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BRACKET ASSEMBLY AND LAMP

- (57)

A lamp (100) and a bracket (20). The lamp (100) includes a lamp body (10), a bracket (20) rotating around the lamp body (10), and rotating shafts (11) connecting the lamp body (10) and the bracket (20). Connecting members (30) rotatably connected to the rotating shafts (11) are provided between the lamp body (10) and the
- bracket (20). The lamp (100) further includes a first-stage angle adjusting structure for geared adjustment and a second-stage angle adjusting structure for stepless angle adjustment. 360-degree stepless angle adjustment is achieved by means of two-stage angle adjustment, so that angle adjustment is more accurate and convenient.

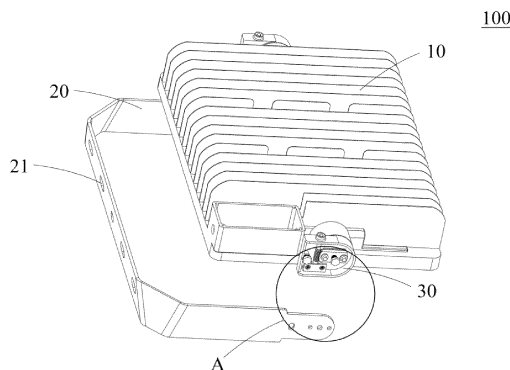


FIG. 1

Description

[0001] The present application claims the priority of the Chinese Patent Application No. 202123034173.X filed on December 6, 2021, with the title of "BRACKET ASSEMBLY AND LAMP", and the entire contents of the present application are incorporated by reference in the present application.

TECHNICAL FIELD

[0002] The present disclosure relates to a bracket assembly and a lamp, and belongs to a technical field of lighting.

BACKGROUND

[0003] At present, most of the lamps adjust their angles by a gear adjustment mechanism, which can realize a wide range of adjustment and even 360° adjustment, but because of the large angle change between the gears of the gear adjustment mechanism, it is impossible to adjust the angle more finely. Especially for large lamps such as projector lamps, because of the long irradiation distance, fine angle changes have a greater impact on the irradiation region.

[0004] In view of this, it is necessary to propose improvements to the existing lamps to solve the above-described problems.

SUMMARY

[0005] The purpose of the present application is to provide a bracket assembly and a lamp, which can realize 360° stepless angle adjustment and are convenient to operate.

[0006] In order to achieve the above object, the present application provides a lamp, which includes a lamp body, a bracket rotating around the lamp body, and a rotation shaft connecting the lamp body and the bracket. A connection member for rotational connection with the rotation shaft is disposed between the lamp body and the bracket, the lamp further includes a first level angle adjustment structure, the first level angle adjustment structure is disposed between the connection member and the lamp body, the connection member rotates around the lamp body to realize gear adjustment. The lamp further includes a second level angle adjustment structure including a worm, the worm is rotationally mounted to the connection member, the bracket is provided with a gear rack, and the worm cooperates with the gear rack to drive the bracket to rotate relative to the connection member.

[0007] As a further improvement of the present application, the second level angle adjustment structure further includes a rotation member, the rotation member is disposed on the connection member and the rotation member is provided with the gear rack.

[0008] As a further improvement of the present appli-

cation, the rotation member is disposed between the connection member and the bracket, and is rotationally mounted to the rotation shaft.

[0009] As a further improvement of the present application, both ends of the rotation member are provided with convex extension portions that fit into the bracket, the bracket is correspondingly provided with slotted holes for the convex extension portions to pass through, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.

[0010] As a further improvement of the present application, the bracket is provided with a rotating member protruding towards the connecting member, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.

[0011] As a further improvement of the present application, an edge of the connection member is provided with a blocking edge for limiting rotation angle of the bracket.

[0012] As a further improvement of the present application, the lamp further includes a fastener, the bracket is provided with a slide groove for the fastener to slide, and the fastener passes through the slide groove and is connected to the connection member, upon being adjusted by the second level angle adjustment structure, the fastener loosens and is able to slide along the slide groove, after adjusting to a set angle, the fastener is tightened by locking so as to prevent relative rotation between the connection member and the bracket.

[0013] As a further improvement of the present application, the lamp further includes a fastener, the connection member is provided with a slide groove for the fastener to slide, and the fastener passes through the slide groove and is connected to the bracket, upon being adjusted by the second level angle adjustment structure, the fastener loosens and is able to slide along the slide groove, after adjusting to a set angle, the fastener is tightened by locking so as to prevent relative rotation between the connection member and the bracket.

[0014] As a further improvement of the present application, an outer side of the connection member is provided with a protective ring, and the protective ring is disposed around exterior of an end of the worm extending to an outside of the connection member.

[0015] As a further improvement of the present application, a maximum adjustment angle of the second level angle adjustment structure is greater than or equal to a minimum adjustment angle of the first level angle adjust-

ment structure.

[0016] As a further improvement of the present application, the connection member is provided with scales, and the scales are used to identify an angle at which the connection member is rotated relative to the bracket.

[0017] As a further improvement of the present application, the bracket is rotationally connected to two sides of the lamp body, and the two sides of the lamp body are provided with the first level angle adjustment structure and the second level angle adjustment structure, respectively.

[0018] As a further improvement of the present application, the first level angle adjustment structure includes a first ring gear and a second ring gear, the first ring gear is disposed on the lamp body, the second ring gear is disposed on the connection member, the first ring gear and the second ring gear are both provided with serrated structures that are distributed in shape of a ring, and the first ring gear and the second ring gear engage with each other through the serrated structures, the second ring gear is capable of rotating relative to the first ring gear under an action of an external force to realize gear adjustment.

[0019] In order to achieve the above object, the present application provides a bracket assembly, which includes a bracket, a rotation shaft and a connection member, the bracket is rotationally connected to the connection member by the rotation shaft; the bracket further includes a second level angle adjustment structure, the second level angle adjustment structure includes a worm, the worm is rotationally mounted to the connection member, the bracket is provided with a gear rack, and the worm cooperates with the gear rack to drive the bracket to rotate relative to the connection member.

[0020] As a further improvement of the present application, the second level angle adjustment structure further includes a rotation member, the rotation member is disposed on the connection member and the rotation member is provided with the gear rack.

[0021] As a further improvement of the present application, the rotation member is disposed between the connection member and the bracket and is rotationally mounted to the rotation shaft.

[0022] As a further improvement of the present application, both ends of the rotation member are provided with convex extension portions that fit into the bracket, the bracket is correspondingly provided with a slotted hole for the convex extension portion to pass through, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.

[0023] As a further improvement of the present application, the bracket is provided with a rotating member protruding towards the connecting member, an outer wall

of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.

[0024] The beneficial effect of the application is that the application realizes 360° stepless angle adjustment by two levels angle adjustment, which makes the angle adjustment more accurate and easier to operate.

BRIEF DESCRIPTION OF DRAWINGS

[0025]

FIG. 1 is a structural diagram of a lamp in a preferred embodiment of the present application.

FIG. 2 is an enlarged structural diagram at position A in FIG. 1.

FIG. 3 is a decomposition structural diagram of a lamp in another preferred embodiment of the present application.

FIG. 4 is a structural diagram of a bracket assembly and a connection member of a lamp in another preferred embodiment of the present application.

DETAILED DESCRIPTION

[0026] In order to make the purpose, technical scheme and advantages of this application more clear, the application will be described in detail with the attached drawings and specific embodiments.

[0027] Here, it should be noted that, in order to avoid obscuring this application with unnecessary details, only the structure and/or processing steps closely related to the scheme of this application are shown in the attached drawings, while other details that are not related to this application are omitted.

[0028] In addition, it should be noted that the term "include", "comprise" or any other variation is intended to cover non-exclusive inclusion, so that a process, method, article or equipment including a series of elements includes not only those elements, but also other elements not explicitly listed, or elements inherent to such process, method, article or equipment.

[0029] As shown in FIGS. 1 to 4, the present application relates to a lamp 100, the lamp 100 is primarily used in a large projection lamp and is capable of stepless angle adjustment of 360°. The lamp 100 includes two levels of angle adjustment, a first level of angle adjustment is a large angle adjustment for quickly adjusting the approximate illumination orientation of the lamp, and a second level of angle adjustment is a small angle adjustment for fine-adjusting a small angle after the first level of angle adjustment in order to more accurately control the illumination position of the lamp. For the sake of clarity of description, the specific structure of the lamp 100 will be

described in detail in the following specification section.

[0030] As shown in FIG. 1, the lamp 100 includes a lamp body 10 and a bracket 20, the bracket 20 can rotate around the lamp body 10, the bracket 20 is connected to the lamp body 10 by a rotation shaft 11, and the lamp body 10 can freely rotate around the rotation shaft 11 relative to the bracket 20. The bracket 20 is provided with mounting holes 21, and the mounting holes 21 are provided with mounting members for fixing the bracket 20 to a mounting surface, and the angle of illumination of the lamp 100 can be adjusted by rotating the lamp body 10.

[0031] As shown in FIGS. 2 and 3, one end of the rotation shaft 11 is provided with a limiting portion 111 abutting against the bracket 20, and the other end of the rotation shaft 11 sequentially passes through the bracket 20 and is threadedly connected to the lamp body 10, and the limiting portion 111 is used to prevent the bracket 20 from being detached, and the angle of rotation of the lamp body 10 relative to the bracket 20 is fixed by tightening the rotation shaft 11 to tighten the bracket 20. It should be understood that in the case where the illumination angle of the lamp body 10 needs to be adjusted, it is only necessary to loosen the rotation shaft 11. More preferably, an elastic pad 112 is provided between the bracket 20 and the limiting portion 111 for enhancing friction to prevent the rotation shaft 11 from loosening.

[0032] As the best embodiment of the present application, a connection member 30 is provided between the lamp body 10 and the bracket 20, and the rotation shaft 11 sequentially connects the bracket 20, the connection member 30 and the lamp body 10, and the connection member 30 is provided with a through hole 31 for the rotation shaft 11 to pass through, and the connection member 30 is capable of rotating around the rotation shaft 11, i.e., the connection member 30 rotates coaxially with the bracket 20. It should be understood that the rotation shaft 11 can be tightened to allow the connection member 30 to be fastened between the lamp body 10 and the bracket 20, so as to prevent free rotation of the connection member 30.

[0033] Further, the lamp 100 has a first level angle adjustment structure and a second level angle adjustment structure to realize coarse and fine adjustment functions, respectively.

[0034] The first level angle adjustment structure is a gear adjustment structure that enables a large angle adjustment between the lamp body 10 and the bracket 20. Specifically, the first level angle adjustment structure is provided between the connection member 30 and the lamp body 10, and the first level angle adjustment structure includes a first ring gear 12 and a second ring gear 13 disposed on the lamp body 10 and the connection member 30, respectively, and the first ring gear 12 and the second ring gear 13 are both correspondingly in the shape of a ring. The rotation shaft 11 sequentially passes through a center of the second ring gear 13 and a center of the first ring gear 12 and is threadedly connected with

the first ring gear 12, the first ring gear 12 and the second ring gear 13 are both provided with serrated structures that are distributed in the shape of a ring, and the first ring gear 12 and the second ring gear 13 engage with each other by the serrated structures.

[0035] By controlling the degree of tightness of the rotation shaft 11, the degree of closeness of engagement between the first ring gear 12 and the second ring gear 13 can be changed. When the rotation shaft 11 is tightened, the engagement between the first ring gear 12 and the second ring gear 13 is tighter, and it is difficult to generate relative rotation between the connection member 30 and the lamp body 10, i.e., the angle between the lamp body 10 and the bracket 20 is fixed. When the rotation shaft 11 is loosened, the degree of engagement between the first ring gear 12 and the second ring gear 13 is reduced, and it is easier to generate a relative rotation between the connection member 30 and the lamp body 10, so that the angle between the lamp body 10 and the bracket 20 can be adjusted. The second ring gear 13 is rotated relative to the first ring gear 12 by an external force and by engaging with a different serrated structure in the first ring gear 12 in order to realize gear adjustment.

[0036] As shown in FIGS. 3 and 4, it should be noted that in the case where the serrated structures are arranged in a ring shape to cover the entire first ring gear 12 and the second ring gear 13, respectively, the maximum adjusting angle of the first level of the angle adjustment structure is 360° , while the minimum adjusting angle is determined by the number of serrated teeth in the serrated structures. In this embodiment, the number of serrated teeth in the serrated structure is preferably 72, and the minimum adjustment angle at which the first ring gear 12 rotates with respect to the second ring gear 13, i.e., the minimum adjustment angle of the first level angle adjustment structure, is 5° .

[0037] A blocking edge 32 for limiting the rotation angle of the bracket 20 is formed at an edge of the connection member 30, and a rotation plane of the connection member 30 rotating around the rotation shaft 11 is parallel to a rotation plane of the bracket 20 rotating around the rotation shaft 11. When the bracket 20 is rotated to a maximum limit with respect to the connection member 30, the bracket 20 may drive the connection member 30 to rotate around the lamp body 10 under an action of external force to realize the gear adjustment function.

[0038] The second level angle adjustment structure is a stepless angle adjustment structure for fine-tuning on the basis of the first level angle adjustment structure.

[0039] The second level angle adjustment structure includes a worm 33 disposed in the connection member 30, the worm 33 is provided with threads, and the blocking edge 32 of the connection member 30 is provided with a threaded hole. The worm 33 is mounted in the threaded hole of the connection member 30, and one end of the worm 33 is accommodated and limited in a cavity and in a mechanical connection with the bracket 20. The me-

chanical connection includes, but is not limited to, a connection by a flexible connection, such as an iron wire, a locking bar, etc., the worm 33 can drive the bracket 20 to rotate relative to the connection member 30, and the other end of the worm 33 is provided with an operating portion 331 which extends through the blocking edge 32 and extends to the outer side of the connection member 30 through a threaded connection. By rotating the operation portion 331, the worm 33 can be driven to rotate, which can cause a relative rotation between the connection member 30 and the bracket 20, so as to achieve the stepless angle adjustment for the angle between the lamp body 10 and the bracket 20.

[0040] Preferably, a maximum adjustment angle of the second level angle adjustment structure is greater than or equal to a minimum adjustment angle of the first level angle adjustment structure. In this embodiment, in the case where the minimum adjustment angle of the first angle adjustment structure is preferably 5° , the maximum adjustment angle of the second angle adjustment structure should be greater than or equal to 5° , so as to enable the lamp body 10 to be adjusted at the stepless angle of 360° relative to the bracket 20.

[0041] Further, the connection member 30 may be provided with scales, the scales are used to indicate the angle of the connection member 30 rotated relative to the bracket 20. The bracket 20 is also provided with a window for exposing the scales for observation.

[0042] As shown in FIG. 2, as a preferred embodiment of the present application, a rotation member 34 rotatable around the rotation shaft 11 is provided between the connection member 30 and the bracket 20, both radial ends of the rotation member 34 are provided with convex extension portions 341 that fit into the bracket 20, the convex extension portions 341 are parallel to the rotation shaft 11, the bracket 20 is correspondingly provided with a slotted hole 23 for the convex extension portion 341 to pass through, a threaded structure is provided on the outer wall of the worm 33, and the circumferential side of the rotation member 34 is provided with a gear rack that engages with the worm 33. The worm 33 converts rotary motion into linear motion to drive the rotation member 34 to rotate around the rotation shaft 11, and then the convex extension portion 341 drives the bracket 20 to rotate around the rotation shaft 11, so that the bracket 20 rotates relative to the connection member 30.

[0043] In another preferred embodiment of the present application, the bracket 20 is formed with a rotation member 34 provided projecting towards the connection member 30, i.e., the rotation member 34 is fixed to the side of the bracket 20 towards the connection member 30, an outer wall of the worm 33 is provided with a threaded structure, the gear rack is formed on the circumferential side of the rotation member 34 and engages with the worm 33, and in the case where the worm 33 is rotated, the worm 33 can drive the rotation member 30 to rotate, such that the rotation member 30 drives the bracket to rotate relative to the connection member 30.

[0044] In the above-described embodiment, the lamp 100 further includes a fastener 35, the bracket 20 is provided with a slide groove 24 for the fastener 35 to slide, and the fastener 35 passes through the slide groove 24 and is connected to the connection member 30, the slide groove 24 is curved in shape. Upon being adjusted by the second level angle adjustment structure, the fastener 35 loosens and is able to slide along the slide groove 24, after adjusting to a set angle, the fastener 35 is tightened by locking so as to prevent relative rotation between the connection member 30 and the bracket 20. In other embodiments of the present application, the slide groove 24 may also be opened in the connection member 30 and the fastener 35 is connected to the bracket 20 through the slide groove 24, which is not limited herein.

[0045] The outer side of the connection member 30 is also provided with a protective ring 36, the protective ring 36 is provided around the exterior of the end of the worm 33 extending to the outer side of the connection member 30, for preventing accidental disturbance of the worm 33 and thereby affecting the angle setting.

[0046] In a preferred embodiment of the present application, the bracket 20 is rotationally connected to two sides of the lamp body 10, and the two sides of the lamp body 10 are provided with the first level angle adjustment structure and the second level angle adjustment structure, respectively. Of course, both sides of the lamp body 10 may also be provided with both the first level angle adjustment structure and the second level angle adjustment structure, and which is not limited herein.

[0047] In summary, the present application realizes a 360° stepless angle adjustment by two-level angle adjustment, which makes the angle adjustment more accurate and easier to operate.

[0048] The above embodiments are only used to illustrate the technical scheme of the application, but not to limit it. Although the application has been described in detail with reference to the preferred embodiments, it should be understood by those skilled in the art that the technical scheme of the application can be modified or replaced by equivalents without departing from the spirit and scope of the technical scheme of the application.

Claims

1. A lamp, comprising a lamp body, a bracket rotating around the lamp body, and a rotation shaft connecting the lamp body and the bracket, wherein a connection member for rotational connection with the rotation shaft is disposed between the lamp body and the bracket, the lamp further comprises:

a first level angle adjustment structure, the first level angle adjustment structure being disposed between the connection member and the lamp body, the connection member rotating around the lamp body to realize gear adjustment; and

- a second level angle adjustment structure, comprising a worm, the worm being rotationally mounted to the connection member, the bracket being provided with a gear rack, and the worm cooperating with the gear rack to drive the bracket to rotate relative to the connection member.
2. The lamp according to claim 1, wherein the second level angle adjustment structure further comprises a rotation member, the rotation member is disposed on the connection member and the rotation member is provided with the gear rack.
 3. The lamp according to claim 2, wherein the rotation member is disposed between the connection member and the bracket, and is rotationally mounted to the rotation shaft.
 4. The lamp according to claim 3, wherein both ends of the rotation member are provided with convex extension portions that fit into the bracket, the bracket is correspondingly provided with slotted holes for the convex extension portions to pass through, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.
 5. The lamp according to claim 1, wherein the bracket is provided with a rotating member protruding towards the connecting member, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member.
 6. The lamp according to claim 1, wherein an edge of the connection member is provided with a blocking edge for limiting rotation angle of the bracket.
 7. The lamp according to claim 1, wherein the lamp further comprises a fastener, the bracket is provided with a slide groove for the fastener to slide, and the fastener passes through the slide groove and is connected to the connection member, upon being adjusted by the second level angle adjustment structure, the fastener loosens and is able to slide along the slide groove, after adjusting to a set angle, the fastener is tightened by locking so as to prevent relative rotation between the connection member and the bracket.
 8. The lamp according to claim 1, wherein the lamp further comprises a fastener, the connection member is provided with a slide groove for the fastener to slide, and the fastener passes through the slide groove and is connected to the bracket, upon being adjusted by the second level angle adjustment structure, the fastener loosens and is able to slide along the slide groove, after adjusting to a set angle, the fastener is tightened by locking so as to prevent relative rotation between the connection member and the bracket.
 9. The lamp according to claim 1, wherein an outer side of the connection member is provided with a protective ring, and the protective ring is disposed around exterior of an end of the worm extending to an outside of the connection member.
 10. The lamp according to claim 1, wherein a maximum adjustment angle of the second level angle adjustment structure is greater than or equal to a minimum adjustment angle of the first level angle adjustment structure.
 11. The lamp according to claim 1, wherein the connection member is provided with scales, and the scales are used to identify an angle at which the connection member is rotated relative to the bracket.
 12. The lamp according to claim 1, wherein the bracket is rotationally connected to two sides of the lamp body, and the two sides of the lamp body are provided with the first level angle adjustment structure and the second level angle adjustment structure, respectively.
 13. The lamp according to claim 1, wherein the first level angle adjustment structure comprises a first ring gear and a second ring gear, the first ring gear is disposed on the lamp body, the second ring gear is disposed on the connection member, the first ring gear and the second ring gear are both provided with serrated structures that are distributed in shape of a ring, and the first ring gear and the second ring gear engage with each other through the serrated structures, the second ring gear is capable of rotating relative to the first ring gear under an action of an external force to realize gear adjustment.
 14. A bracket assembly, wherein
 the bracket assembly comprises a bracket, a rotation shaft and a connection member, the bracket is rotationally connected to the connection member by the rotation shaft;
 the bracket comprises a second level angle adjustment structure, the second level angle adjustment structure comprises a worm, the worm

is rotationally mounted to the connection member, the bracket is provided with a gear rack, and the worm cooperates with the gear rack to drive the bracket to rotate relative to the connection member.

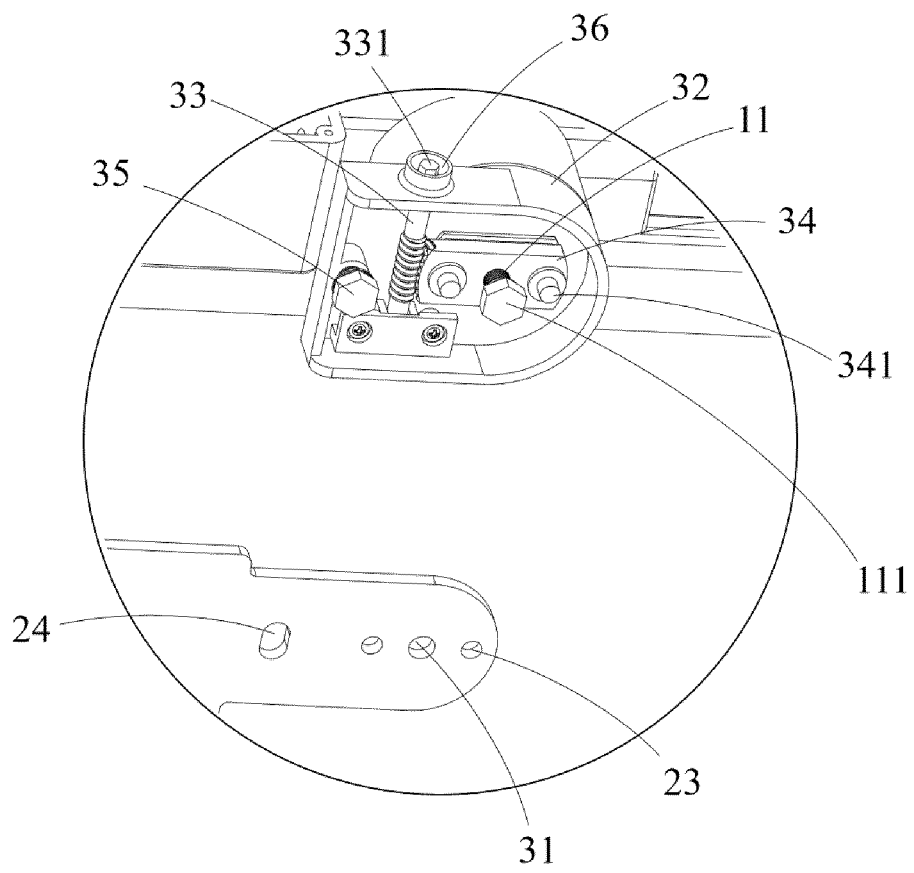
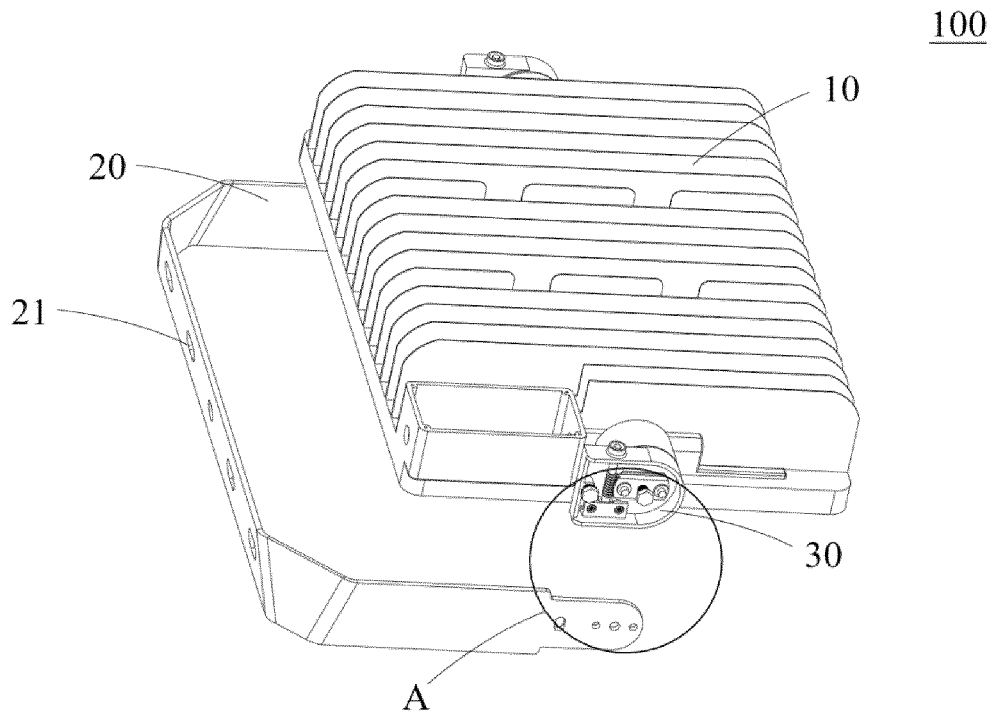
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15. The bracket assembly according to claim 14, wherein the second level angle adjustment structure further comprises a rotation member, the rotation member is disposed on the connection member and the rotation member is provided with the gear rack. 10
16. The bracket assembly according to claim 15, wherein the rotation member is disposed between the connection member and the bracket and is rotationally mounted to the rotation shaft. 15
17. The bracket assembly according to claim 16, wherein both ends of the rotation member are provided with convex extension portions that fit into the bracket, the bracket is correspondingly provided with a slotted hole for the convex extension portion to pass through, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member. 20 25 30
18. The bracket assembly according to claim 14, wherein the bracket is provided with a rotating member protruding towards the connecting member, an outer wall of the worm is provided with a threaded structure, the gear rack is disposed on a circumferential side of the rotation member and engages with the worm, and in a case where the worm rotates, the worm is capable of driving the rotation member to rotate, such that the rotation member drives the bracket to rotate relative to the connection member. 35 40

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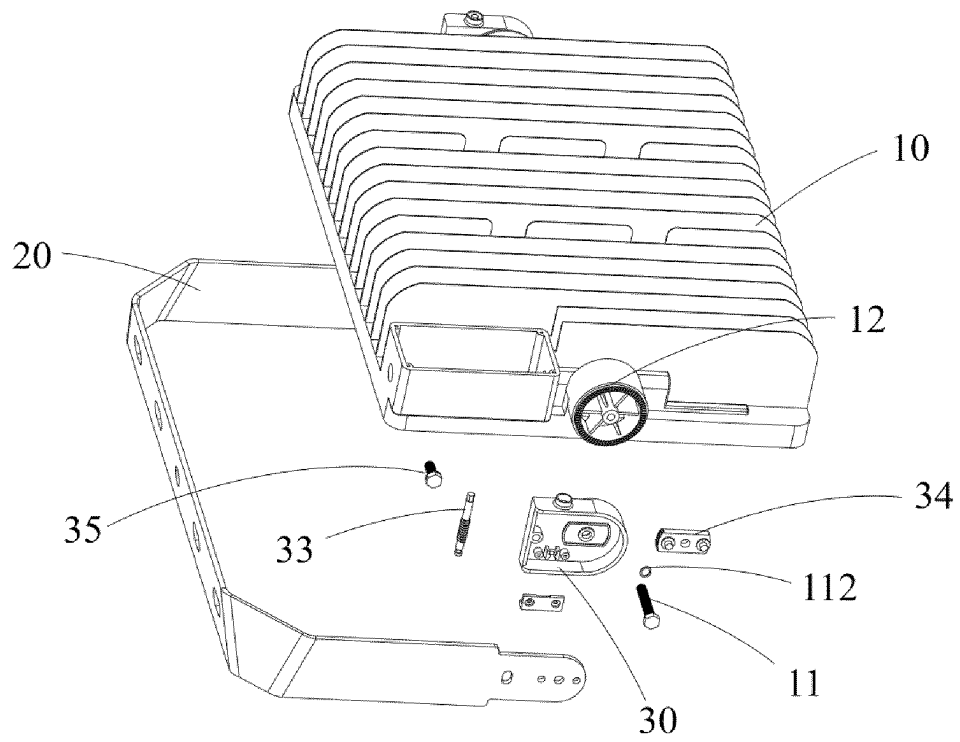


FIG. 3

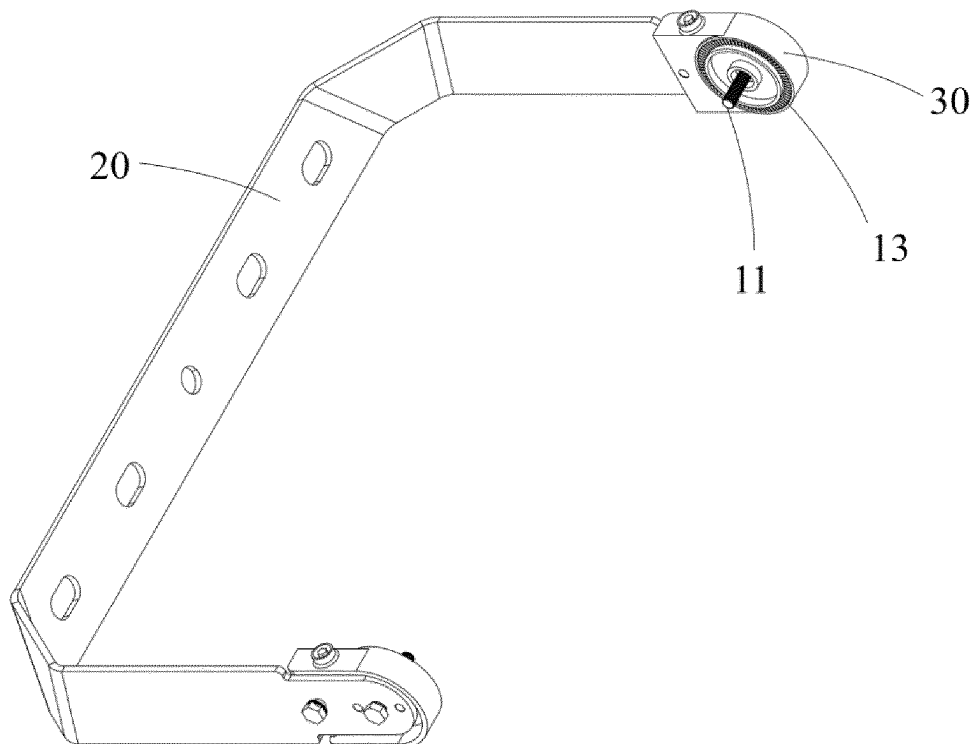


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/135254

A. CLASSIFICATION OF SUBJECT MATTER

F21V14/02(2006.01);F21S8/08(2006.01);F21V19/02(2006.01);

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:F21V; F21S

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

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

CNTXT; ENTXTC; DWPI; VEN: 齿, 蜗杆, 支架, 旋转, 转动, 轴, tooth, teeth, worm, support+, hold+, rotat+, spin+, axis

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 216667468 U (SUZHOU OPPL LIGHTING CO., LTD.) 03 June 2022 (2022-06-03) claims 1-18	1-18
X	CN 103782095 A (GOLIGHT INC.) 07 May 2014 (2014-05-07) description, paragraphs [0002]-[0056], and figures 1-13	1-18
X	CN 101725933 A (OCEAN'S KING LIGHTING SCIENCE & TECHNOLOGY CO., LTD. et al.) 09 June 2010 (2010-06-09) description, paragraphs [0002]-[0024], and figures 1-3	1-18
X	CN 201697072 U (DONGGUAN HUAMING LAMP CO., LTD.) 05 January 2011 (2011-01-05) description, paragraphs [0002]-[0021], and figures 1-2	1-18
A	CH 696067 A5 (SAIA-BURGESS MURTEN AG) 15 December 2006 (2006-12-15) entire document	1-18
A	CN 102840462 A (OCEAN'S KING LIGHTING SCIENCE & TECHNOLOGY CO., LTD. et al.) 26 December 2012 (2012-12-26) entire document	1-18

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

* Special categories of cited documents:

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“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

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Date of the actual completion of the international search

21 February 2023

Date of mailing of the international search report

23 February 2023

Name and mailing address of the ISA/CN

China National Intellectual Property Administration (ISA/
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China No. 6, Xitucheng Road, Jimenqiao, Haidian District,
Beijing 100088

Facsimile No. (86-10)62019451

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT

International application No. PCT/CN2022/135254

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C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 206694921 U (XIAMEN GREENER OPTOELECTRONICS CO., LTD.) 01 December 2017 (2017-12-01) entire document	1-18
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