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(54) **Bar type LED lighting apparatus**

Stabförmige LED Leuchtvorrichtung

Barre d'éclairage à LED

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US-A1- 2010 110 683 **US-A1- 2011 103 051**

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates, in general, to bar type LED lighting apparatuses and, more particularly, to a bar type LED lighting apparatus, in which an upper surface of a main body equipped with an LED module is inclined to both sides to expand a beam angle, the number of respective parts constituting the lighting apparatus is reduced, the parts are air-tightly fastened to each other, a fastening means for mounting the parts is also simple and affords convenience, and a heat dissipating problem occurring in the LED can be overcome by changing a structure of a main body, to increase heat dissipating efficiency, thus allowing the beam angle to be expanded, and ensuring air-tightness as well as a compact structure.

2. Description of the Related Art

[0002] A light emitting diode (hereinafter referred to as an 'LED') is a photoelectric conversion semiconductor device consisting of an N-type semiconductor crystal and a P-type semiconductor crystal. Here, a plurality of carriers is electrons in the N-type semiconductor crystal, while a plurality of carriers is holes in the P-type semiconductor crystal. The LED is a semiconductor light emitting device using natural emitting light that is generated when the electrons and holes injected into a PN junction are recombined with each other.

[0003] Recently, steady research into an LED lamp as a light source is ongoing. Likewise, attempts are being made to utilize the LED lamp as a lighting apparatus for a vehicle.

[0004] In particular, since the LED is high in photoelectric conversion efficiency, power consumption is very low, for example, 5W, and thus little heat is generated. Further, the LED does not emit light by heat discharge, so that a preheat time is not required and thus the LED is rapidly turned on or off. Furthermore, the LED has no gas or filament, so that it is shock resistant and safe. The LED adopts a stable DC lighting method, so that power consumption is low, a repetitively pulsed operation is possible, fatigue in optic nerves can be reduced, a service life is semi-permanent, and the LED is high in economic efficiency.

[0005] Meanwhile, a halogen lamp, a xenon lamp, a high-voltage discharge lamp (HID), etc. may be exemplified as a conventional lighting apparatus used in an exterior construction site.

[0006] The halogen lamp is usually 50w in rating power consumption, so that power consumption is high and a lot of heat is generated. Hence, if an intensity of illumination is increased, there exists a fire danger. Further, since the halogen lamp has a short service life of about 5,000-6,000 hours, the frequency of replacement is high and consequently the halogen lamp is low in economic efficiency due to the frequent replacement of the lamp.

[0007] The xenon lamp is configured by injecting xenon gas into a bulb. The xenon lamp can obtain light that is slightly brighter than that of the halogen lamp, but its effect is not very high.

[0008] Further, the high-voltage discharge lamp is advantageous in that it can achieve a very high intensity of illumination with low power. However, the high-voltage discharge lamp is problematic in that it is turned on by the discharge of electricity, so that a lighting speed is low, and an additional voltage stabilizing device is required to turn the lamp on, so that the lamp is expensive, and an auxiliary mechanism is required to operate the lamp, so that it is difficult to miniaturize the lamp.

[0009] In order to solve the problems, an LED is utilized as a light source. The LED is advantageous in that it is superior to the above-mentioned conventional light sources in power consumption, life span, and luminance. However, the LED has a problem concerning heat dissipation. Thus, recently, the LED lighting apparatus puts emphasis on effective heat dissipation as well as a compact structure.

[0010] Of course, since the LED is a lighting apparatus that has an inherent problem in heat dissipation and besides directly contacts an exterior work environment (i.e. a construction site or a mining site), air-tightness is required. Moreover, since the LED is installed in such a site, a more convenient and stable fastening method is required. Several related arts have been proposed to solve the problems.

[0011] As one of the related arts, there is proposed Korean U.M. Registration No. 20-0453689 (May, 13, 2011), which was created by the applicant of this invention and is entitled "Bar Type LED Lighting apparatus for Vehicles".

[0012] U.M. Registration No. 20-0453689 pertains to the bar type LED lighting apparatus for vehicles, which is good in assemblability, has 0-ring grooves on front and side covers of a main body casing to perfectly prevent water leakage, and can easily expand a support point according to the type of work that is to be performed by a vehicle.

[0013] Several effects can be expected in U.M. Registration No. 20-0453689. However, as for U.M. Registration No. 20-0453689, a beam angle of the LED is limited. Further, since the lighting apparatus is configured so that the front and side of the main body casing are disassembled from each other, such a configuration has some advantages but is poor in air-tightness.

[0014] Other types of lighting apparatuses are proposed in Korean Patent No. 10-0939477 (Jan. 22, 2010), which is entitled Handrail Lighting apparatus for Road, Korean Patent No. 10-0987391 (Oct. 6, 2010), which is entitled "LED Lighting apparatus", etc.

[0015] As for Korean Patent No. 10-0939477, an LED light source is arranged only on a front, so that it is limited

to expand a beam angle.

[0016] Further, since a side socket closing a side of the lighting apparatus has a shape of a plate and thus is simply fastened to a main frame, the lighting apparatus suffers from poor air-tightness.

[0017] Furthermore, Korean Patent No. 10-0987391 discloses an LED lighting apparatus having a bracket that allows the rotation of a heat dissipation frame in a particular direction to change the irradiation angle of the LED.

[0018] In the lighting apparatus disclosed in Korean Patent No. 10-0987391, it is possible to change the irradiation angle in the particular direction, but it is impossible to expand a beam angle.

[0019] Further, unlike the present invention that will be described below, a side cover of a plate shape for closing a side of the lighting apparatus is adopted, so that air-tightness may be deteriorated.

[0020] Of course, this is lower in heat dissipating efficiency than the present invention that will be described below.

[0021] Document US 2010/0110683 describes an LED lamp which includes a heat sink having a planar base, a plurality of LED modules attached to a bottom face of the base, an envelope disposed on the bottom face of the base and covering the LED modules, and a lamp bracket securing the base and the envelope together. The lamp bracket includes a vertical frame which defines an opening at a lateral side thereof, an engaging flange extending from an inner face of the frame and supporting a fixing flange of the envelope, and a plurality of protrusions projecting from the inner face of the frame above the engaging flange and pressing the base downwardly towards the envelope. The base of the heat sink and the envelope are inserted into the vertical frame through the opening.

[0022] Further, document US 2011/0103051 relates to an LED apparatus of the type including (a) a mounting board having an LED-supporting surface with an LED device thereon and (b) a lens member over the LED device establishing a light path therebetween. The inventive LED apparatus includes a lens-aligning member having front and back surfaces and defining an aperture receiving the LED device therethrough such that the LED device protrudes beyond the front surface. The lens member includes a lens portion and a flange thereabout, the flange being attached to the front surface of the lens-aligning member such that the lens portion substantially surrounds the protruding LED device. The lens-aligning member has a first mating feature which is positioned and arranged for mating engagement with a second mating feature of the mounting board, thereby accurately aligning the lens member over the LED device by accurately aligning the lens-alignment member with the mounting board.

SUMMARY OF THE INVENTION

[0023] Accordingly, the present invention has been made keeping in mind the above problems occurring in the related art, and the present invention is intended to propose a bar type LED lighting apparatus, which is compact in structure, and besides is capable of expanding a beam angle of an LED lighting apparatus.

[0024] Another object of the present invention is intended to propose a bar type LED lighting apparatus, which is configured to be airtight as well as be compact in structure considering that it is a lighting apparatus exposed to the exterior environment, thus preventing the leakage of water.

[0025] A further object of the present invention is intended to propose a bar type LED lighting apparatus, which realizes high heat dissipating efficiency with a compact structure.

[0026] Yet another object of the present invention is intended to propose a bar type LED lighting apparatus, which ensures simple and tight fastening when the apparatus is mounted on a ceiling of a site.

[0027] In order to achieve the above object, according to one aspect of the present invention, there is provided a bar type LED lighting apparatus, including:

a main body having first and second upper surfaces that are provided on opposite sides of a center line in such a way as to be inclined, and a side surface that is bent rearwards from each of the first and second upper surfaces,

an LED module disposed on the upper surfaces of the main body;

a cover member positioned to protect the LED module; and

a bezel part fastened to the upper surfaces of the main body in such a way as to pressurize an outer portion of the cover member,

a wire discharge duct serving to discharge a wire by the LED module and mounted to a lower surface of the main body, and

a fastening means mounted to the lower surface of the main body and fastening the lighting apparatus to a vehicle,

wherein an angle between the first and second upper surfaces of the main body with respect to the center line is an obtuse angle,

a plurality of heat dissipation fins is arranged on the lower surface of the main body in a lateral direction, with an uneven portion formed on a side surface of each heat dissipation fin in a lateral direction, and

a concave groove is formed in a portion of a longitudinal side surface of the main body, and the wire discharge duct is press fitted into the concave groove.

[0028] Further, according to the present invention, the bezel part may comprise first and second bezel parts that are provided on the opposite sides of the center line in such a way as to be inclined and thereby correspond to the inclined first and second upper surfaces of the main

body, each of the first and second bezel parts being divided into several portions in a longitudinal direction, and

[0029] A bottom edge of each of the first and second bezel parts may comprise a double edge, so that, during an insertion of a fastening pin, an inner edge pressurizes the cover member, and an outer edge pressurizes the upper surface of the main body.

[0030] Further, a contact surface of the cover member that is in contact with the upper surface of the main body may comprise a contact-surface middle groove to be in double contact with the upper surface of the main body, so that the contact surface may comprise a first contact surface and a second contact surface.

[0031] Furthermore, the fastening means may include an intermediate plate fastened to the main body, and a fastening plate placed on the intermediate plate and fastened to the vehicle,

the intermediate plate may include an attaching surface fastened to the lower surface of the main body, an expanding surface extending outwards from the attaching surface to be connected thereto, and a protruding step protruding forwards from an end of the expanding surface to prevent the removal of the fastening plate,

the fastening plate may include a connecting surface placed on the expanding surface of the intermediate plate, and a fastening surface bent rearwards from each of opposite ends of the connecting surface and then bent outwards to fasten the lighting apparatus to the vehicle, and

a fastening hole may be formed in each of the fastening surface and the attaching surface.

[0032] As is apparent from the above description, the bar type LED lighting apparatus is advantageous in that it has a more compact structure as compared to a conventional LED lighting apparatus, expands a beam angle, and ensures air-tightness, thus being capable of protecting an interior LED module and being suitable for a location exposed to an external environment, such as a construction site or a mining site.

[0033] Particularly for air-tightness, unlike the conventional lighting apparatus, a plate-shaped side is eliminated, and a bezel part structure for doubly pressurizing an outer portion of an upper surface of a main body is adopted, thus realizing a compact structure and superior air-tightness.

[0034] Further, a lower surface and a side surface of a main body according to the present invention are portions that are directly exposed to the outside. A plurality of heat dissipation fins is arranged in a longitudinal direction on the lower surface of the main body. Simultaneously, each heat dissipation fin forms an uneven portion in a longitudinal direction on the side surface, thus enhancing heat dissipating efficiency.

[0035] The uneven portion allows a wire discharge duct to be press-fitted into the main body.

[0036] Ultimately, the lighting apparatus of the present invention has effects to expand a beam angle and achieve good air-tightness and high heat dissipating efficiency as a compact structure.

[0037] Further, a fastening means is simply designed and also enables tight fastening.

BRIEF DESCRIPTION OF THE DRAWINGS

[0038] The above and other objects, features and advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

FIGS. 1A and 1B are perspective views showing a lighting apparatus according to the present invention;

FIGS. 2A and 2B are partially enlarged views showing the lighting apparatus according to the present invention;

FIG. 3 is an exploded perspective view showing the lighting apparatus according to the present invention;

FIGS. 4A and 4B are exploded perspective views illustrating parts of the lighting apparatus according to the present invention in enlarged views; and

FIGS. 5A and 5B are sectional views taken along line A-A' and line B-B' of FIG. 1A.

DESCRIPTION OF PREFERRED EMBODIMENTS

[0039] Hereinafter, the bar type LED lighting apparatus according to the present invention will be described in more detail.

[0040] First, in order to aid the understanding of the lighting apparatus according to the present invention, directions are designated as follows.

[0041] That is, in the lighting apparatus of FIGS. 1A and 1B, a side of the lighting apparatus having a cover member 20 and a bezel part 30 is designated as a front, while an opposite side, namely, a side through which a heat dissipation fin 140 of a main body is exposed is designated as a rear.

[0042] Further, in the lighting apparatus of FIGS. 1A and 1B, a lateral direction and a longitudinal direction are designated to explain a configuration of the present invention.

[0043] Next, in the lighting apparatus of FIG. 4A, a portion of the main body 10 exposed to the front is designated as upper surfaces 111 and 112, while an opposite portion is designated as a lower surface. A portion bent rearwards from each of upper and lower ends of the upper surface of the main body is referred to as a side surface 120, and a surface of the main body through which the heat dissipation fin is exposed is designated as a longitudinal side surface 130. The configuration of this invention will be described on a basis of the above-mentioned direction.

[0044] Referring to FIGS. 1A and 1B and FIG. 3, the bar type LED lighting apparatus according to the present invention includes a main body 10, an LED module (not

shown) that is disposed on an upper surface of the main body 10, a cover member 20 that is disposed over the LED module to protect the LED module, and a bezel part 30 that is provided on the cover member 20 and is fastened to the main body 10.

[0045] In particular, the upper surface of the main body comprises first and second upper surfaces 111 and 112 that are provided on opposite sides of a center line C in such a way as to be inclined. The LED module is disposed on the upper surfaces, thus expanding a beam angle.

[0046] In other words, as ends of the first and second upper surfaces 111 and 112 are displaced rearwards from the center line C, the upper surface of the main body 10 is not a plane but comprises two inclined surfaces formed on the opposite sides of the center line C.

[0047] Of course, in order to appropriately expand the beam angle and increase the heat dissipating efficiency of a heat dissipation fin installed in the lower surface of the main body 10, an angle α between the first upper surface 111 and the second upper surface 112 is preferably an obtuse angle (see FIGS. 4A and 4B).

[0048] Next, the bezel part 30 is fastened to the upper surface of the main body 10 in such a way as to pressurize the outer portion of the cover member 20 that is previously disposed on the upper,surface of the main body 10.

[0049] The bezel part 30 comprises first and second bezel parts 311 and 312 that are inclined rearwards from the center line C in such a way as to correspond to the inclined first and second upper surfaces 111 and 112 of the main body 10.

[0050] Bottom edges of the first and second bezel parts 311 and 312 that are in contact with the upper surface of the main body 10 comprise a double edge, namely, an inner edge 321 and an outer edge 322. When a fastening pin P is inserted to fasten the bezel part 30 to the upper surface of the main body 10, the inner edge 321 pressurizes the cover member 20 and the outer edge 322 pressurizes the first and second upper surfaces 111 and 112 of the main body 10 (see FIG. 5A).

[0051] Next, the cover member 20 of the present invention includes a lens 22 irradiating light from the LED module, and an outer portion 21 formed around the lens 22.

[0052] When the fastening pin P is fastened, the inner edge 321 of the bezel part 30 pressurizes the upper surface of the outer portion 21 of the cover member 20.

[0053] Further, since the lighting apparatus of the present invention is a type of a bar that is long in the lateral direction, it is preferable that each of the first and second bezel parts be longitudinally divided into several portions 30a, 30b, 30c, and 30d.

[0054] The longitudinal division can provide a space for inserting the fastening pin. Thereby, the fastening pin is preferably fastened at a specific point of the inner portion as well as the outer portions of the first and second bezel parts, thus ensuring the tight coupling with the main body 10.

[0055] Moreover, according to the present invention, the bezel part 30 itself closes the side surface of the lighting apparatus and protects the LED module disposed therein, thus enhancing air-tightness due to the double pressurizing structure.

[0056] Further, according to the present invention, the air-tightness is improved by the cover member 20.

[0057] As shown in FIG. 5A, according to the present invention, a contact surface of the outer portion 21 of the cover member 20 which is in contact with the upper surface of the main body 10 is provided with a contact-surface middle groove 230 to be in double contact with the upper surface of the main body 10, so that the contact surface is divided into a first contact surface 210 and a second contact surface 220.

[0058] The contact surfaces 210 and 220 are in contact with the upper surfaces 111 and 112 of the main body 10, thus achieving tighter contact and improving air-tightness.

[0059] Next, according to the present invention, a plurality of heat dissipation fins 140 is laterally arranged on the lower surface of the main body 10 in such a way as to be integrally connected to the main body 10, thus performing a heat dissipating function.

[0060] Further, an uneven portion 145 is formed laterally on a side surface of the heat dissipation fin 140, thus maximizing a contact area and enhancing the heat dissipating effect.

[0061] Moreover, an uneven portion 145 is also formed laterally on a side surface 120 of the main body 10, thus enhancing the heat dissipating effect.

[0062] Particularly in the present invention, a concave portion 125 is formed in the side surface 120 of the main body 10, and an uneven portion 145 is further formed on a surface of the concave portion 125, thus maximizing a contact area and enhancing heat dissipating efficiency.

[0063] Further, as seen in FIGS. 1A and 1B and FIGS. 2A and 2B, the lighting apparatus of the present invention is designed such that the heat dissipation fin is exposed to the outside even at the side surface, thus increasing the heat dissipating efficiency.

[0064] Moreover, the uneven portion formed on the side surface of the heat dissipation fin has heat dissipating effect and besides enables press-fitting of the wire discharge duct 40.

[0065] That is, some of the heat dissipation fins are removed from the longitudinal side surface 130 of the main body 10, thus defining concave grooves 150. The wire discharge duct 40 is press-fitted into the concave groove 150 (see FIG. 5B).

[0066] The wire discharge duct 40 serves to provide a passage for discharging a wire connected to the LED module to the outside. Even if there is no wire discharge duct, it is possible to discharge the wire to the outside. However, the wire discharge duct allows the wire to be uniformly discharged in a predetermined direction, thus providing a neat appearance when the lighting apparatus is mounted to the vehicle.

[0067] Next, the lighting apparatus of the present in-

vention further comprises a fastening means T for fastening the lighting apparatus to a ceiling of a construction site or a mining site. The fastening means will be described below.

[0068] The fastening means T is mounted to the lower surface of the main body 10 to fasten the lighting apparatus to the vehicle.

[0069] The fastening means T includes an intermediate plate 50 that is fastened to the main body 10, and a fastening plate 60 that is placed on the intermediate plate 50 and mounted to a ceiling (an object to be fastened).

[0070] This will be described in detail with reference to FIGS. 2A and 2B and FIGS. 4A and 4B.

[0071] The intermediate plate 50 has the shape of a plate and includes an attaching surface 51 and an expanding surface 52. The attaching surface 51 is a portion that is to be fastened to the lower surface of the main body 10. Further, the expanding surface 52 extends outwards from the attaching surface 51 to be connected thereto. The fastening plate 60 is placed on the upper surface of the expanding surface 52.

[0072] Further, a protruding step 53 is formed on an end of the expanding surface 52 in such a way as to protrude forwards, thus preventing the removal of the fastening plate 60.

[0073] Next, the fastening plate 60 includes a connecting surface 61 that is in contact with the expanding surface 52 of the intermediate plate 50, and fastening surfaces 62 that are formed, respectively, on both ends of the connecting surface 61 to provide fastening portions with the object to be fastened.

[0074] More specifically, the fastening surfaces 62 are bent rearwards from both ends of the connecting surface 61 and then bent outwards.

[0075] Of course, fastening holes A are formed, respectively, in the fastening surfaces 62 and the attaching surface 51 to fasten the lower surface of the main body 10 to be fastened to the object.

[0076] That is, the fastening means of the lighting apparatus according to the present invention is used to attach the lighting apparatus to the ceiling. First, the fastening plate 60 is attached to the ceiling. Afterwards, it is required only to place the lighting apparatus, having the intermediate plate 50 attached to the lower surface of the main body 10, on the fastening plate 60. Thereby, the mounting operation is simply completed.

[0077] 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 of the invention as disclosed in the accompanying claims.

Claims

1. A bar type LED lighting apparatus, comprising:

a main body (10) having a heat dissipation fin (140) on a lower surface;

an LED module disposed on an upper surface (111,112) of the main body (10);

a cover member (20) positioned to protect the LED module; and

a bezel part (30) fastened to the upper surface (111,112) of the main body (10) in such a way as to pressurize an outer portion of the cover member (20),

wherein the main body (10) comprises first and second upper surfaces (111,112) that are provided on opposite sides of a center line (c) in such a way as to be inclined, and a side surface (120) that is bent rearwards from each of the first and second upper surfaces (111,112),

the bezel part (30) comprises first and second bezel parts (311, 312) that are provided on the opposite sides of the center line (c) in such a way as to be inclined and to correspond to the inclined first and second upper surfaces (111,112) of the main body (10),

each of the first and second bezel parts (311, 312) is divided into several portions (30a,30b,30c,30d) in a longitudinal direction,

a bottom edge of each of the first and second bezel parts (311, 312) is doubly formed, so that, during an insertion of a fastening pin (P), an inner edge (321) pressurizes the cover member (20), and an outer edge (322) pressurizes the upper surface (111,112) of the main body (10).

2. The LED lighting apparatus as set forth in claim 1, wherein an angle between the first and second upper surfaces with respect to the center line of the main body (10) is an obtuse angle with respect to the center line.

3. The LED lighting apparatus as set forth in claim 1 or 2, wherein a contact surface of the cover member (20) that is in contact with the upper surface of the main body (10) comprises a contact-surface middle groove to be in double contact with the upper surface of the main body, so that the contact surface comprises a first contact surface and a second contact surface.

4. The LED lighting apparatus as set forth in any one of claims 1 to 3, wherein the lighting apparatus comprises fastening means that is mounted to the lower surface of the main body lower surface and serves to fasten the lighting apparatus to a desired object,

the fastening means comprises an intermediate plate fastened to the main body, and a fastening plate placed on the intermediate plate and fastened to the object,

the intermediate plate comprises an attaching surface fastened to the lower surface of the main body,

an expanding surface extending outwards from the attaching surface to be connected thereto, and a protruding step protruding forwards from an end of the expanding surface to prevent a removal of the fastening plate,
the fastening plate comprises a connecting surface placed on the expanding surface of the intermediate plate, and a fastening surface bent rearwards from each of opposite ends of the connecting surface and then bent outwards to fasten the lighting apparatus to the object, and
a fastening hole is formed in each of the fastening surface and the attaching surface.

Patentansprüche

1. Stangenförmiges LED-Beleuchtungsgerät, umfassend:

   Einen Hauptkörper (10) mit einer Wärmeabführungsrippe (140) an einer unteren Oberfläche;
   ein LED-Modul, das an einer oberen Oberfläche (111, 112) des Hauptkörpers (10) angeordnet ist;
   ein Abdeckelement (20), das derart positioniert ist, dass es das LED-Modul schützt; und
   ein Blendenteil (30), das an der oberen Oberfläche (111, 112) des Hauptkörpers (10) derart befestigt ist, dass es einen Außenbereich des Abdeckelements (20) beaufschlagt,
   wobei der Hauptkörper (10) erste und zweite obere Oberflächen (111, 112) umfasst, die an entgegengesetzten Seiten einer Mittellinie (c) derart vorgesehen sind, dass sie geneigt sind, sowie eine Seitenoberfläche (120), die von jeder der ersten und zweiten oberen Oberflächen (111, 112) rückwärts gebogen ist,
   wobei das Blendenteil (30) erste und zweite Blendenteile (311, 312) umfasst, die an den entgegengesetzten Seiten der Mittellinie (c) derart vorgesehen sind, dass sie geneigt sind und den geneigten ersten und zweiten oberen Oberflächen (111, 112) des Hauptkörpers (10) entsprechen,
   wobei jedes von den ersten und zweiten Blendenteilen (311, 312) in einer Längsrichtung in verschiedene Bereiche (30a, 30b, 30c, 30d) unterteilt ist,
   wobei eine Bodenkante von jedem der ersten und zweiten Blendenteile (311, 312) doppelt gebildet ist, derart, dass während eines Einsetzens eines Befestigungsstifts (P) eine Innenkante (321) das Abdeckelement (20) beaufschlagt, und eine Außenkante (322) die obere Oberfläche (111, 112) des Hauptkörpers (10) beaufschlagt.

2. LED-Beleuchtungsgerät nach Anspruch 1, wobei ein Winkel zwischen den ersten und zweiten oberen Oberflächen relativ zur Mittellinie des Hauptkörpers (10) ein stumpfer Winkel relativ zur Mittellinie ist.

3. LED-Beleuchtungsgerät nach Anspruch 1 oder 2, wobei eine Kontaktoberfläche des Abdeckelements (20), die in Kontakt ist mit der oberen Oberfläche des Hauptkörpers (10), eine Kontaktoberfläche - Mittelrille für einen doppelten Kontakt mit der oberen Oberfläche des Hauptkörpers umfasst, so dass die Kontaktoberfläche eine erste Kontaktoberfläche und eine zweite Kontaktoberfläche umfasst.

4. LED-Beleuchtungsgerät nach einem der Ansprüche 1 - 3, wobei das Beleuchtungsgerät eine Befestigungseinrichtung umfasst, die an der unteren Oberfläche der unteren Hauptkörperoberfäche montiert ist und dazu dient, das Beleuchtungsgerät an einem gewünschten Objekt zu befestigen,
   wobei die Befestigungseinrichtung eine Zwischenplatte umfasst, die an dem Hauptkörper befestigt ist, sowie eine Befestigungsplatte, die an der Zwischenplatte platziert und an dem Objekt befestigt ist,
   wobei die Zwischenplatte eine Anbringungsoberfläche umfasst, die an der unteren Oberfläche des Hauptkörpers befestigt ist, eine Expansionsoberfläche, die sich von der Anbringungsoberfläche auswärts erstreckt zur Verbindung damit, sowie eine vorstehende Stufe, die von einem Ende der Expansionsoberfläche nach vorne vorsteht, um ein Entfernen der Befestigungsplatte zu verhindern,
   wobei die Befestigungsplatte eine Verbindungsoberfläche umfasst, die an der Expansionsoberfläche der Zwischenplatte platziert ist, und eine Befestigungsoberfläche, die von jedem von entgegengesetzten Enden der Verbindungsoberfläche rückwärts gebogen und dann auswärts gebogen ist, um das Beleuchtungsgerät an dem Objekt zu befestigen, und
   wobei ein Befestigungsloch sowohl in der Befestigungsoberfläche als auch der Anbringungsoberfläche gebildet ist.

Revendications

1. Appareil d'éclairage à LED de type barre, comprenant :

   un corps principal (10) présentant une ailette de dissipation de la chaleur (140) sur une surface inférieure ;
   un module de LED disposé sur une surface supérieure (111, 112) du corps principal (10) ;
   un capot (20) positionné afin de protéger le module de LED ;
   et

un cadre (30) fixé sur la surface supérieure (111, 112) du corps principal (10) de manière à appliquer une pression sur une partie externe de l'élément de capot (20),
le corps principal (10) comprenant une première et une deuxième surfaces supérieures (111, 112) ménagées de part et d'autre d'une ligne centrale (c) de façon à être inclinées, et une surface latérale (120) courbée vers l'arrière depuis chacune des première et deuxième surfaces supérieures (111, 112),
le cadre (30) comprenant un premier et un deuxième cadres (311, 312) ménagés de part et d'autre de la ligne centrale (c) de manière à être inclinés et à correspondre à la première et à la deuxième surfaces supérieures (111, 112) inclinées du corps principal (10),
chacun des premier et deuxième cadres (311, 312) étant divisé en plusieurs parties (30a, 30b, 30c, 30d) dans une direction longitudinale,
un bord inférieur de chacun des premier et deuxième cadres (311, 312) étant doublé, afin que, durant l'insertion d'un pion de fixation (P), un bord intérieur (321) applique une pression sur le capot (20), et un bord extérieur (322) applique une pression sur la surface supérieure (111, 112) du corps principal (10).

2. Appareil d'éclairage à LED selon la revendication 1, dans lequel un angle entre les première et deuxième surfaces supérieures par rapport à la ligne centrale du corps principal (10) est un angle obtus par rapport à la ligne centrale.

3. Appareil d'éclairage à LED selon la revendication 1 ou 2, dans lequel une surface de contact du capot (20) en contact avec la surface supérieure du corps principal (10) comprend une rainure centrale à surface de contact afin d'être en double contact avec la surface supérieure du corps principal, de sorte que la surface de contact comprend une première et une deuxième surfaces de contact.

4. Appareil d'éclairage à LED selon l'une quelconque des revendications de 1 à 3, dans lequel l'appareil d'éclairage comprend un moyen de fixation monté sur la surface inférieure de la surface inférieure du corps principal et sert à fixer le dispositif d'éclairage sur un objet souhaité,
le moyen de fixation comprenant une plaque intermédiaire fixée sur le corps principal, et une plaque de fixation placée sur la plaque intermédiaire et fixée sur l'objet,
la plaque intermédiaire comprenant une surface d'attache fixée sur la surface inférieure du corps principal, une surface de prolongement s'étendant vers l'extérieur depuis la surface d'attache afin d'y être reliée, et une patte faisant saillie vers l'avant depuis une extrémité de la surface de prolongement afin d'empêcher le retrait de la plaque de fixation,
la plaque de fixation comprenant une surface de raccordement placée sur la surface de prolongement de la plaque intermédiaire, et une surface de fixation courbée vers l'arrière depuis chacune des extrémités opposées de la surface de raccordement, puis courbée vers l'extérieur afin de fixer l'appareil d'éclairage sur l'objet, et
un trou de fixation étant formé dans chacune des surfaces de fixation et d'attache.

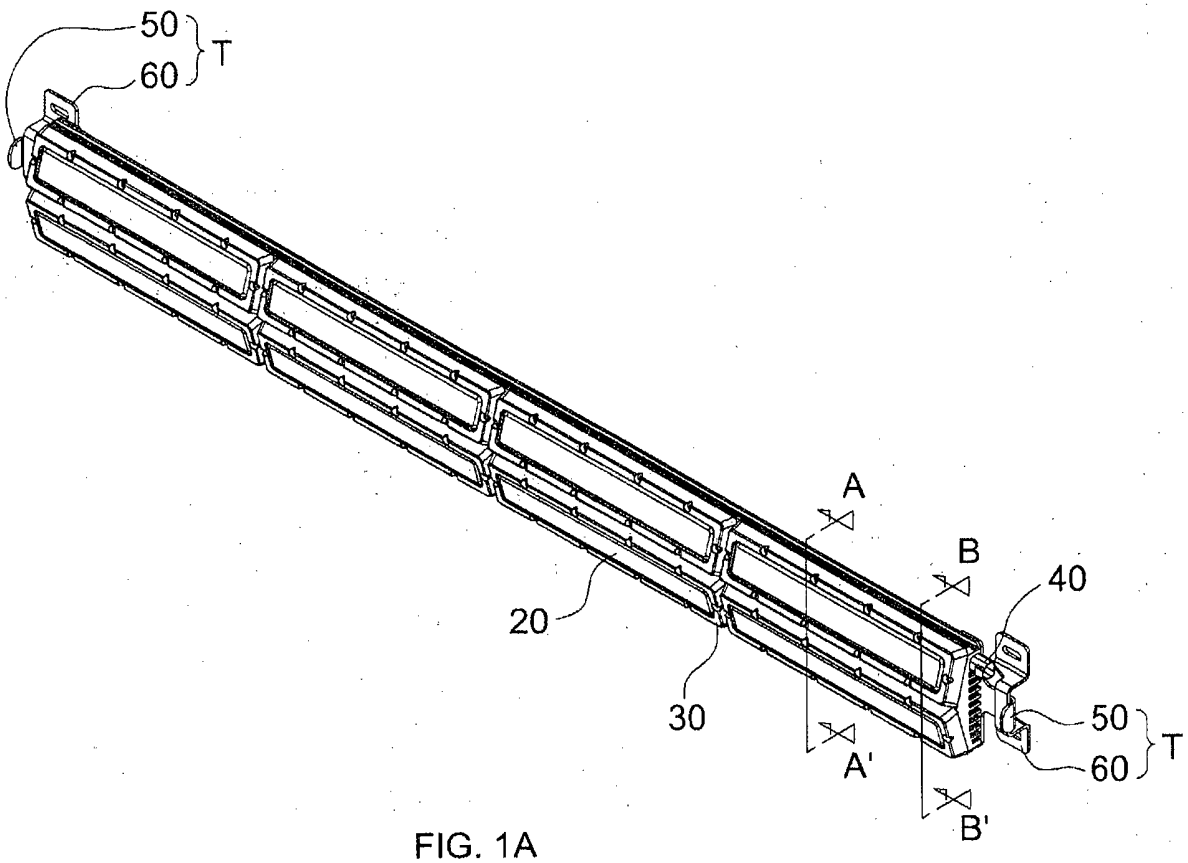


FIG. 1A

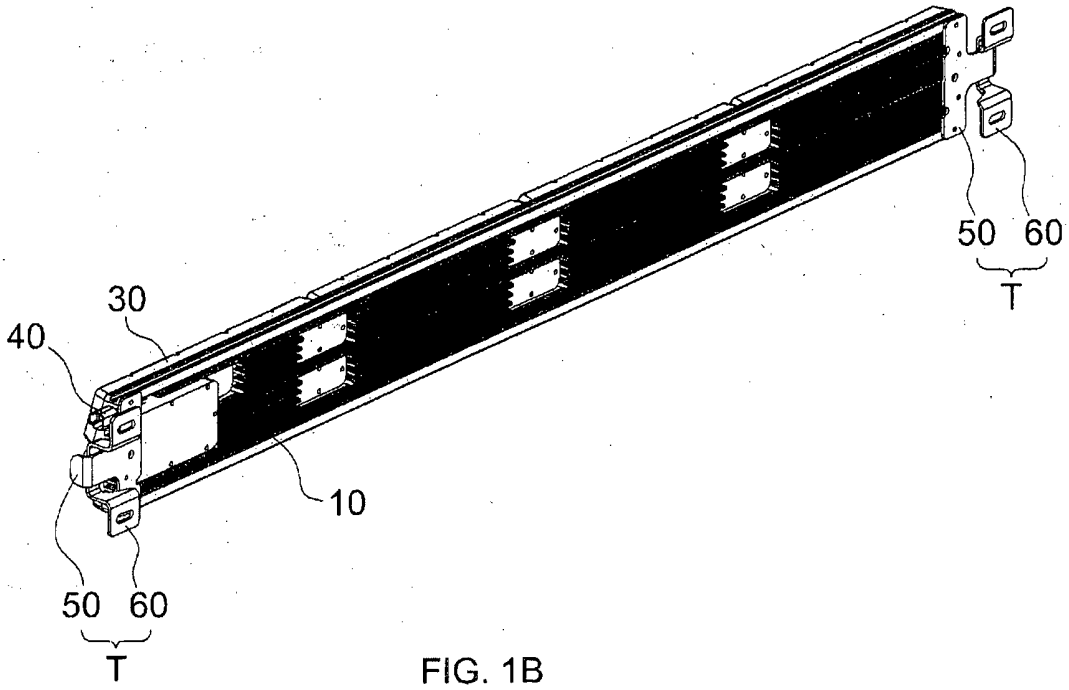


FIG. 1B

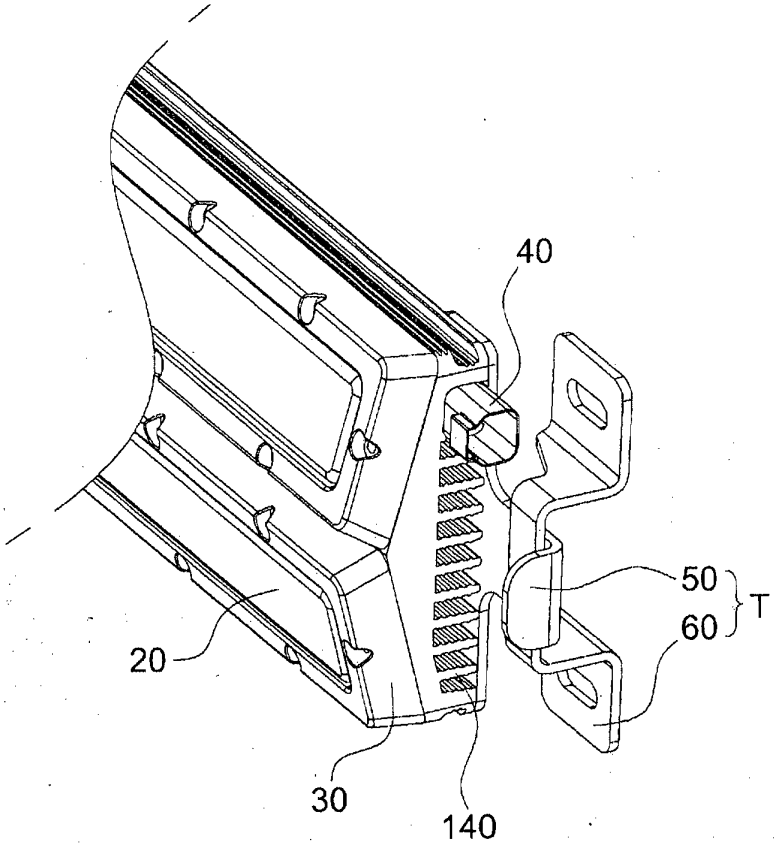


FIG. 2A

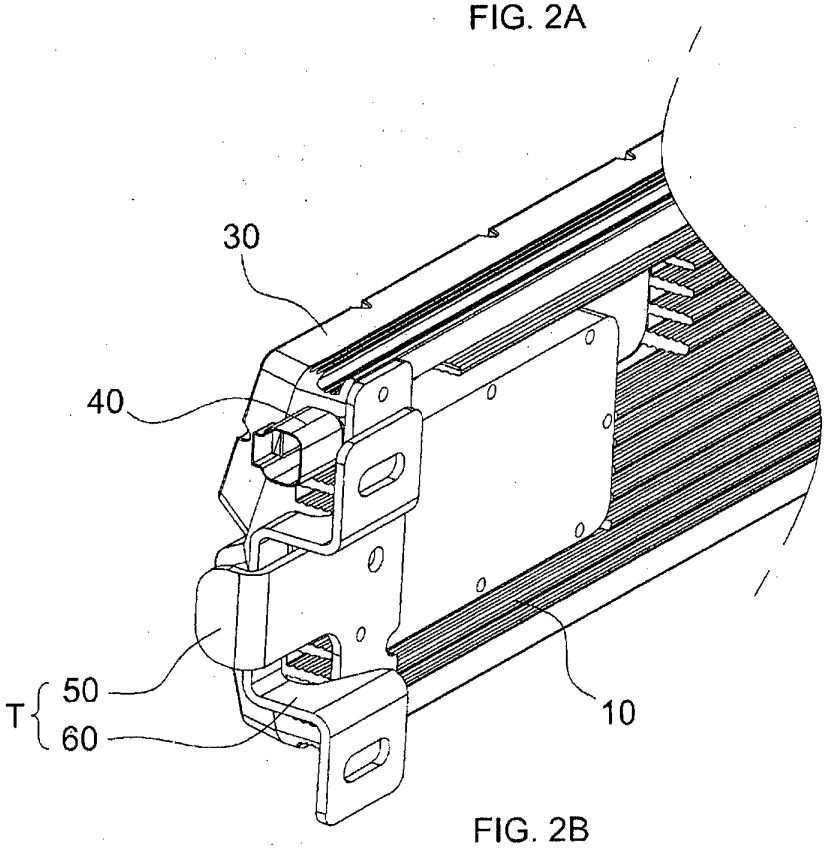
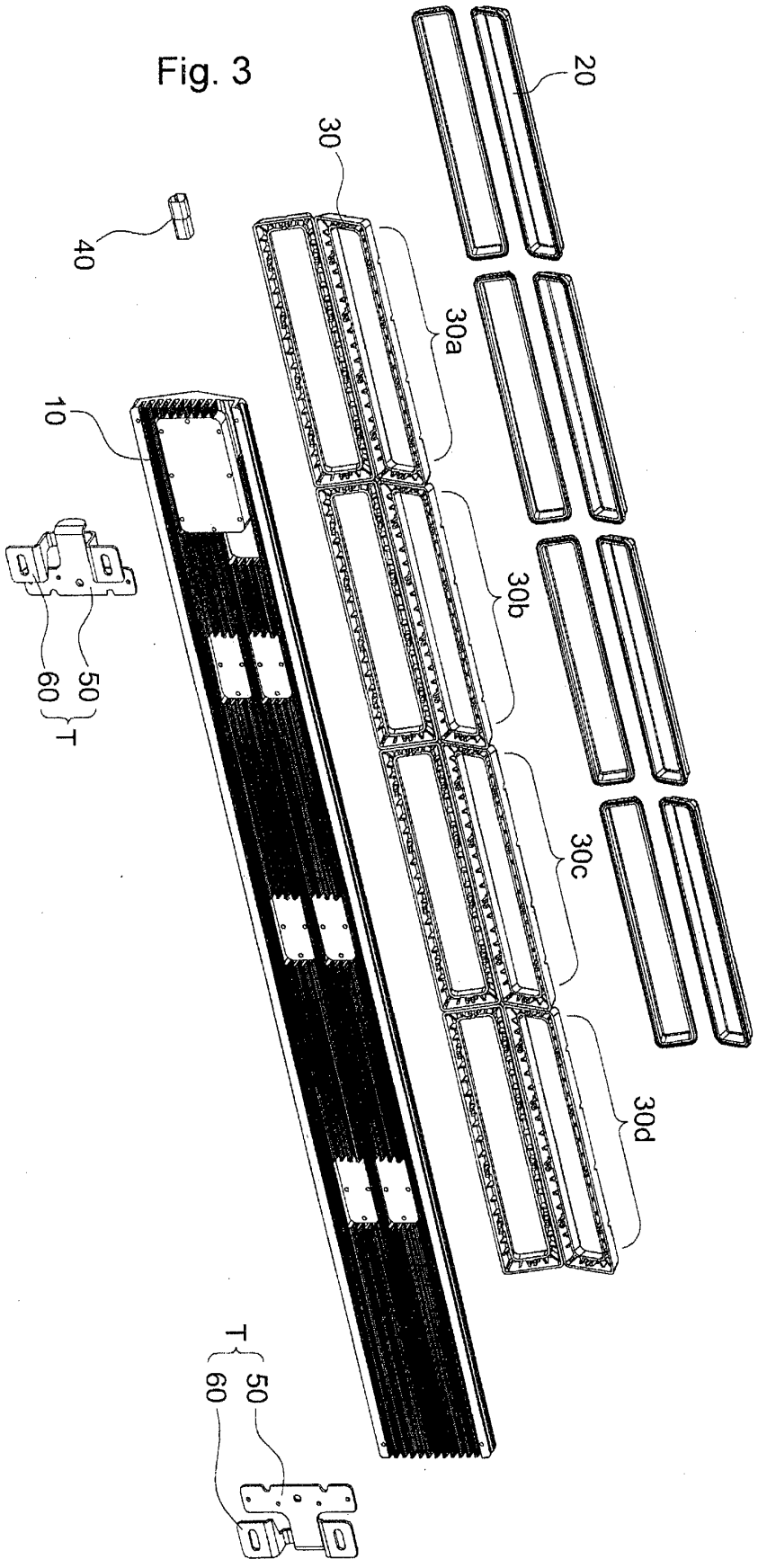


FIG. 2B

Fig. 3



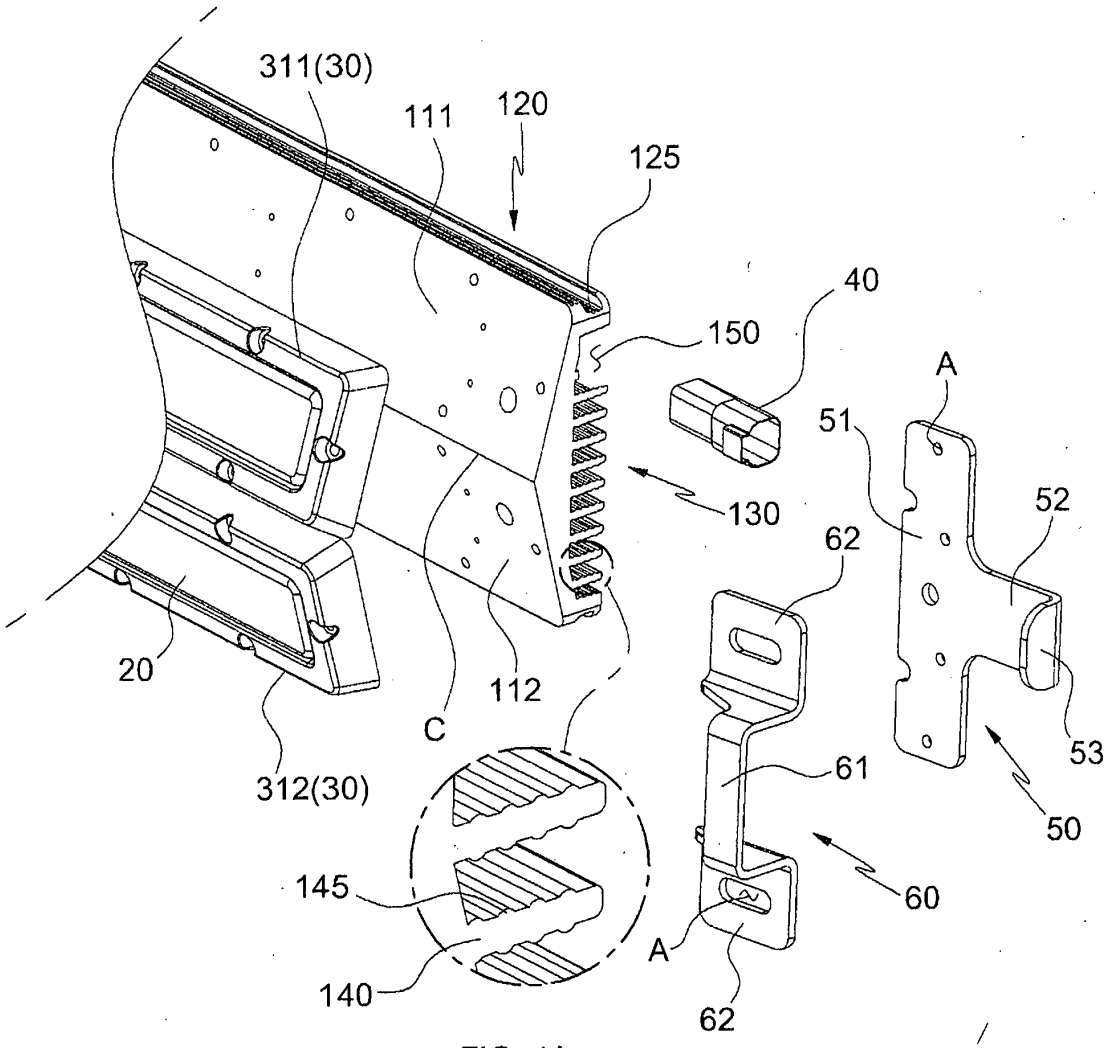

311(30)
111
120
125
40
150
A
51
52
62
130
20
112
C
312(30)
61
53
50
145
60
140
A
62

FIG. 4A

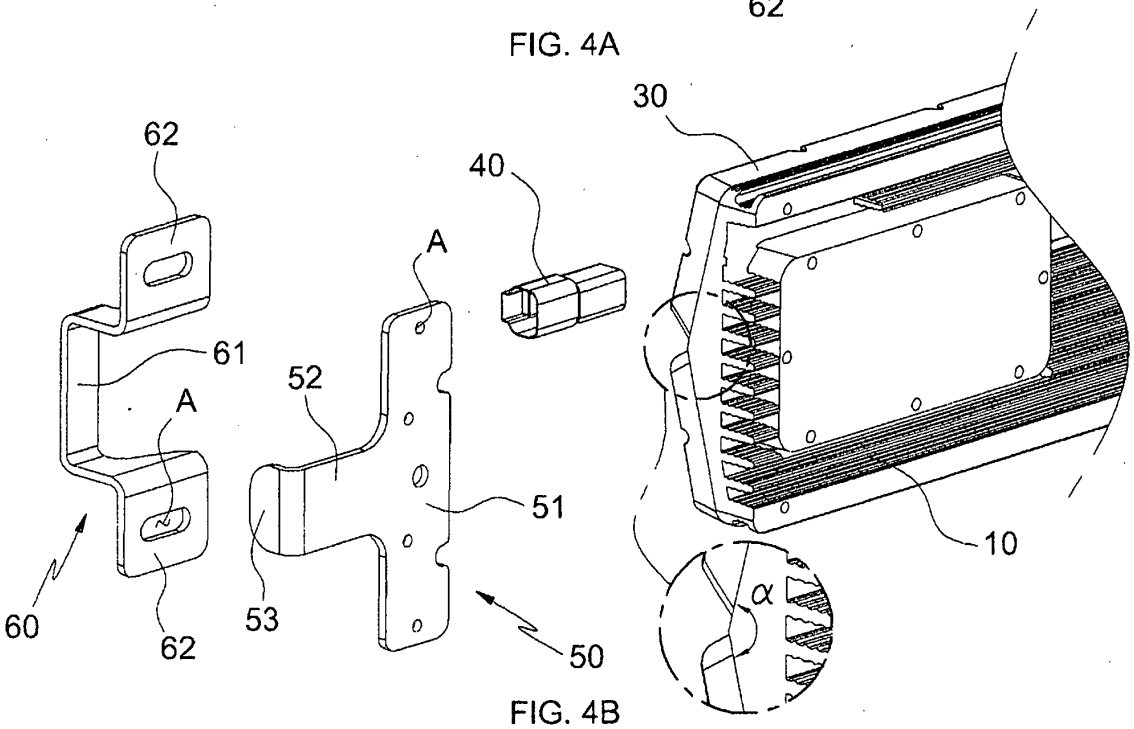

62
30
40
A
61
52
A
51
10
60
62
53
α
50

FIG. 4B

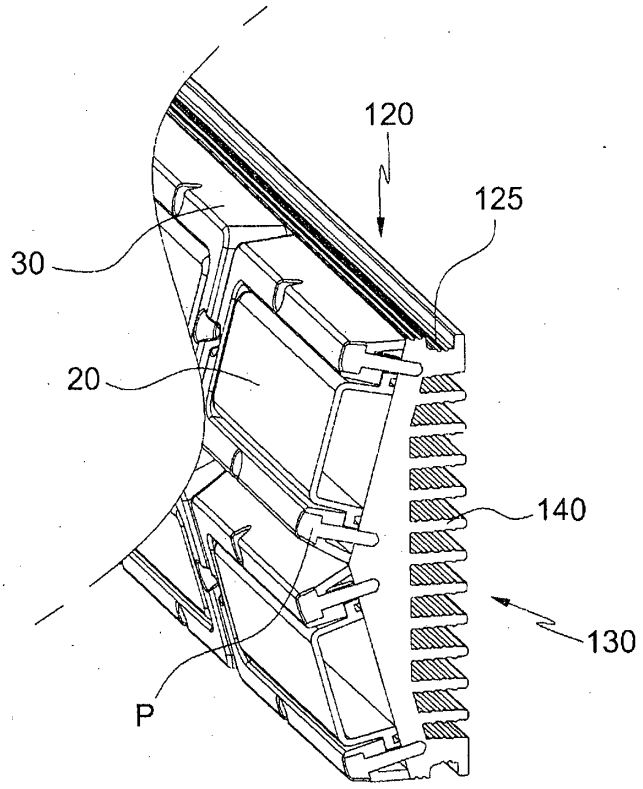


FIG. 5A

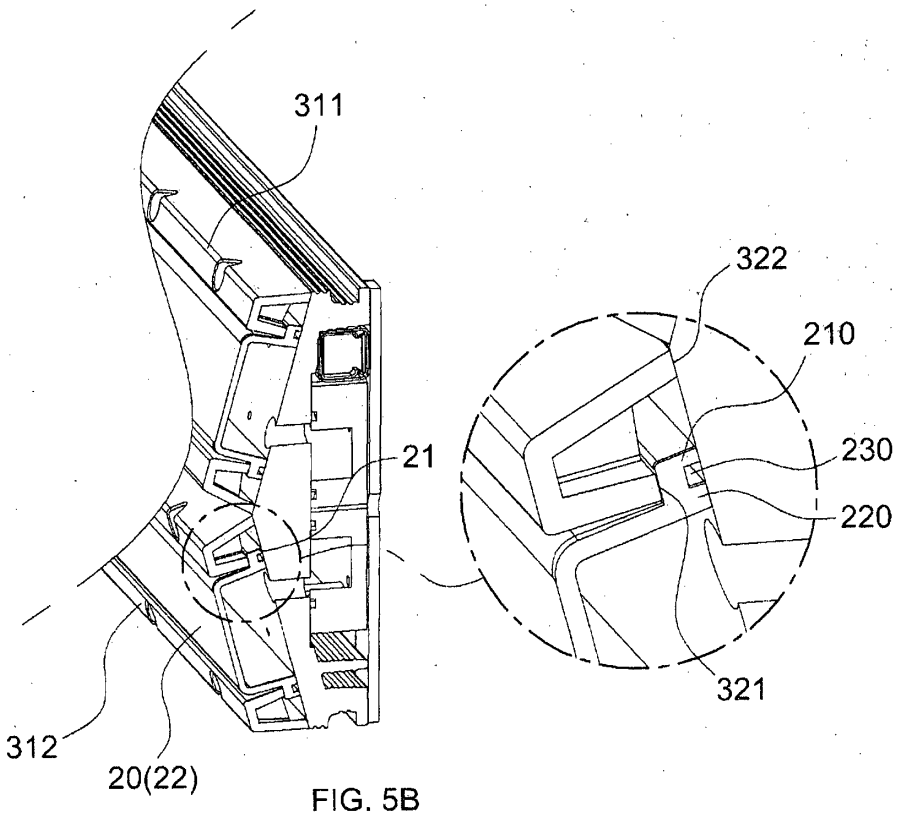


FIG. 5B

REFERENCES CITED IN THE DESCRIPTION

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