CLAIMS

[Claim 1] A lighting system comprising:

a plurality of lighting sources;

a body retaining the plurality of the light sources while comprising a transparent window for escaping the light emitted from the light sources, and a reflection member;

the reflection member being disposed so as to cover a window for reflecting light from outside of the body while a plurality of holes for launching the light emitted from each of the light sources are formed.

[Claim 2] The lighting system of claim 1, wherein the reflection member is a reflection sheet and a reflectivity of the reflection sheet is not less than 98 %.

[Claim 3] The lighting system of claim 1 or 2, wherein a material having a humidity absorption property is packed in the body.

[Claim 4] The lighting system of claim 1, wherein the body comprises a cooling panel to which a plurality of the light sources are attached, a spacer disposed such that the spacer is disposed surrounding a plurality of the light sources and being bonded to the cooling panel though a sealing material, and a light transparent plate which is disposed opposing to an attachment surface of a plurality of the light sources being attached to the cooling panel while being connected to the spacer through a sealing material to seal the light source.

[Claim 5] The lighting system of claim 4, wherein the cooling panel comprises a hollow part at a back side of the attachment surface of a plurality of the light sources

and is cooled by a cooling fluid flowing in the hollow part.

[Claim 6] The lighting system of claim 5, wherein the lighting system further comprises a water flowing tube passed through the hollow part to flow the coolant fluid therein.

[Claim 7] The lighting system of claim 4, wherein the cooling panel comprises an engagement part at a back side of the attachment surface for a plurality of the light sources and the water flowing tube is fixed by pressing in the water flowing tube into the engagement part.

[Claim 8] The lighting system of claim 4, wherein the cooling panel comprises a heat dissipation fins and the heat dissipation fins are arranged at a given spacing at the back side of the attachment surface for a plurality of the light source.

[Claim 9] A plant cultivation apparatus comprising:

at least one gutter member;

a cultivation shelf 23 to which at least one gutter member is placed slant to a longitudinal direction;

a cultivation tray placed adjacent to each other on at least one gutter;

a cultivation solution supply means that supplies the cultivation solution into each of the gutter member; and

a lighting system selected from any one of claims from claim 1 to claim 8 for shining light to the plants planted on a plurality of the cultivation tray.

[Claim 10] The plant cultivation apparatus of claim 9, wherein the plant cultivation apparatus comprises a reflection plate comprising a reflection surface for

reflecting the light from the lighting system and the light reflected by a surface of a plurality of the cultivation tray and disposed so as to close a side of a plurality of the cultivation tray to which the plants are planted thereon.

[Claim 11] The plant cultivation apparatus of claim 9 or 10, wherein the cultivation tray is paced such that the cultivation trays are placed in a series of growth of the plants along with a longitudinal direction of at least one of the gutter member and the gutter member is categorized into at least two region along to the longitudinal direction and the lighting systems comprises at least two lighting systems for the regions each of which comprises different numbers of light sources determined depending on growth of the plants.

[Claim 12] The plant cultivation apparatus of any one from claim 9 to 11, wherein the plant cultivation apparatus further comprises gas supply means for supplying oxygen to the cultivation solution,

[Claim 13] The plant cultivation apparatus of any one from claim 9 to 12, wherein the plant cultivation apparatus is placed in a room and further comprises an air circulation means for circulating the air on the room, a humidity control means for controlling the humidity in the room, and a floating substance removal means for removing the floating substances in the room.

CLAIMS

[Claim 1]
A lighting system comprising:
a plurality of lighting sources;
a cooling panel to which a plurality of the light sources are attached;
a spacer disposed such that the spacer is disposed surrounding a plurality of the light sources and being bonded to the cooling panel though a sealing material;
a body which is disposed opposing to an attachment surface of a plurality of the light sources being attached to the cooling panel while comprising a light transparent plate which is connected to the spacer through a sealing material to seal the light source, retaining the plurality of the light sources while comprising a transparent window for escaping the light emitted from the light sources; and
a reflection member being disposed so as to cover a window for reflecting light from outside of the body while a plurality of holes for launching the light emitted from each of the light sources are formed.

[Claim 2]
The lighting system of claim 1, wherein the reflection member is a reflection sheet which is attached to a window and a reflectivity of the reflection sheet is not less than 98 %.

[Claim 3]
The lighting system of claim 1 or 2, wherein a material having a humidity absorption property which is packed in the body.

[Claim 4]
The lighting system of any one from claim 1 to 3, wherein the cooling panel comprises a hollow part at a back side of the attachment surface of a plurality of the light sources and is cooled by a cooling fluid flowing in the hollow part.

[Claim 5]
The lighting system of claim 4, wherein the lighting system further comprises a water flowing tube passed through the hollow part to flow the coolant fluid therein.

[Claim 6]
The lighting system of any one from claim 1 to 3, wherein the cooling panel comprises an engagement part at a back side of the attachment surface for a plurality of the light sources and the water flowing tube is fixed by pressing in the water flowing tube into the engagement part.

[Claim 7]
The lighting system of any one from claim 1 to 3, wherein the cooling panel comprises a heat dissipation fin and a plurality of the heat dissipation fins being arranged at a given spacing at the back side of the attachment surface for a plurality of the light source.

[Claim 8]
A plant cultivation apparatus comprising:
at least one gutter member;
a cultivation shelf to which at least one gutter member is placed slant to a longitudinal direction;
a plurality of the cultivation tray placed adjacent to each other on at least one gutter;
a cultivation solution supply means that supplies the cultivation solution into each of the gutter member; and
a lighting system of any one from claim 1 to 7 for shining light to the plants planted on a plurality of the cultivation tray.

[Claim 9]
The plant cultivation apparatus of claim 8, wherein the plant cultivation apparatus comprises a reflection plate comprising a reflection surface for reflecting the light from the lighting system and the light reflected by a surface of a plurality of the cultivation tray and disposed so as to close a side of a plurality of the cultivation tray to which the plants are planted thereon.

[Claim 10]
The plant cultivation apparatus of claim 8 or 9, wherein the cultivation tray is paced such that the cultivation trays are placed in a series of growth of the plants along with a longitudinal direction of at least one of the gutter member and the gutter member is categorized into at least two region along to the longitudinal direction and the lighting systems comprises at least two lighting systems for the regions each of which comprises

different numbers of light sources determined depending on growth of the plants.

[Claim 11]
The plant cultivation apparatus of any one from claim 8 to 10, wherein the plant cultivation apparatus further comprises gas supply means for supplying oxygen to the cultivation solution,

[Claim 12]
The plant cultivation apparatus of any one from claim 8 to 11, wherein the plant cultivation apparatus is placed in a room and further comprises an air circulation means for circulating the air on the room, a humidity control means for controlling the humidity in the room, and a floating substance removal means for removing the floating substances in the room.