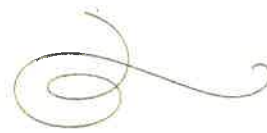


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*of Science and Useful Arts*

## *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*

grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America, and if the invention is a process, of the right to exclude others from using, offering for sale or selling throughout the United States of America, products made by that process, for the term set forth in 35 U.S.C. 154(a)(2) or (c)(1), subject to the payment of maintenance fees as provided by 35 U.S.C. 41(b). See the Maintenance Fee Notice on the inside of the cover.

*Katherine Kelly Vidal*

DIRECTOR OF THE UNITED STATES PATENT AND TRADEMARK OFFICE



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**Chung et al.**

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(54) **LED ILLUMINATING DEVICE WITHOUT USING CAPACITOR**

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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 3 days.

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**H05B 45/345** (2020.01)  
**H05B 45/54** (2020.01)

(52) **U.S. Cl.**  
CPC ..... **H05B 45/345** (2020.01); **H05B 45/54** (2020.01)

(58) **Field of Classification Search**  
CPC ..... H05B 45/20; H05B 45/30; H05B 45/37; H05B 45/44; H05B 45/46; H05B 45/48; H05B 45/52; H05B 45/54  
See application file for complete search history.

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(57) **ABSTRACT**

An LED illuminating device without using a capacitor includes a surge absorber group, a three-phase rectifier bridge module, an LED chip group and a current-limiting chip group. The surge absorber group includes a first surge absorber electrically connected between the first and the second AC power input terminal, and a second surge absorber electrically connected between the second and the third AC power input terminal, and a third surge absorber electrically connected between the third and the first AC power input terminal. The three-phase rectifier bridge module is electrically connected to the first, the second and the third AC power input terminal. The LED chip group is electrically connected to the three-phase rectifier bridge module. The current-limiting chip group is electrically connected to the bridge rectifier group. The LED illuminating device can generate a lighting source through a three-phase power provided by a three-phase power supply.

**10 Claims, 20 Drawing Sheets**

2	{ 21	3	{ 31	7	{ 71	8	{ 81	9	{ 91
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