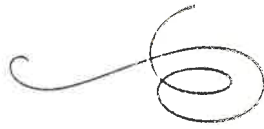


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The Director

of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this United States

Patent

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(12) **United States Patent**
Chung et al.

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(54) **LIGHTING DEVICE FOR MULTIPLE INPUT VOLTAGES**

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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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H05B 45/50 (2020.01)
H05B 45/54 (2020.01)
H05B 45/44 (2020.01)
H05B 45/56 (2020.01)

(52) **U.S. Cl.**
CPC **H05B 45/54** (2020.01); **H05B 45/44** (2020.01); **H05B 45/56** (2020.01)

(58) **Field of Classification Search**
CPC H05B 45/00; H05B 45/44; H05B 45/50; H05B 45/54; H05B 45/56; H05B 47/24; H05B 47/02; H05B 45/30; H05B 45/37; H05B 47/25

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2013/0049600 A1* 2/2013 Kim H05B 45/37 315/122
2014/0312768 A1* 10/2014 Wu H05B 45/48 315/85
2014/0354156 A1* 12/2014 Yang H05B 45/37 315/122
2016/0050724 A1* 2/2016 Moon H05B 45/37 315/200 R
2019/0215919 A1* 7/2019 Fang H02H 9/041

* cited by examiner

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(57) **ABSTRACT**

A lighting device for multiple input voltages is provided. The lighting device for multiple input voltages includes a plurality of driving circuits each being electrically connected with the light-emitting unit. Each of the driving circuits receives an AC input voltage, and converts the AC input voltage into a working voltage for use by the light-emitting unit. Each of the driving circuits includes a surge protection device and a rectifier. The surge protection device inputs the AC input voltage. The rectifier is electrically connected with the surge protection device, and rectifies the AC input voltage into the working voltage through the surge protection device for use by the light-emitting unit. A threshold voltage of each of the surge protection devices to prevent a surge is different from each other, so that the AC input voltage received by the driving circuits are different from each other.

10 Claims, 6 Drawing Sheets

