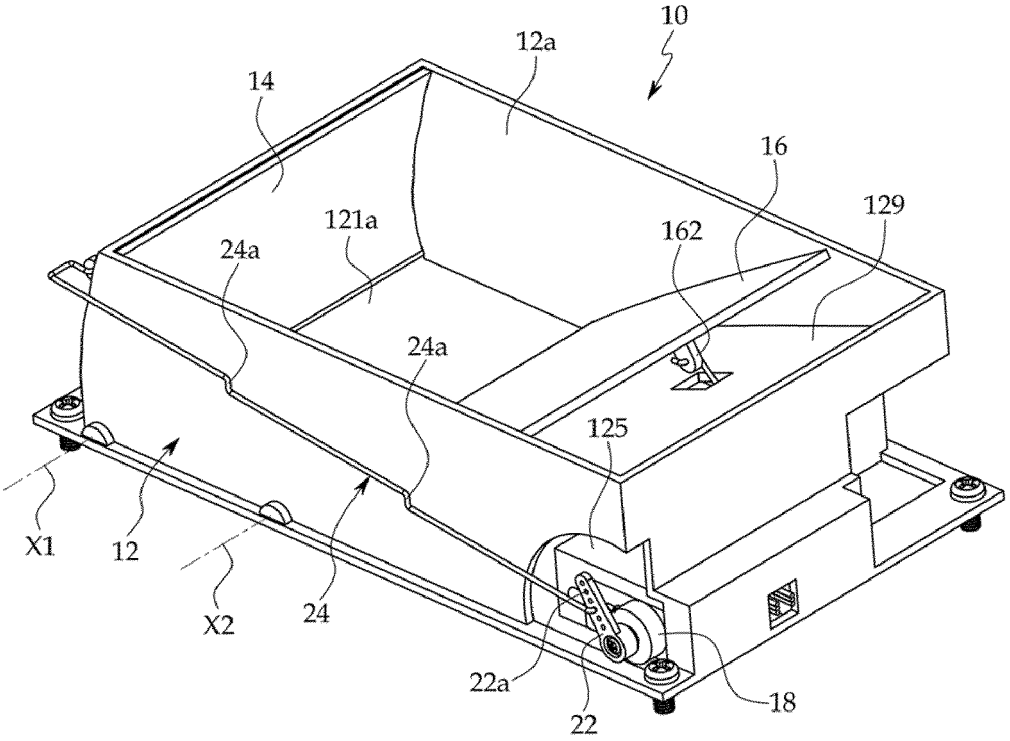
[FIG. 7a]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12a
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16
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24a
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125
X1
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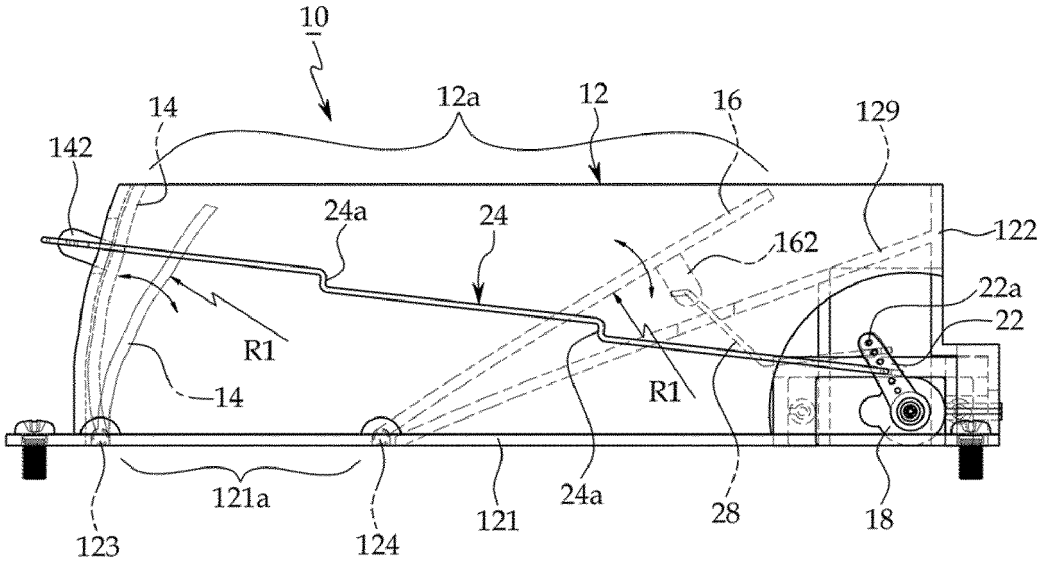
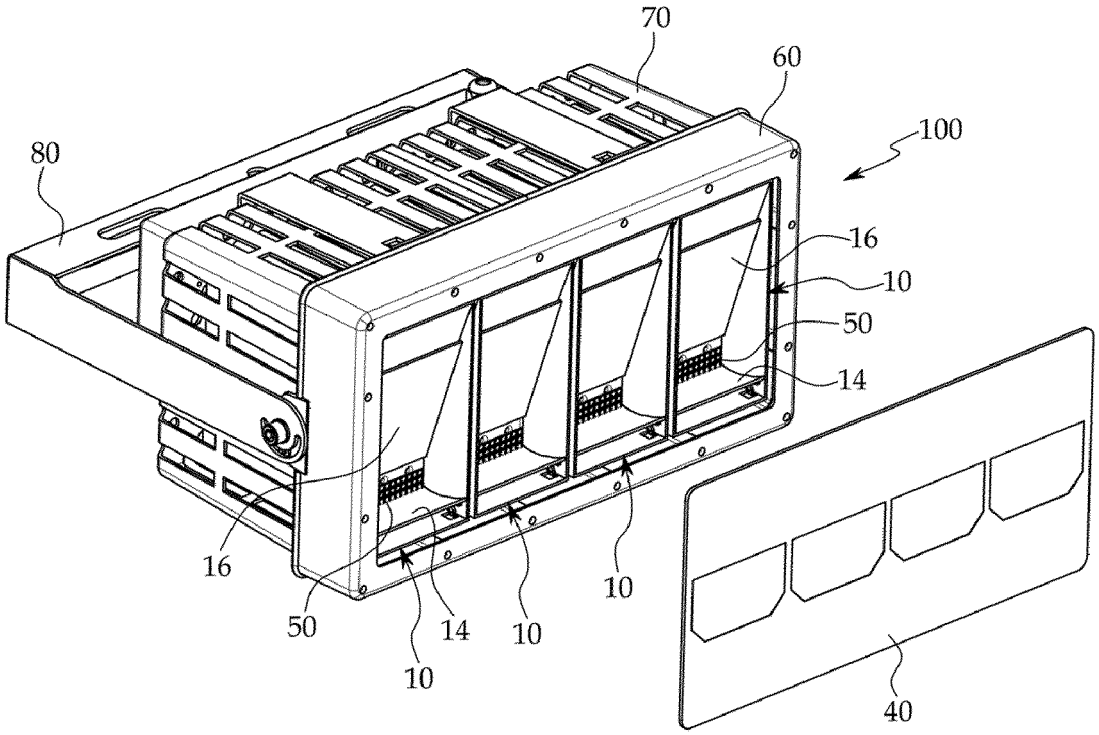
X2
24
22a
22
18

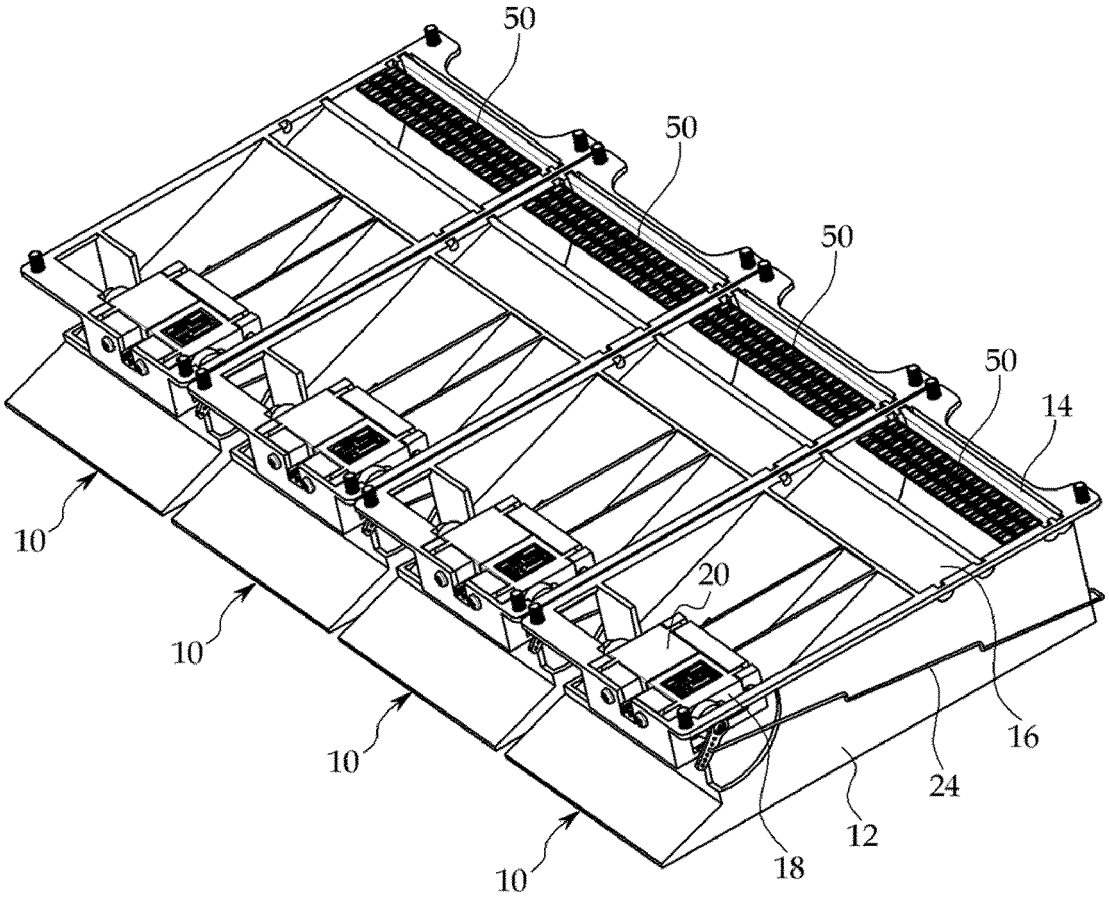
[FIG. 7b]


10
14
12a
12
16
129
142
24a
24
162
122
22a
22
R1
14
R1
121a
123
124
121
24a
28
18

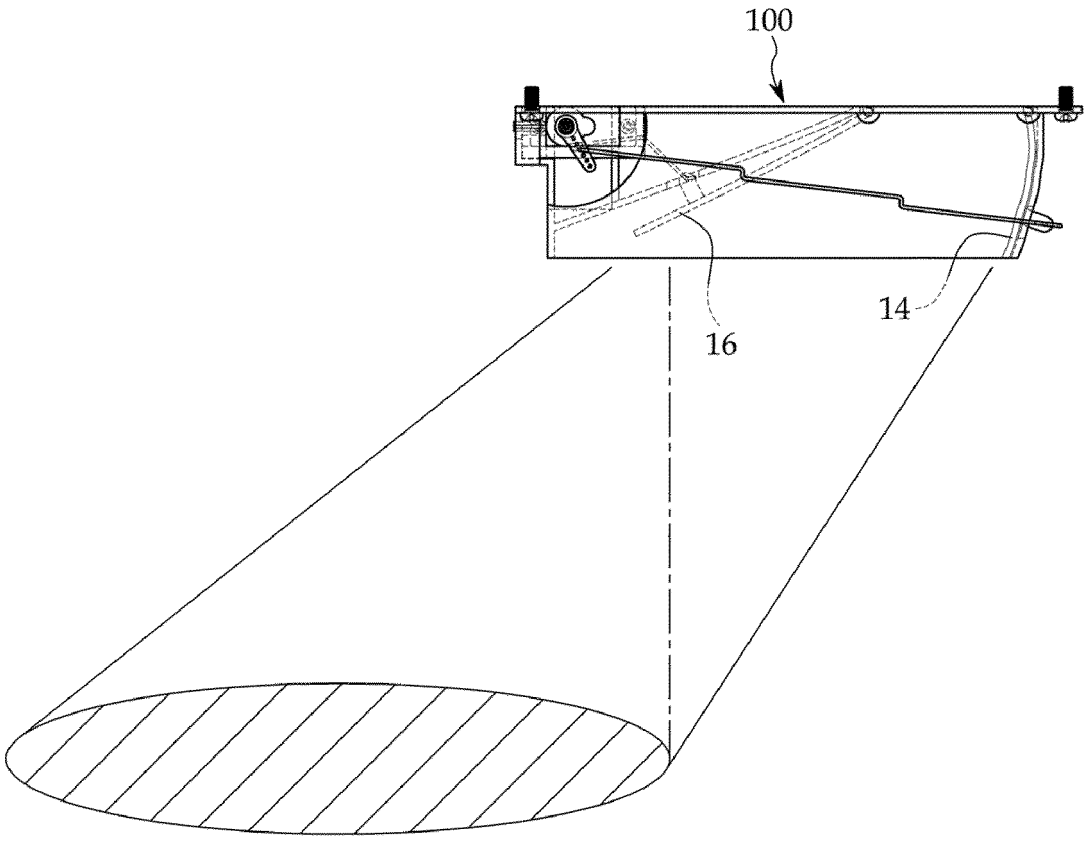
[FIG. 8a]



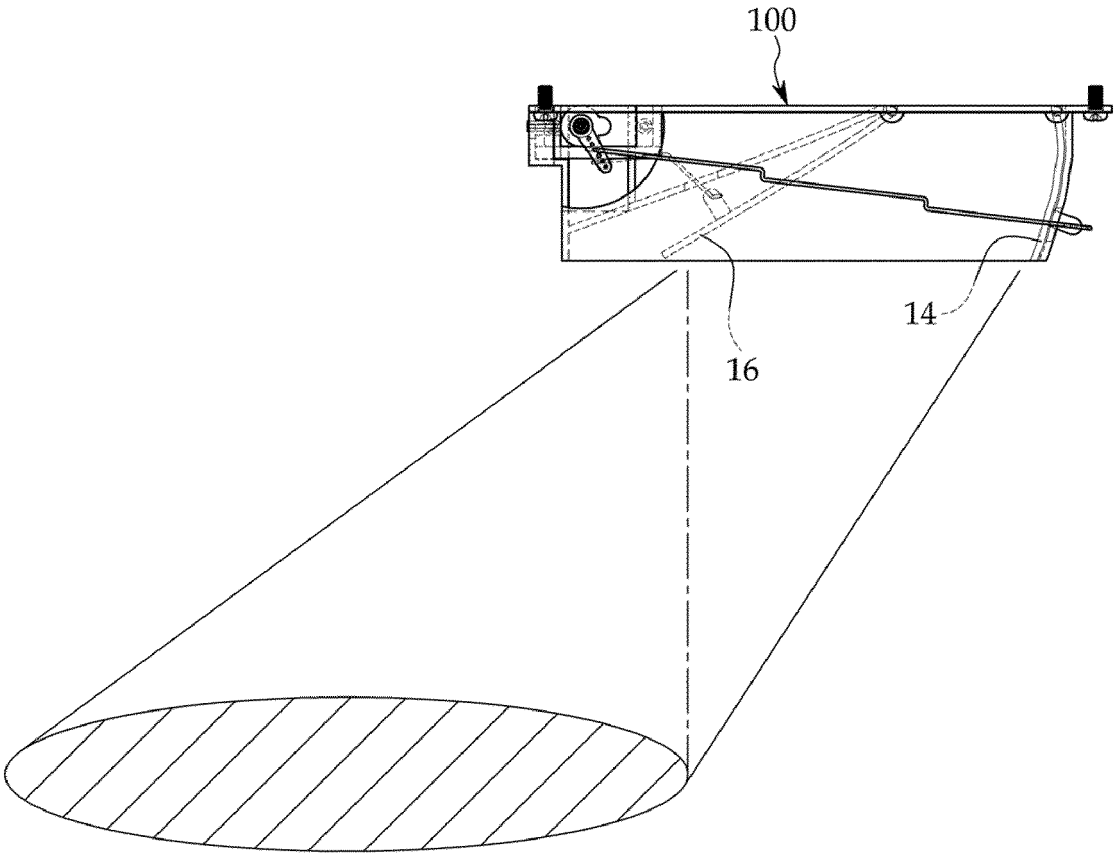
[FIG. 8b]



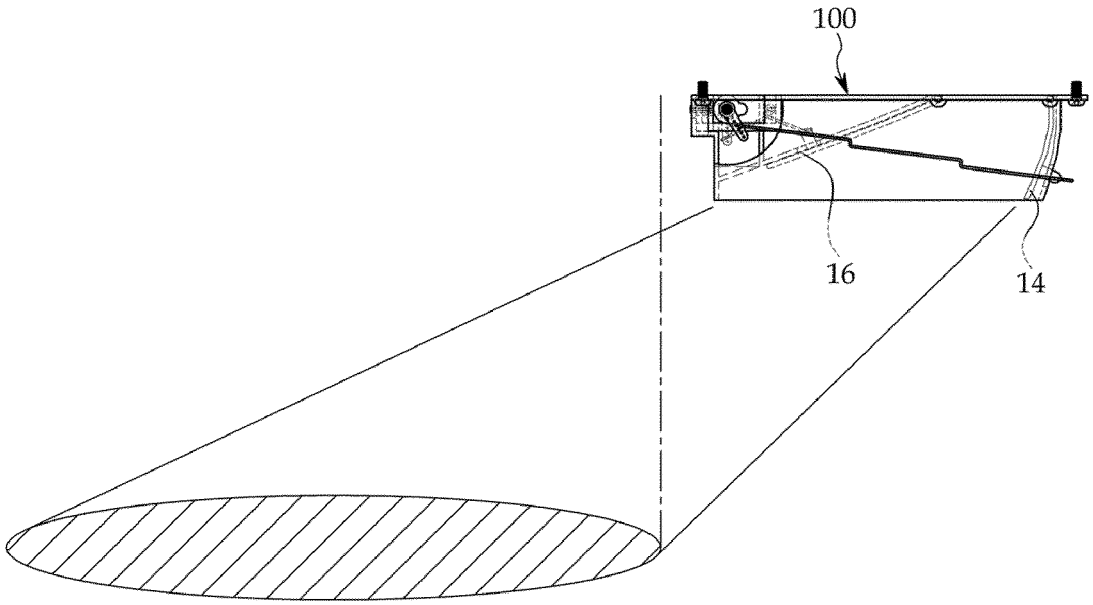
[FIG. 9a]



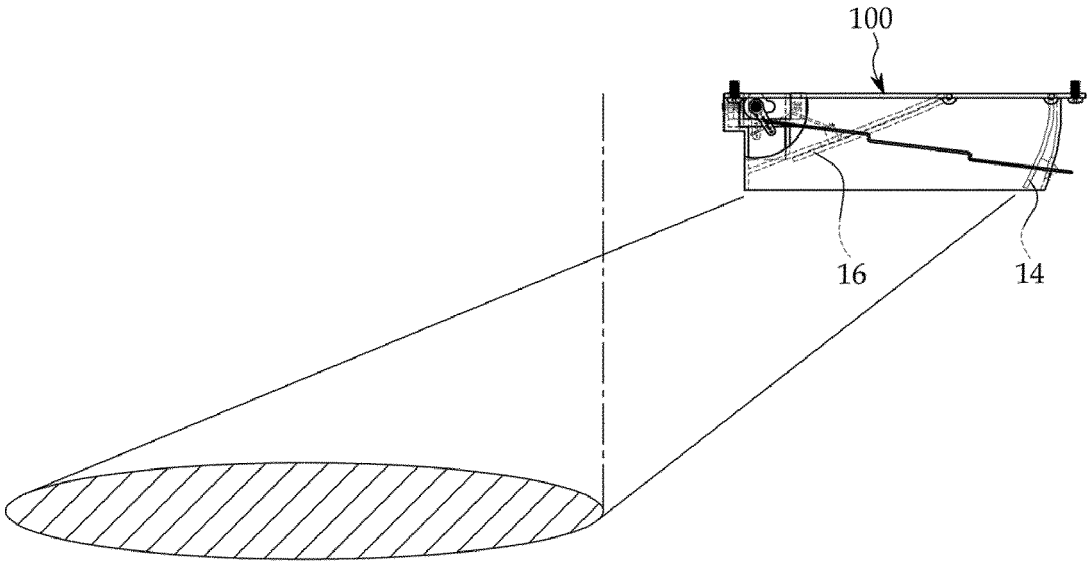
[FIG. 9b]



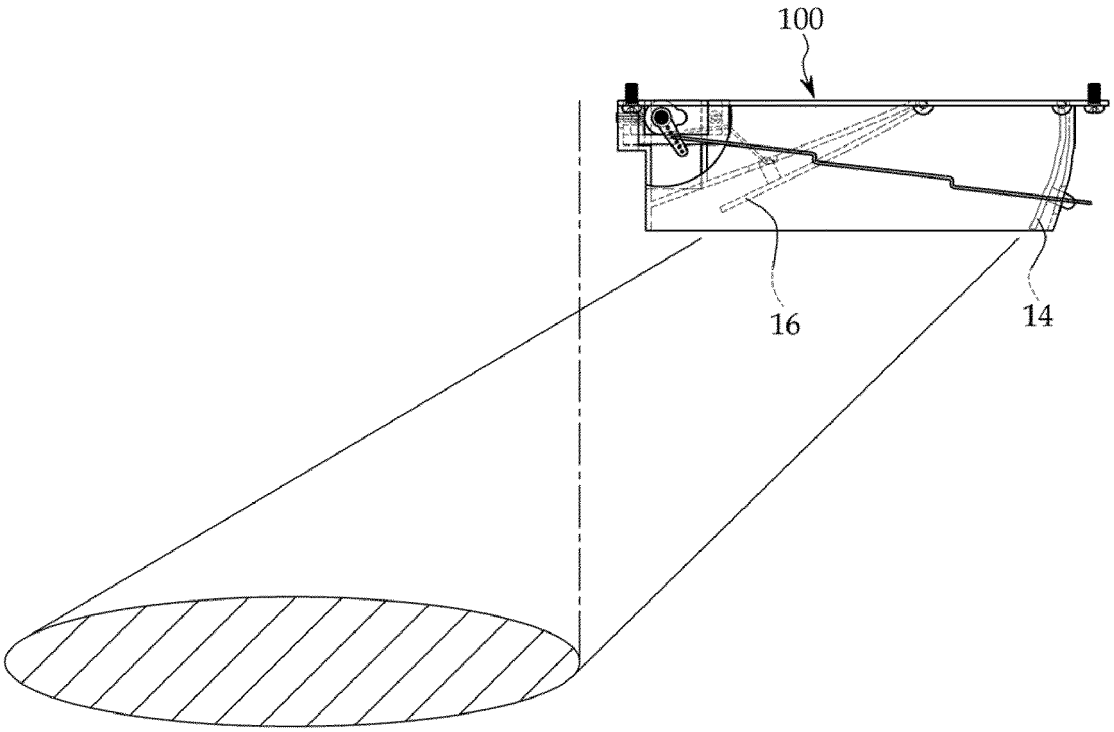
[FIG. 9c]



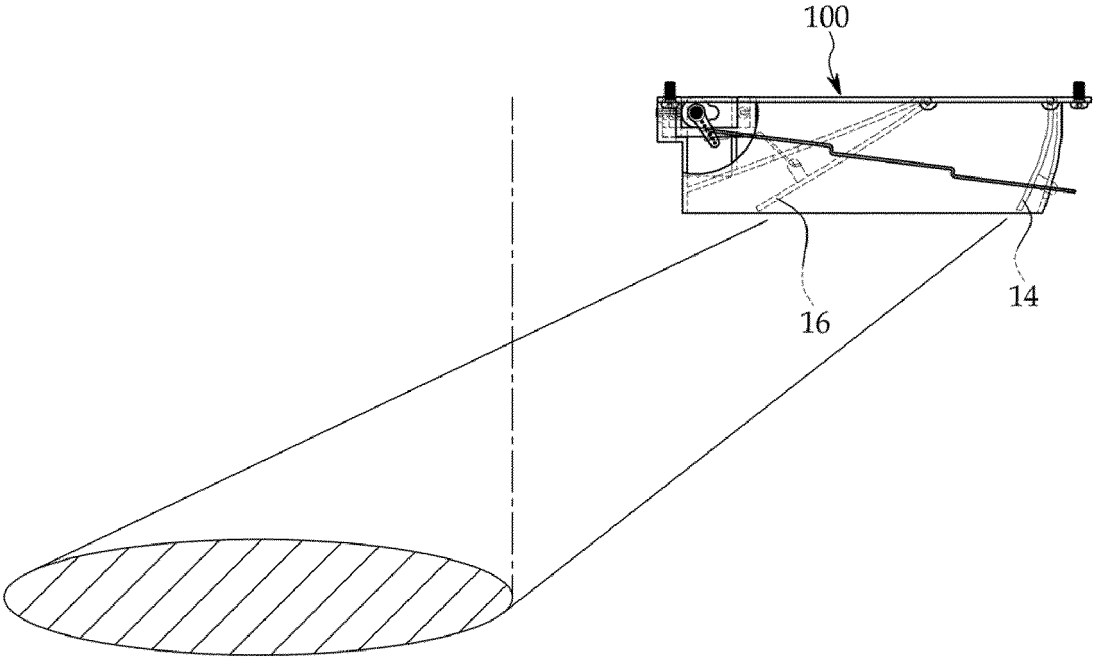
[FIG. 9d]



[FIG. 9e]



[FIG. 9f]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2021/001438

A. CLASSIFICATION OF SUBJECT MATTER

F21V 14/04(2006.01)i; **F21V 7/00**(2006.01)i; **F21V 17/10**(2006.01)i; **F21Y 115/10**(2016.01)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)

F21V 14/04(2006.01); A01K 1/02(2006.01); B60Q 1/04(2006.01); F21K 9/20(2016.01); F21S 41/36(2018.01); F21S 41/675(2018.01); F21Y 115/10(2016.01)

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: IPC as above
Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: LED 램프(LED lamp), 듀얼 반사판(dual reflector), 조절 모듈(adjusting module), 회전(rotate)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 10-1003508 B1 (THREEI ELECTRIC CO., LTD.) 29 December 2010 (2010-12-29) See paragraphs [0023] and [0024] and figures 6 and 7.	1-7
A	KR 10-2020-0008349 A (LS MTRON LTD.) 28 January 2020 (2020-01-28) See paragraphs [0050]-[0063] and figure 8.	1-7
A	KR 10-1998-0050897 A (HYUNDAI MOTOR COMPANY) 15 September 1998 (1998-09-15) See figures 1-3.	1-7
A	KR 10-2078074 B1 (INDUSTRY-ACADEMIC COOPERATION FOUNDATION GYEONGSANG NATIONAL UNIVERSITY) 17 February 2020 (2020-02-17) See paragraph [0055] and figures 1-6.	1-7
A	KR 10-1801241 B1 (JEON, Jae Seok) 24 November 2017 (2017-11-24) See figures 6-12.	1-7

☑ 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
"D" document cited by the applicant in the international application
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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another 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
10 May 2021	**10 May 2021**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2021/001438

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	KR 10-2128220 B1 (LEGEN CO., LTD.) 29 June 2020 (2020-06-29) See claims 1-7. 'This document is a published earlier application that serves as a basis for claiming priority of the present international application.'	1-7

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2021/001438

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-1003508 B1	29 December 2010	None	
KR 10-2020-0008349 A	28 January 2020	None	
KR 10-1998-0050897 A	15 September 1998	None	
KR 10-2078074 B1	17 February 2020	None	
KR 10-1801241 B1	24 November 2017	None	
KR 10-2128220 B1	29 June 2020	None	

Form PCT/ISA/210 (patent family annex) (July 2019)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 102030931 **[0003]**