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Auyeung et al.

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(54) **LIGHTING ASSEMBLY WITH MULTIPLE LIGHTING UNITS**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(Continued)

(58) **Field of Classification Search**

None

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2,254,961 A 9/1941 Lawrence et al.

4,235,285 A 11/1980 Johnson et al.

(Continued)

FOREIGN PATENT DOCUMENTS

CA 2615706 A1 9/2006

CN 201925854 U 8/2011

(Continued)

OTHER PUBLICATIONS

“General Catalog—2012,” Thorlux Lighting, Dec. 2012, 164 pages.

(Continued)

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(57) **ABSTRACT**

A method can be used to illuminate a surface that includes a number of non-overlapping portions. The method includes simultaneously illuminating each of the portions so that the surface is substantially uniformly lit. Each portion is illuminated by a respective lighting assembly. Each lighting assembly includes a plurality of LEDs and a plurality of optical elements proximate the plurality of LEDs. For each lighting assembly, when all LEDs of the lighting assembly are operating, the entire portion of the surface is illuminated with an illumination level and a uniformity. Failure of one or more LEDs of the lighting assembly will cause the illumination level of light impinging the portion of the surface to decrease while the uniformity of light impinging the portion of the surface remains substantially the same.

23 Claims, 13 Drawing Sheets

