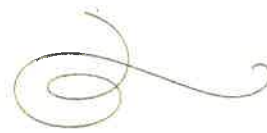


United
States
of
America



To Promote the Progress

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



US011716801B1

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

(10) **Patent No.:** **US 11,716,801 B1**

(45) **Date of Patent:** **Aug. 1, 2023**

(54) **LED ILLUMINATION DEVICE FOR RAPIDLY RELEASING RESIDUAL CAPACITANCE**

(71) Applicant: **PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO., LTD.**, New Taipei (TW)

(72) Inventors: **Chia-Tin Chung**, Miaoli County (TW); **Pei-Chun Liu**, New Taipei (TW)

(73) Assignee: **PARAGON SEMICONDUCTOR LIGHTING TECHNOLOGY CO., LTD.**, New Taipei (TW)

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

(21) Appl. No.: **17/702,805**

(22) Filed: **Mar. 24, 2022**

Foreign Application Priority Data

Jan. 18, 2022 (TW) 111200624

(51) **Int. Cl.**
H05B 45/3725 (2020.01)
H05B 45/40 (2020.01)
H02M 7/06 (2006.01)

(52) **U.S. Cl.**
CPC **H05B 45/3725** (2020.01); **H05B 45/40** (2020.01); **H02M 7/06** (2013.01)

(58) **Field of Classification Search**
CPC H05B 45/3725; H05B 45/37; H02M 7/06
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

10,039,159 B1 * 7/2018 Xiong H05B 45/37
2013/0320880 A1 * 12/2013 Walker H05B 45/3725
363/125
2017/0367158 A1 * 12/2017 Petersen H05K 1/189
2020/0288549 A1 * 9/2020 Hsia H05B 45/357
2021/0227663 A1 * 7/2021 Zhou H05B 45/30

FOREIGN PATENT DOCUMENTS

WO WO-2019062782 A1 * 4/2019 F21K 9/272
WO WO-2020088521 A1 * 5/2020 H05B 45/3578

* cited by examiner

Primary Examiner — Abdullah A Riyami

Assistant Examiner — Syed M Kaiser

(74) *Attorney, Agent, or Firm* — Li & Cai Intellectual Property Office

(57) **ABSTRACT**

An LED illumination device for rapidly releasing residual capacitance, which includes a bridge rectifier chip, a current-limiting chip, a light-emitting group, a resistor group and a capacitor. The light-emitting group includes a plurality of first and second LED chips. The resistor group includes a plurality of first and second resistor chips. The first working voltage of the first LED chip is different from the second working voltage of the second LED chip. The first resistance value of the first resistor chip is different from the second resistance value of the second resistor chip. Each first LED chip corresponds to one of the first resistor chips, and each second LED chip corresponds to one of the second resistor chips. When the power supply is turned off, the residual capacitance remaining in the capacitor can be released by cooperation of the first resistor chips and the second resistor chips.

10 Claims, 7 Drawing Sheets

