CLAIMS

1. An illumination device, comprising:

an illumination panel configured to be arranged in proximity to an illumination target, the illumination panel comprising a plurality of illumination units, each illumination unit configured to emit at least one electromagnetic radiation directed towards the illumination target;

a reflector extending from at least a part of a perimeter of the illumination panel, the reflector configured to direct a portion of the at least one electromagnetic radiation incident on the reflector towards the illumination target; and

a lens configured to be arranged on at least one electromagnetic radiation source of a plurality of electromagnetic radiation sources within each illumination unit, wherein the lens comprises an outer hemisphere and an inner semi-ellipsoidal cavity,

wherein each illumination unit is spaced apart from a neighboring illumination unit in a first direction by a first pitch,

wherein the reflector is spaced apart from an adjacent illumination unit proximate to the reflector in the first direction by a third pitch, and

wherein the first pitch and the third pitch are relative to each other to provide an electromagnetic radiation distribution based on the type of illumination target.

2. The illumination device of claim 1, wherein each illumination unit is spaced apart from another neighboring illumination unit in a second direction by a second pitch,

wherein the reflector is spaced apart from another adjacent illumination unit proximate to the reflector in the second direction by a fourth pitch, the second direction being perpendicular to the first direction, and

wherein the second pitch and the fourth pitch are relative to each other to provide the electromagnetic radiation distribution based on the type of illumination target.

3. The illumination device of claim 2, wherein the first pitch and the third pitch, and the second pitch and the fourth pitch, are relative to each other to provide a uniform electromagnetic radiation distribution.

4. The illumination device of claim 2 or claim 3, wherein the reflector extends perpendicular to the illumination panel, in a third direction perpendicular to the first direction and the second direction, and towards the illumination target.

5. The illumination device of any one of claims 1 to 4, wherein the reflector extends along an entire perimeter of the illumination panel.

6. The illumination device of any one of claims 2 to 5, wherein the third pitch is adjusted to be less than the first pitch, and the fourth pitch is adjusted to be less than the second pitch.

7. The illumination device of any one of claims 2 to 6,

wherein the first pitch is equal to the second pitch, and

wherein the third pitch is adjusted to be half of the first pitch, and the fourth pitch is adjusted to be a half of the second pitch.

8. The illumination device of any one of claims 1 to 7, wherein each electromagnetic radiation source configured to emit an electromagnetic radiation which is directed toward the illumination target.

9. The illumination device of claim 8, wherein the at least one electromagnetic radiation source is configured to emit the electromagnetic radiation of different wavelength relative to the emitted electromagnetic radiation wavelength of another electromagnetic radiation source within the illumination unit.

10. The illumination device of claim 8 or claim 9, wherein the lens is configured to modify the electromagnetic radiation emitted by the electromagnetic radiation source, to form a modified electromagnetic radiation, which forms at least another part of the portion of the at least one electromagnetic radiation.

11. The illumination device of claim 10, wherein the modified electromagnetic radiation has a modified beam angle.

12. The illumination device of any one of claims 1 to 11, wherein the at least one electromagnetic radiation source is a high-power light emitting diode.

13. The illumination device of any one of claims 4 to 12, wherein a height of the reflector is equal to or less than a distance between the illumination panel and the illumination target, in the third direction, and

wherein the distance between the illumination panel and the illumination target, ranges from 5 to 40 cm, preferably 10 to 30 cm.

14. The illumination device of any one of claims 1 to 13, wherein the illumination target is a horticulture bed.

15. A system for illuminating a horticulture bed, comprising:

an illumination panel configured to be arranged in proximity to the horticulture bed, the illumination panel comprising a plurality of illumination units, each illumination unit configured to emit at least one electromagnetic radiation directed towards the horticulture bed;

a reflector extending from at least a part of a perimeter of the illumination panel, the reflector configured to direct the portion of the at least one electromagnetic radiation incident on the reflector towards the horticulture bed; and

a lens configured to be arranged on at least one electromagnetic radiation source of a plurality of electromagnetic radiation sources within each illumination unit, wherein the lens comprises an outer hemisphere and an inner semi-ellipsoidal cavity,

wherein each illumination unit is spaced apart from a neighboring illumination unit in a first direction by a first pitch,

wherein the reflector is spaced apart from an adjacent illumination unit proximate to the reflector in the first direction by a third pitch, and

wherein the first pitch and the third pitch are relative to each other to provide an electromagnetic radiation distribution on the horticulture bed in operation.

16. The system of claim 15, wherein each illumination unit is spaced apart from another neighboring illumination unit in a second direction by a second pitch,

wherein the reflector is spaced apart from another adjacent illumination unit proximate to the reflector in the second direction by a fourth pitch, the second direction being perpendicular to the first direction, and

wherein the second pitch and the fourth pitch are relative to each other to provide the electromagnetic radiation distribution on the horticulture bed in operation.

17. The system of claim 16, wherein the first pitch and the third pitch, and the second pitch and the fourth pitch, are relative to each other to provide a uniform electromagnetic radiation distribution.

18. The system of claim 16 or claim 17, wherein the third pitch is adjusted to be less than the first pitch, and the fourth pitch is adjusted to be less than the second pitch, preferably the third pitch is adjusted to be half of the first pitch and the fourth pitch is adjusted to be half of the second pitch.

19. A method of manufacturing an illumination device, comprising:

providing an illumination panel configured to be arranged in proximity to an illumination target, the illumination panel comprising a plurality of illumination units, each illumination unit configured to emit at least one electromagnetic radiation directed towards the illumination target;

arranging a reflector extending from at least a part of a perimeter of the illumination panel, the reflector configured to direct a portion of the at least one electromagnetic radiation incident on the reflector towards the illumination target; and

providing a lens configured to be arranged on at least one electromagnetic radiation source of a plurality of electromagnetic radiation sources within each illumination unit, wherein the lens comprises an outer hemisphere and an inner semi-ellipsoidal cavity,

wherein each illumination unit is spaced apart from a neighboring illumination unit in a first direction by a first pitch,

wherein the reflector is spaced apart from an adjacent illumination unit proximate to the reflector in the first direction by a third pitch, and

wherein the first pitch and the third pitch are relative to each other to provide an electromagnetic radiation distribution based on the type of illumination target.